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Learning about design in context: an  
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constructivist learning environment  
created to support authentic design  
activities

Susan Jane Bennett  
University of Wollongong

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**Learning about design in context: An investigation of learners'  
interpretations and use of real-life cases within a constructivist  
learning environment created to support authentic design  
activities**

A thesis submitted in fulfilment of the  
requirements for the award of the degree

Doctor of Philosophy

from

University of Wollongong

by

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Faculty of Education  
2002

## **Declaration**

I, Susan Bennett, declare that this thesis, submitted in fulfilment of the requirements for the award of Doctor of Philosophy, in the Faculty of Education, University of Wollongong, is wholly my own work unless otherwise referenced or acknowledged. The document has not been submitted for qualifications at any other institution.

Susan Bennett

17 April 2002

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## **Abstract**

Teachers and designers in a range of disciplines are interested in engaging their students in authentic activities that reflect the experiences of practitioners and have begun to explore the potential of cases to present the complexity of real-world situations. Despite a long tradition of cases in legal, medical and business education, there is little empirical research on which to base the design and implementation of case-based approaches. This study addresses this gap by investigating learners' understanding of multimedia design and development derived from the analysis of two real-life cases, and how this understanding supports learners in their own design projects.

A qualitative case study approach was used to follow a class of graduate-level students enrolled in a technology-supported, case-based subject designed using Jonassen's (1999) model for a constructivist learning environment. The study was guided by three key questions: (1) How do learners interpret the case materials? (2) How do learners develop solutions to their project design tasks? (3) What aspects of the projects and cases do learners reflect on at the end of the subject? Student work from case analysis, group project and reflective tasks was collected as a key data source. This was complemented by interviews with students and their instructor, observations by the researcher at class meetings, and the collection of documents, such as discussion list records and subject files. Data analysis was guided by the research questions, but also sought to identify emergent themes and issues.

The study found that the case analysis task produced a diverse range of responses from students, both in terms of the issues discussed and the type of responses elicited. Learners found the cases useful in raising their awareness of project issues, and suggesting design approaches and management strategies. The critical role of discussion and reflection in developing students' understanding of multimedia design and development emerged. The study also revealed some of the limitations of the case approach and highlighted the need for strategies that support learners' thinking and reasoning. The findings have implications for the design of cases and suggest avenues for further research.

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# **Chapter One**

## **Introduction to the Study**

### ***1.1 Introduction***

Many teachers recognise the value of involving their students in tasks that reflect the way knowledge and skills are used in practice. The challenge is to design learning environments that incorporate these authentic activities and the realistic contexts needed to support them. One popular method for illustrating the complexities of real life is with cases that present detailed accounts of situations through the actions of key characters, the issues that arise and the outcomes that eventuate. Despite the widespread use of case methods across a variety of disciplines, there is little research to support claims for its effectiveness and little is known about how learners make use of case materials.

This study investigated learners' experiences of a technology-supported, case-based learning environment developed for a graduate subject in which student teams designed and developed multimedia packages for real clients. The aim of the study was to gain a fuller understanding of the different ways in which learners interpret contextually rich case-based materials and how they use that understanding in their own projects. It is hoped that this improved understanding will inform the design of these types of case-based learning environments, particularly so that appropriate support can be provided to learners.

This chapter outlines the purpose and context of this study by explaining the background to the investigation, the setting in which it was conducted, the research strategy adopted, the questions that guided the inquiry, and the significance and limitations of the findings. The final section provides an overview of the remaining chapters in this thesis.

## **1.2 Background to the study**

Many theorists argue the importance of providing students with authentic experiences - experiences that reflect real-world ways of knowing and doing. It is thought that such experiences allow learners to transfer knowledge from formal education to practice, and so provide opportunities for meaningful learning. These ideas are based on recent re-conceptions of learning which suggest that:

- people transfer learning with difficulty, needing both context and content learning
- skills and knowledge are best acquired within realistic contexts
- assessment must take more realistic and holistic forms (Grabinger, 1996, p. 667).

In creating learning environments to support these authentic activities, designers must consider how to bring experiences that reflect the nature of real-world practice into formal educational settings. The learning designs that have emerged draw on constructivist and situated theories of learning as a theoretical basis and make use of multimedia and Internet technologies. These highly contextual learning experiences and environments aim to support learning by:

- providing learners with access to dynamic, real-life data sources which they can manipulate and analyse (Natesan & Smith, 1998)
- setting information and activities within realistic environments and situations, for example through information landscapes and virtual reality (Cognition and Technology Group at Vanderbilt, 1997; Harper & Hedberg, 1997; Herrington & Oliver, 1997; McLellan, 1991)
- incorporating computer-based cognitive support tools, such as concept mapping, statistical software and communication tools (Jonassen, 1996; Jonassen, Previs, Christy & Stravrulaki 1999).

These learning environments present rich, detailed descriptions of complex, realistic situations as a stimulus for analysis and/or problem-solving activities. Various forms of situation-specific materials, or cases, have long been used in legal, medical and business education, and more recently have become popular in a host of other disciplines. This has

seen the emergence of both distinctive forms, such as the problem-solving approach developed by Barrows (1994), and significant innovations, such as case writing activities in teacher education programs (Kagan, 1993).

Although much attention has been paid to evaluating and developing particular styles of case-based learning (Albanese & Mitchell, 1993; Christensen, 1987) there has been little in the way of empirical research investigating what students learn from different genres of cases and instructional methods used (Grossman, 1992). Recent research work, particularly in the area of teacher education, has begun to reveal more about the outcomes of various case-based approaches, but these are yet to form a well-connected body of knowledge. In particular there is still much to be learned about how individuals respond to case-based learning (Ertmer, Newby & MacDougall, 1996).

This study sought to address this gap in the research by investigating how learners in a graduate level education subject developed their understanding of multimedia design and development through analysis of two real-life cases, and how they then applied that knowledge to the design of their own projects. This setting also provided an opportunity to explore the potential for cases to bring students into contact with the complexities of real-life instructional design problems which are typically ill-defined and require the application of situational knowledge (Ertmer & Russell, 1995; Rowland, Fixl & Yung, 1994). The use of cases in instructional design education is relatively new and therefore there has been little research work in this area on which to build. This situation suggested that the study should be of an exploratory nature.

### ***1.3 Research strategy and context***

The exploratory nature of this study made it well-suited to a qualitative approach. As Creswell (1994) suggested, qualitative techniques are useful for exploring research problems on topics about which little information exists – specifically when variables are not known, context is important and the theoretical base is undeveloped. Furthermore, the focus on understanding more about students' individual interpretations is consistent with an



emphasis on the participants' perspectives, which is also a feature of a qualitative mode of inquiry.

The investigation used a case study approach that allowed the researcher to undertake a detailed examination of the setting. This strategy was chosen for its strength in addressing the 'how' and 'why' questions within real-life contexts, of particular relevance in situations such as this one, in which "the boundaries between the phenomenon and context are not clearly evident" (Yin, 1994, p. 13).

The investigation was set within the context of a graduate-level subject in which students formed collaborative project teams. Each team worked with a real client to develop a solution to an educational or training problem. Jonassen's (1999) model for a constructivist learning environment provided a framework for the overall learning design. A key feature of this model is the inclusion of related cases as resources to support authentic project activities. The design of the materials and activities was informed by the conceptual and research literature on case-based learning and by pilot testing with two class groups.

Two cases were chosen for full development, each focusing on a multimedia CD-ROM product developed by the Interactive Multimedia Learning Laboratory at the University of Wollongong. The case materials included: an overview, a timeline, interviews with key informants and access to original documents and prototypes. These resources were developed from interviews with project staff and examination of archival materials including project diaries, meeting notes and communication records. A three-phase learning design was developed incorporating individual and group activities that would assist students develop their understanding of multimedia design.

The study followed the students through each of the three phases. During the first phase the learners analysed the cases through individual and collaborative tasks. Of particular interest at this stage were differences in the ways the learners interpreted the cases and approached the analysis task. The study then followed the students through the second phase as they worked in teams to develop their projects. This task sought to provide them with experience

with authentic design problems. The focus of the investigation at this stage was to understand the context of the project experience for each team, and where possible identify influences of the case projects. The final phase of the learning design required learners to reflect on their project experiences by preparing an individual paper and a collaborative case. This stage of the investigation was concerned with the aspects of the project experience learners focused on and the connections they made with the cases.

All 12 students enrolled in the campus-based subject, offered in Spring Session 2000, participated in the study. Student work and interviews comprised the primary data sources for the study. Student work was sourced from writing and discussion activities and multimedia design tasks. Semi-structured interviews with participating students provided further insights into the way learners interpreted and made use of case materials. Observations made during class meetings and records of electronic discussions provided additional sources of information, which supported interpretation of other data. The researcher's own reflections were also recorded throughout the investigation.

After the data collection was complete, written and assessment work and interview transcriptions were coded and analysed to identify categories and themes. Coding schemes for students' written and interview responses were derived from emergent themes in the data and the research sub-questions. Coding for assessment work was based upon emergent themes, assessment criteria and evaluation protocols from the literature as appropriate.

## ***1.4 Research questions***

The study was guided by a broad research question: How do learners use contextual information presented in cases to construct meaning and solve problems? This addresses one of the central claims in the literature - that from the study of particular cases learners develop knowledge that is useful when they are faced with similar problems.

From this central question, sub-questions were developed which, in keeping with the qualitative approach taken, evolved over the course of the study. These questions, listed below, probe different facets of learners' interpretations of case information and the

relevance of the cases to the design and development of learners' own projects. The questions relate to the three phases of the learning design – analysis, project and reflection – and explore the nature of these activities and the outcomes for the learners.

### **Question 1: How do learners interpret the case materials?**

This question was concerned first of all with investigating what students learned from the cases. In particular, with determining the ideas they developed about the project development process, the design and management issues they focused on, how they related the case projects to their previous experiences, the similarities and differences they identified, and the general principles they derived in their analyses.

The question also encompasses how learners approached the task and what types of responses they gave. For example, did they tend to describe the case events or did they try to interpret beyond the information given? Also, what kinds of strategies did they use when working on the case analysis task? How did they use the case documents and other resources provided? The role of the discussion activities – small group and whole class – in helping learners develop their interpretations of the cases was also considered.

### **Question 2: How do learners develop solutions to their project design tasks?**

The study was also concerned with following the development of the group design projects. In addressing this question the researcher considered how the teams defined their design problems and presented proposed solutions in their design statements, how they realised their ideas in their prototypes, and the issues they faced in working on the projects. As the main focus of this study was on the interpretation and use of cases, this line of inquiry provided the contextual data needed to understand the learners' reflections, rather than to investigate collaboration and group work.

### **Question 3: What aspects of the projects and cases do learners reflect on at the end of the subject?**

Learners' reflections at the end of the subject provide insights into how their project experiences helped them to further develop their understanding of multimedia design and development. Also of interest were the links learners made between their project experiences and those presented in the case projects.

## **1.5 Significance and limitations of the study**

The study makes a contribution to the research on case-based methods by:

- addressing the significant gap between theory and practice which results from limited investigation of the learners' experiences of case-based learning
- seeking to understand more about how individual learners make use of case resources to build their own understanding and how they apply that knowledge to new situations
- providing an in-depth account of a situation and its particulars such that other researchers can make comparisons with their own findings
- considering the implications of the different approaches adopted by learners for the design of case-based learning environments and the support needed by learners.

While the case study approach offers an opportunity to explore a situation in depth, a number of limitations are associated with the method, namely the inability to generalise from the findings and the influence of the researcher's own subjectivities.

A case study such as this one investigates a complex situation that is bounded in terms of place, time and participants. Although some studies claim to focus on typical cases, drawing general conclusions from a specific situation with all of its attendant variables and interactions is hazardous (Borg & Gall, 1989). Generalisations to other situations of the kind made on the basis of statistical analyses are not possible from a single case study like this one, given the small number of participants and teams. The findings of this investigation acknowledge the uniqueness of the research context, and the limited transferability of conclusions and implications to other settings.

The role of the qualitative researcher who observes and interacts with participants, and collects and analyses data as the main research instrument contrasts to the objectivity and impartiality valued in the quantitative investigator. This feature of qualitative research raises the issue of subjectivity in data collection and interpretation in that the evidence collected and the conclusions drawn come from a single perspective. While this may be seen as a critical flaw in the qualitative approach, Peshkin (1988) argued that a researcher

should systematically identify the ways in which his or her subjectivities shape an inquiry and its outcomes, and report these influences with the findings for scrutiny by readers. To address these concerns a description of the researcher's background and beliefs about teaching and learning are included in Chapter Three of this thesis, and the details of the strategies and protocols used throughout the study are made available to readers.

## ***1.6 Structure of thesis***

This opening chapter has outlined the origin and rationale for the study and provided an overview of the investigation. The remaining chapters expand on the issues raised in more detail. Chapter Two provides a review of the relevant literature focusing on current thinking about the benefits of authentic activities and contexts, and the design and implementation of case-based learning. Chapter Three describes the research design and details the qualitative case study approach that was taken. It also describes the design and development of the learning environment, including the cases, resources and activities. The results and details of the data analysis processes used are presented over three chapters. Chapter Four covers the learners' interpretations of the case materials, Chapter Five the group project experiences and Chapter Six the learners' reflections. The final chapter, Chapter Seven, presents the findings in response to the research questions, discusses the implications for practice and suggests possibilities for further research work. Supporting documents to which readers may wish to refer are included in the appendices at the end of this volume and in electronic form on the accompanying CD-ROM.

## **Chapter Two**

### **Literature Review**

#### **2.1 Introduction**

This chapter examines the research and conceptual literature that provides a background for this study. The first section provides an overview of the relevant literature in relation to current practice. Section 2.3 examines theories that underpin ideas about authentic activities and contexts. This is followed by an examination of the literature on case-based learning, describing traditional approaches from which current applications have developed, and discussing recent research and development in instructional design and teacher education programs. The closing section of the chapter sets this particular study within that body of literature.

#### **2.2 An overview**

Many teachers recognise the value of involving their students in tasks that reflect the way knowledge and skills are used in practice. This reflects a long-held concern for linking conceptual knowledge and its real life application.

Early last century Alfred North Whitehead and John Dewey criticised the prevailing practice of education. Whitehead (1929) was concerned that learning in school resulted in knowledge that could not be applied to the outside world, making it ‘inert’ rather than active. He proposed an alternative view of education as “the acquisition of the art of utilization of knowledge” (p. 4). Similarly, Dewey (1938) described genuine education as arising from experience. He argued, however, that not all experiences are of equal educational value and that traditional school-based education was dominated by the wrong kinds of experiences, wrong in that they fail to prepare students for life. According to Dewey, school-based learning segregated knowledge by disconnecting it from application, and so making it unavailable when required later in real-life situations.

The disconnection between school and everyday learning was again raised by Resnick (1987a), who compared learning in the classroom with learning outside of school. She described the latter as being collaborative, contextualised and concrete – in marked contrast to much of the learning taking place in schools at that time. Furthermore in considering how ‘higher order skills’ might be taught more effectively, Resnick (1987b) suggested that learning the way skills, such as problem-solving, are used within a discipline is preferable to learning general problem-solving strategies. Locating skills within a discipline, she argued, provides a natural knowledge base and environment for practice in which the social community plays a role in establishing the norms of behaviour.

Two recent developments have prompted designers and teachers to investigate new ways of bridging the gap between formal education and real-life practice. One is the shift towards situated and constructivist views of learning which emphasise the importance of engaging learners in authentic activities set within meaningful contexts. The other is the advent of multimedia and Internet technologies that have made possible the creation of highly sophisticated computer-based learning environments.

These applications seek to engage learners with problems and challenges that reflect the way knowledge is used in real-world practice. For example:

- In *Exploring the Nardoo* learners apply scientific concepts and collect information from a virtual river environment to solve problems. The package incorporates high-quality visual media, measuring tools with which learners can interrogate the environment, and cognitive tools to help learners develop and present their ideas (Harper & Hedberg, 1997).
- Pre-service teachers use multimedia resources contained in the *Investigating Assessment Strategies in Mathematics Classrooms* package to determine appropriate mathematics assessment strategies for realistic classroom situations. The tasks take the form of a verbal report suitable for a staff meeting and a written proposal that might be made to the school principal (Herrington & Oliver, 1997).

- The *Jasper Woodbury Problem Solving Series* consists of video-based adventures that engage learners with complex, realistic problems. To solve the mathematical problems learners must generate relevant sub-problems and collect the necessary data from the video (Cognition and Technology Group at Vanderbilt, 1992; 1997).
- In the *Aggregate Planning Web Site* learners encounter ill-structured problems derived from practice. They develop their solutions by referring to related cases and information resources, supported by cognitive and collaborative tools (Jonassen et al., 1999).

These applications embed situation-specific information within the learning environment that mirrors aspects of the real world which learners explore and manipulate to develop their understanding of the relevant discipline. Learning from situations, or cases, has long been popular in medicine, law and business to represent the complexities of real life practice and is becoming increasingly common in other fields. Cases present detailed accounts of situations through the actions of key characters, the issues that arise and the outcomes that eventuate. Cases are also used as a starting point for problem-solving activities, particularly in domains that are complex and ill-structured.

Despite the long history of case-based instruction and a significant body of conceptual literature advocating its use, there has been little evaluation of its various forms (Knirk, 1991; Sykes & Bird, 1992). In particular little is known about how individual learners interact with case materials or use knowledge of cases in subsequent situations (Ertmer et al. 1996; Kagan, 1993). This study aims to address this gap by investigating how learners in a graduate level instructional design subject develop their understanding of multimedia design from case materials and then apply this knowledge to their own design projects.

This chapter reviews the conceptual and research literature that forms a basis for this study by providing insights into the design and implementation of cases, and the potential for case-based methods to support authentic activities. The remainder of this chapter is structured in three main parts. The first examines various perspectives on authentic activities and contexts. The second part explores the conceptual literature describing the



design and implementation of cases and the findings from relevant research studies. The third and final section describes how this literature informed the design of the learning environment investigated in this study.

## **2.3 Authentic activities and contexts**

Designers and teachers aiming to involve their learners in authentic activities and contexts draw on a variety of different theoretical perspectives (see for example recent proceedings from the ED-MEDIA (Montgomerie & Viteli, 2001) and ASCILITE (Kennedy, Keppell, McNaught & Petrovic, 2001) conferences. The following sections examine how interest in authentic activities and contexts has arisen from research on knowledge transfer and contemporary learning theories, and then examines different ideas about what is meant by ‘authentic’.

### **2.3.1 Transfer of knowledge**

Theorists have emphasised the role of context in teaching and learning, and of particular interest has been its effect on the transfer of knowledge and skills from one context to another (see for example Berryman, 1993; Gick & Holyoak, 1980, 1983; Perkins & Salomon, 1989).

Traditional educational practices based on associationist traditions (such as behaviourism) view learning as a process of actively forming, strengthening and adjusting associations between stimuli and response. The response to stimuli in a new situation is determined by similarities to previously learned stimulus-response associations (Greeno, Collins & Resnick, 1996). Irrelevant stimuli that might distract learners are removed, producing simplified contexts from which many of the features of everyday situations have been eliminated.

However, much of the research on transfer suggests “thinking at its most effective depends on specific, context-bound skills and units of knowledge that have little application to other domains” (Perkins & Salomon, 1989, p. 19). Thus the practice of decontextualising and fragmenting learning destroys sense-making and inhibits transfer to new situations because

it prevents learners from developing a sound understanding of knowledge and skills (Berryman, 1993).

Perkins and Salomon (1989) suggested that this does not mean that transfer cannot occur. They proposed two mechanisms by which transfer can be supported. ‘Low road’ transfer, which results in near-automatic performance under similar conditions, requires extensive practice in a large variety of situations. ‘High road’ transfer, that allows people to respond to novel situations, requires “the deliberate, usually metacognitively guided and effortful, decontextualisation of a principle, main idea, strategy or procedure” (Perkins & Salomon, 1989, p. 126). In addition to an ability to draw generalisations learners also need to discriminate between situations to guard against over-generalisation (Cree & Macaulay, 2000).

Traditional educational approaches that have encouraged only limited transfer, of the kind Perkins and Salomon refer to as ‘low road’, “mattered less in traditional workplaces because tasks were narrowly defined” (Berryman, 1993, p. 386). However these approaches do little to prepare students for the modern workplace in which workers are expected to draw on knowledge from multiple domains in response to ill-defined situations.

This deficiency has led many teachers and designers to draw on constructivist and situated theories to learning to inform their designs (see for example Barab, Squire & Dueber, 2000; Bird, 2001; Harper & Hedberg, 1997; Herrington & Oliver, 1997; Kearney & Treagust, 2001). The role of context in learning from these two perspectives is examined below.

### **2.3.2 A constructivist perspective**

While the term ‘constructivism’ embraces a diversity of views, there is general agreement between theorists that “learning is an active process of constructing rather than acquiring knowledge” and in turn “instruction is a process of supporting that construction rather than communicating knowledge” (Duffy & Cunningham, 1996, p. 171). Furthermore “the learner brings an accumulation of assumptions, motives, intentions and previous knowledge” to the teaching/learning situation (Biggs, 1996, p. 348).

In developing a definition of constructivism, Duffy and Cunningham (1996, pp. 178-181) noted seven grounding assumptions:

1. All knowledge is constructed, all learning is a process of construction.
2. Many world views can be constructed, hence there will be multiple perspectives.
3. Knowledge is context dependent, so learning should occur in contexts to which it is relevant.
4. Learning is mediated by tools and signs.
5. Learning is an inherently social-dialogical activity.
6. Learners are distributed, multidimensional participants in a sociocultural process.
7. Knowing how we know is the ultimate human accomplishment.

In a more detailed discussion of the third assumption above, that knowledge is context-dependent, Duffy and Cunningham explained, “the question of context is really a question about what aspects of the context must be represented if the learning (knowledge) is to be used (elicited?) elsewhere” (1996, p. 179).

Many designers of constructivist learning environments believe that learning should take place in realistic settings that allow learners to make use of specific contextual information to construct their own meanings (Atkins, 1993). Furthermore it is through engaging in real-world tasks within such environments that learners most effectively develop expertise (Honebein, Duffy & Fishman, 1993; Jonassen, Mayes & McAleese 1993).

However not all agree that contextualisation should be considered a key characteristic of constructivist learning. Simons (1993) argued that context is only of secondary importance and that experience with ‘high context’ learning environments can cause learning to remain bound to one or a few contexts precisely because no decontextualisation occurs. He contended that both contextualisation and decontextualisation are essential.

### 2.3.3 A situated perspective

Advocates of situated cognition believe that “thinking is an interaction between an individual and a physical and social situation” (Greeno, 1989, p. 135). Learning comes about through active participation in a situation rather than being an activity that occurs inside an individual’s mind. From the situated perspective the context in which learning takes place is an integral part of the learning process.

In their influential paper, Brown, Collins and Duguid (1989) compared everyday and school-based learning arguing that the latter is limited by the assumption that knowledge can be abstracted from the learning environment and transferred to new situations. The authors criticised common classroom practice for removing contextual information as ‘noise’ and for emphasising ‘approved’ approaches to learning.

The alternative view of learning offered by Brown et al. (1989) is of a process of enculturation into the community of practice, which involves students in authentic activities using the conceptual tools of the domain. They advocated cognitive apprenticeship as a means of moving learners from embedded activity to generality. This reflected Lave and Wenger’s (1991) characterisation of learning as a process of moving from ‘legitimate peripheral participation’ toward fuller participation in the community of practice.

Situated learning has been a source of ongoing debate (see Anderson, Reder & Simon, 1996, 1997; Greeno, 1997) with critics arguing that its claims are overstated and misleading. Although fundamental disagreement over the meaning of situated cognition makes it difficult to find any common ground, the debate does raise several key questions:

- Does learning need to occur in the situation of its intended application? What does this mean for the mismatch between formal education and practical knowledge?
- Is knowledge about one situation of use in other situations?
- What kinds of abstractions and generalisations about a situation are useful?
- What is the role of the wider social environment in learning?

Laurillard (1993) argued against a purely situated approach using as a basis her definition of academic knowledge as having a second-order character - as being concerned with descriptions of the world in addition to direct experience. She suggested that while it is important not to decontextualise knowledge completely, “academic learning should occupy the middle position of an activity that develops abstractions from multiple contexts” (p. 19). This reflects the notion that the most desirable outcome of academic learning is characterised by Biggs (1996) as ‘extended abstract’ in which “the integrated whole at the relational level is reconceptualised at a higher level of abstraction, which enables generalisation to a new topic or area.” (p. 353).

### **2.3.4 Making sense of these multiple views**

The research on transfer and contemporary views of learning discussed above suggests that understanding comes through both knowledge of specific situations and general principles. Advocates for learning in context argue for the creation of experiences and environments that bring learners into contact with the way knowledge is applied. Many suggest that these experiences should reflect real-world ways of knowing and doing, and attributes of the context of use. Some, however, are concerned that knowledge should not be bound too closely to a particular situation as to render it useless in others, and warn that learners need support to abstract principles from those contexts.

These different ideas show that there is no one theoretical view, nor are there definitive research findings to guide the designer. Instead there are multiple perspectives, each offering different interpretations but, as noted by Barab and Duffy (2000), having underlying similarities that can advance thinking about the design of learning environments.

### **2.3.5 The nature of ‘authenticity’**

Similarly various are the perspectives on ‘authenticity’ of activities and contexts that appears in much of the constructivist and situated literature. As noted in the previous section many theorists argue the importance of providing students with authentic experiences. What makes an activity or context ‘authentic’ and how can these kinds of experiences be designed and supported?

Designing for authenticity requires attention to both the activities the learners will engage in and the representation of the real-life context, which reflect ‘cognitive’ and ‘contextual’ perspectives respectively (Squires, 1999; Sugrue, 1999).

Some researchers have identified general features thought to foster authentic learning. Activities are authentic if they reflect the nature of real problems as being complex, ill-structured, collaborative, containing multiple perspectives, and offering multiple paths and solutions (Squires, 1999; Young, 1993). Alternatively an authentic activity may simply be one that is personally meaningful to the learner - that is engaging and relevant in a way that assists in meaning-making (Jonassen, 1999).

Other researchers have argued that emphasis should be placed on engaging students in cognitive processes that reflect the real-world counterpart and not the “real-world trappings” (Anderson et al., 1996, p. 9). Learners should be involved in the same types of cognitive challenges as are present in the work environment, but not necessarily in exactly the same tasks an expert practitioner would perform (Savery & Duffy, 1995). Learners should be encouraged not just to do what practitioners do, but to think like them - as Biggs (1989) put it “Rote learning scientific formulae may be one of the things scientists do, but it is not the way scientists think” (p. 10).

Honebein, Duffy and Fishman (1993) argued against labelling learning environments as authentic or not, and suggested instead that an activity is not inherently authentic, but authentic only in relation to some other activity. They propose three critical features of an authentic task:

- Ownership by the learner is supported to promote the development of metacognitive skills needed for everyday learning.
- It is set within a larger context of real-world use (“the global task environment”) that gives a project and its sub-tasks meaning.
- It offers the opportunity to “generate and evaluate alternative perspectives” (p. 92)

This second point refers to the need for ‘contextual’ authenticity. Honebein et al. (1993) have argued for a realistic level of complexity in the ‘simulation’ environment and for the learner to be exposed to a variety of relevant contexts. They added that it might be particularly important to provide novice learners with a context for a task because they lack the experience to generate a meaningful context for themselves. The context should reflect as much as possible of “what students will encounter outside school in terms of tools, complexity and interactions with people” (Grabinger, 1996, p. 670). To achieve this designers must consider the various attributes of the real-world setting including the “physical, organizational, cultural, social, political and power issues related to the application of the knowledge being learned” (Jonassen, Davidson, Collins, Campbell & Bannan Haag, 1995, p. 13).

Learning environments that incorporate authentic tasks and contexts in this way have been termed ‘practice fields’ which are “separate from ‘the field’ but they are contexts in which learners ... can practice the kinds of activities that they will encounter outside of schools” and “every attempt is made to situate these authentic activities within the environmental circumstances and surroundings that are present” in the real world (Barab & Duffy, 2000, p. 30).

One approach has been to create ‘virtual worlds’ through video, multimedia and virtual reality technologies (Harper, Hedberg & Wright, 2000). Studies of such environments have suggested that learners find these representations comprehensible, engaging and motivating (Cognition and Technology Group at Vanderbilt, 1992; Wright, Hedberg & Harper, 1998). Furthermore, the potential to create immersive three-dimensional environments using virtual reality technology has sparked interest not only for situations requiring a high level of sensory fidelity to develop practical skills (see for example McLellan, 1991), but also to support learners participating in communities of practice (Hedberg & Alexander, 1994).

Computer technology also offers opportunities to integrate support tools into a learning environment. For example, in situations that focus on developing or applying conceptual knowledge or skills, such as critical thinking or problem solving, cognitive tools may be

included to scaffold learners' reasoning and decision-making (Jonassen, 1996; Jonassen & Reeves, 1996). In other learning situations social interaction and negotiation may be crucial, for which Internet-based discussion tools may play a role (Bonk, Malikowski, Angeli & Supplee, 1998).

For the purposes of this study 'authenticity' is considered to derive from the way in which the learning activities reflect those that practitioners undertake in the real world. Thus, the aim is to bring the contextual factors, such as the types of problem, the relationships, and the roles and functions, from the real-world situation into the formal learning environment.

### **2.3.6 Instructional strategies for authentic learning**

Specific instructional strategies to support authentic activities have also been suggested, with many authors advocating the use of case-, problem- and project-based learning (see for example Duffy & Cunningham, 1996; Jonassen et al., 1993; Savery & Duffy, 1995). Duffy and Cunningham (1996) suggested that cases in particular could be used as the stimulus for authentic activities by extending the approach used in medical education to other kinds of problem-solving. This, argued the authors, would correctly place the focus on the activities of the learner within the content domain. With the instructor providing support in the role of coach, learners discover the conditional application of knowledge because "the situated context structures knowledge appropriate to its uses" (Jonassen et al., 1993, p. 239).

Jonassen (1999) extended these ideas, presenting a framework for supporting learners as they work on authentic activities in the form of cases, problems or projects. A key feature of this model is the use of related cases as resources. These cases present solutions to similar past problems that can compensate for learners' lack of experience and help them develop an understanding of concepts and strategies useful in similar situations.

To determine what form these cases might take and how they might be integrated into the learning environment as a basis for, or in support of, authentic activities, it is necessary to review what is known about designing and implementing cases for learning.



## **2.4 Case-based learning**

The use of cases for learning is not new. Case-based instruction has a firmly established tradition in professional disciplines such as law, business and medicine, most notably at Harvard University (Sykes & Bird, 1992). Recently, cases have found application in other disciplines, such as teacher education, educational psychology and instructional design (Ertmer & Russell, 1995; Kinzie, Hrabe & Larsen, 1998).

Although case-based learning has developed a variety of interpretations and applications, the approach is most broadly defined as requiring “students to actively participate in real or hypothetical problem situations, reflecting the kind of experiences naturally encountered in the discipline under study” (Ertmer & Russell, 1995, p. 24).) A teaching case is “a story, describing or based on actual events and circumstances, that is told with a definite teaching purpose in mind and that rewards careful study and analysis” (Lynn, 1999, p. 2).

The discussion that follows examines the reasons forwarded for adopting case-based learning, traditional approaches to and recent innovations in the application of cases to learning, and relevant research studies investigating case-based learning and their findings.

### **2.4.1 Rationale for a case-based approach**

The two most commonly espoused reasons for adopting a case-based approach to learning are:

- to enhance expertise through “the development of professional, intellectual and behavioural skills”
- to understand the relationship between theory and practice by “interpreting real-world experience” (Lynn, 1999, p. 3).

Cases contribute to the development of professional expertise by involving the learner (usually a novice) in a complex, authentic situation “that depict[s] the world of work” (Hudspeth, 1991, p. 64) using job-related problems faced by practitioners (Stolovitch & Keeps, 1991).

This reflects a view that learning is a process of moving towards greater expertise and of case-based learning as a natural extension of our ability to learn from previous experience (Schank & Cleary, 1995). Experts are people with a store of previous cases upon which they draw when confronted by a new situation. They do this through a process of ‘case-based reasoning’ which:

...can mean adapting old solutions to meet new demands, using old cases to explain new situations, using old cases to critique new solutions, or reasoning from precedents to interpret a new situation (much as lawyers do) or create an equitable solution to a new problem (much as labor mediators do) (Kolodner, 1993, p. 4).

Case-based instruction should be designed to encourage learners to compare a new situation to previous experiences by looking for matching characteristics and then adapting old solutions to create a new one (Riesback, 1996). It is thought that in order to successfully retrieve previous cases learners must label (or index) them appropriately at the time of learning - the goal of learning being to use that knowledge in a new situation.

Cases also help learners connect theory and practice. They offer a means to contextualise learning in a way that connects content and action so as to help learners link the theory and rules of performance with actual practice in particular situations (Christensen, 1987; Hudspeth & Knirk, 1989). Learners analyse a real-life situation based on contextual data provided to identify key issues and evaluate outcomes, and then move beyond the case to consider issues more broadly (Miller & Kantrov, 1998).

This process of analysis is particularly important in complex, ill-structured knowledge domains in which problems tend to be ambiguous and there are many situation-specific factors to consider. Multiple representations presented through cases help learners develop the conditional knowledge needed to operate in these domains because they retain the complexities and contradictions inherent in realistic situations (Spiro & Jehng, 1990). When combined with meaningful real-world tasks and expert coaching, a case-based approach can provide deeper insights into processes and practices used to tackle ill-structured problems (Jonassen et al., 1993).

These perspectives emphasise case-based learning as supporting higher-level objectives, such as judging, evaluating and problem-solving. Case formats range from brief vignettes that describe a single problem incident to richly detailed accounts that take the learner from the initial problem through to its resolution (Hudspeth & Knirk, 1989). Case analysis is thought to help learners develop a range of skills that allow them to (Knirk, 1991; Stolovitch & Keeps, 1991):

- diagnose particular problematic situations
- identify the range of issues involved in a specific case
- make decisions and develop solutions
- formulate principles for handling future situations.

### 2.4.2 Three traditions of case-based learning

Case-based instruction has developed through practice over the last century and has given rise to three traditional approaches – in law, medicine and business. Table 2.1 summarises the main features of each (derived from Barrows, 1994; Barrows & Tamblyn, 1980; Lynn, 1999; Ogden, 1984; Sykes & Bird, 1992; Williams, 1992).

| Table 2.1 Three traditional approaches to case-based learning |  |  |  |
|---|--|--|--|
| Features  | Law  | Medicine   | Business   |
| Origin  | Harvard Law School   | McMaster University  | Harvard Business School  |
| Aim of case approach  | <ul style="list-style-type: none"> <li>▪ To develop legal reasoning skills needed to analyse previous cases (legal precedents)</li> <li>▪ To learn how to ‘think like a lawyer’</li> <li>▪ To apply knowledge and explain reasoning</li> </ul> | <ul style="list-style-type: none"> <li>▪ To develop clinical reasoning skills needed to manage a patient’s health problems</li> <li>▪ To learn how to ‘think like a clinician’</li> </ul>                | <ul style="list-style-type: none"> <li>▪ To link knowledge and its application</li> <li>▪ To apply knowledge to new situations</li> <li>▪ To draw together a diverse knowledge base</li> </ul>   |
| Scope of case   | <ul style="list-style-type: none"> <li>▪ A matter before a judge or a written record</li> <li>▪ A real legal case</li> <li>▪ Usually in textual format</li> </ul>  | <ul style="list-style-type: none"> <li>▪ A patient with symptoms requiring diagnosis and treatment</li> <li>▪ Presented as written records and sometimes a role play using simulated patients</li> </ul> | <ul style="list-style-type: none"> <li>▪ A situation confronting an administrator or manager</li> <li>▪ Presented as a textual narrative that includes rich detail and data</li> <li>▪ Defined by the teacher/case writer rather than occurring naturally</li> </ul> |
| Focus of case   | <ul style="list-style-type: none"> <li>▪ Significant principles</li> <li>▪ Legal concepts</li> <li>▪ Recurring problems</li> </ul>   | <ul style="list-style-type: none"> <li>▪ Based on patient records</li> <li>▪ Cases selected to cover curriculum content areas</li> </ul>   | <ul style="list-style-type: none"> <li>▪ Cases present the ‘story’ of a particular incident or situation</li> </ul>  |

| Table 2.1 Three traditional approaches to case-based learning |   |  |  |
|---|---|--|--|
| Features  | Law   | Medicine   | Business   |
| Learning activities   | <ul style="list-style-type: none"> <li>▪ Cases present legal precedents and examples of judicial decision-making</li> <li>▪ Individual analysis of the particulars of a case plus knowledge of legislation are used to prepare a summary</li> <li>▪ Learners follow well-defined inductive model</li> </ul> | <ul style="list-style-type: none"> <li>▪ Cases present unresolved issues</li> <li>▪ Learners need to research and resolve the problem</li> <li>▪ Learners follow a model of clinical reasoning – interpretation; hypothesis; inquiry; problem formulation; diagnostic and/or therapeutic decision</li> </ul> | <ul style="list-style-type: none"> <li>▪ Learners apply a diverse body of knowledge to understand a case situation and evaluate the solution</li> <li>▪ Cases are open to multiple interpretations</li> <li>▪ Incomplete cases may be used as problems</li> <li>▪ There is no well-defined knowledge base or analysis model</li> </ul> |
| Instructional methods   | <ul style="list-style-type: none"> <li>▪ Instructor-led large group discussion</li> <li>▪ Students present their summaries to the class</li> <li>▪ Socratic method widely used – instructor asks questions to lead the students along a logical path to a justifiable conclusion</li> </ul>                 | <ul style="list-style-type: none"> <li>▪ Small groups work in collaboration</li> <li>▪ Identify information to be collected</li> <li>▪ Tasks distributed among group, independent self-directed learning</li> <li>▪ A tutor guides group through the reasoning process</li> </ul>                            | <ul style="list-style-type: none"> <li>▪ Analysis often begins with individual preparation (reading, note-taking etc.)</li> <li>▪ Small and large group discussions and presentations</li> <li>▪ Instructors take on a facilitative role</li> </ul>  |
| Nature of reasoning   | <ul style="list-style-type: none"> <li>▪ Analogical reasoning</li> <li>▪ Formal, inductive logic</li> </ul>   | <ul style="list-style-type: none"> <li>▪ Formal scientific logic examining facts in light of hypotheses</li> </ul>   | <ul style="list-style-type: none"> <li>▪ Understanding of a specific situation and its resolution</li> <li>▪ Pattern recognition and intuition</li> <li>▪ Form generalisations from specific situation</li> </ul>  |
| Outcome   | <ul style="list-style-type: none"> <li>▪ Preparation of brief which summarises a case</li> <li>▪ Emphasis on reaching the correct interpretation</li> </ul>   | <ul style="list-style-type: none"> <li>▪ Correct diagnosis by preferred method of reasoning</li> </ul>   | <ul style="list-style-type: none"> <li>▪ An explanation or solution which is supported by interpretation and argument</li> </ul>   |

While all of the above approaches seek to engage learners in authentic activities within realistic situations, there are important differences between how cases are used in each of these three traditional case-based approaches.

In the legal education model, students analyse cases as solutions to past problems and for their contributions to the body of common law (Ogden, 1984). Cases are of value in providing multiple perspectives and examples in a legal issue. Learners examine documentary accounts of a case and apply knowledge of related cases and legislation to their analyses of the outcome. This process helps learners develop the kind of case-to-

case reasoning needed in legal systems reliant on precedents, and is regarded as an important preparation for first year students as they learn about legal reasoning and law in general (Williams, 1992).

In medical education cases are used as starting points for developing clinical diagnoses. Students working in small groups are presented with a case constructed from actual patient records. Each case is an incomplete set of symptoms provided without further explanation in the same way they would be received by a doctor (Williams, 1992). Through a process of research and clinical reasoning and with guidance from their tutor, the group arrives at a diagnosis (Barrows & Tamblyn, 1980). Usually called problem-based learning, this is a well-defined instructional approach that mirrors the sequence of activities and behaviours undertaken by a physician with a patient and represents a move away from the traditional subject-based, teacher-centred approach.

The case method as it is used in business studies was adapted from the law school model, but is more in keeping with Dewey's idea of experience-based teaching (Lynn, 1999). Unlike law and medicine in which cases are inherent and easily identifiable, business does not involve naturally occurring cases. Instead they must be defined and created by teachers and case-writers. Business cases are used in a variety of ways - as examples or illustrations, to present new knowledge or to describe a problem situation. Cases are usually presented in a narrative style, with text being the most common medium. Business practice also differs from law and medicine in that there is no well-defined process of 'business reasoning' to be learned. Thus the aim of case-based learning in business is for learners to draw on a diverse body of knowledge to analyse a case by including their own insights and, perhaps, offering alternative solutions (Hazard, 1992). Although a wide variety of teaching and learning strategies are adopted, a general model incorporating individual preparation, and small group and whole class discussion has emerged (Erskine, Leenders & Maufette-Leenders, 1998; Heath, 1998).

More recently the appeal of case-based learning has spread and other disciplines have developed new ways of using cases, often having adapted one of the three traditions described above to suit their own teaching and training needs. Teaching cases are now used in:

- auditing (Weeks, 1987)
- statistics (Carlson, 1999; Parr & Smith, 1998)
- science (Kuntz & Hessler, 1998)
- strategic planning (Richardson & Ginter, 1998)
- social work (Cossom, 1991)
- instructional design (Ertmer & Russell, 1995)
- teacher education (Merseeth, 1991; 1994).

The application of cases to the last two fields above is of greatest relevance to this study because it was set within a graduate-level instructional design subject which aimed to develop students' understanding of instructional design practice through engagement in authentic activities, and because there has been significant innovation and some research of case-based learning in teacher education.

### **2.4.3 Cases in instructional design courses**

There is arguably no such thing as a typical instructional design project. Each is influenced by a variety of factors including the educational philosophy of the instructor, the characteristics of the students, the institutional setting, and the availability of human and financial resources - all of which must be assessed and reassessed throughout a project. "Different circumstances will likely call for different development approaches and the competent professional should be able to select the one that is most appropriate" (Visscher-Voerman, Gustafson & Plomp, 1999, p. 27).

Goel and Pirolli (1988) argued that design problems by their very nature are not amenable to rule-based solutions. The ill-structured nature of instructional design problems means that not only are there multiple paths towards a 'solution', but that there are multiple interpretations and solutions as well (Jonassen, 1997). Research studies have revealed that

expert designers address these complex, multifaceted problems by drawing on knowledge of theory and research, and previous professional experiences (Le Maistre & Weston, 1996; Rowland, 1992). By considering a wide range of interconnected factors present in a particular instructional situation, expert designers develop, evaluate and adapt their ideas to identify the most appropriate instructional strategies (Perez & Emery, 1995; Perez, Johnson & Emery, 1995).

Whatever path their training takes, designers need to develop skills and knowledge to make best use of the range of tools and techniques at their disposal (Rieber, 1998). Academic preparation usually comes through a combination of conceptual and technical coursework and experience of project work. This reflects a view that classrooms should provide the conceptual knowledge with on-the-job experience giving opportunities for application – leading to a separation of theory and practice (Milheim, 1992; 1996).

Furthermore, instructional design is often taught as a set of procedures accompanied by simple examples and short projects (Rowland et al., 1992). Winn (1990) warned that the instructional design prescriptions, which are a legacy of the field's behaviourist origins and often favoured by novice designers, promote a 'designing by numbers' approach. The inadequacy of this becomes apparent when graduates working on their first real projects are challenged "by a mismatch between the complexity of the case at hand and the simple processes they learned" (Rowland et al., 1992, p. 36).

Cases are suggested as a means to bridge "the gap which exists between the complex reality of the design world and the design principles taught at university" (Ertmer & Russell, 1995, p. 25, Rowland, Parra & Basnet 1994). Ertmer and Russell (1995) argued that case-based methods are well-suited to teaching instructional design because they:

- focus on process rather than product
- incorporate situational knowledge
- require analytical and reflective skills
- combine content knowledge and strategic thinking

- encourage habits of thought and ‘thinking like practitioners’
- develop students’ communication and interpersonal skills.

Furthermore the integration of realistic case studies into instructional design courses gives learners insight into a greater array of settings and problems than they are likely to experience through project work or internship, thus better preparing them for the wide range of situations they will face in their professional lives (Milheim, 1996; Julian, Kinzie & Larsen, 2000).

#### **2.4.4 Cases in teacher education**

As a field of study, teaching exhibits the ambiguity and complexity of an ‘ill-structured domain’ in which events are unpredictable and work together in the classroom context under the influence of many variables (Grossman, 1992). Teachers need to use both generic and context-specific pedagogical reasoning to make decisions that take account of the conditions present (Kagan, 1993).

Case-based learning, it is argued, “works well with the conception of teaching as a complex, messy, context-specific activity” (Merseth, 1994, p. 2). Cases present teaching problems and issues as complex and multi-faceted, and allow students access to the multiple perspectives of teacher, student, parents and others involved in a situation (Baker, 2000). Cases can be used to present the strategic thinking of experienced teachers, something not easily conveyed through lectures about techniques and methods (Harrington, 1990-1).

Furthermore the narrative form of cases is “compatible with the ways teachers actually organize their experiences and develop professional knowledge” (Kleinfeld, 1990, p. 2). The cases themselves are also considered valuable in that they portray teachers as reflective practitioners and, through a focus on analysis and problem-solving, offer opportunities for students to be reflective as well (Harrington, 1990-1).



Recently cases have become popular in programmes for both preservice and in-service teachers. Analysis of cases offers preservice teachers an opportunity to expand their understanding of practice through ‘vicarious’ experience and make connections with theoretical concepts (Kleinfeld, 1990; L. S. Shulman, 1992). Many authors have emphasised the importance of group discussion as part of the analysis process as a means for learners to share their interpretations and perspectives (see for example L. S. Shulman, 1996; Wright, 1996).

Writing of cases by students, a strategy unique to teacher education according to Kagan (1993), is promoted as a natural way of sharing teaching experiences through “retelling, reflection and analysis” (L. S. Shulman, 1992, p. 10). This technique has found application in teacher preparation courses as a means for students to share and learn from each others’ practice teaching experiences (Kleinfeld, 1996), and in professional development programs to allow learners to bring their often considerable range of experiences to the classroom and add to the body of knowledge about an issue (Benham, 1996).

The advent of new technologies prompted designers to consider how innovations such as hypermedia and computer networks might enhance case learning (Lacey & Merseth, 1993; Merseth & Lacey, 1993). Communication tools have been used to provide greater flexibility, giving learners greater opportunity to contribute and extending discussion beyond face-to-face meetings (Campbell & Zhao, 1996). On-line discussions have also drawn geographically dispersed participants together and have brought preservice teachers into contact with experienced classroom teachers (Dawson & Mason, 2000). Many have also been investigating the use of multimedia and video-based cases as a means of enriching case materials (Bowers, Kenenhan, Sale & Doerr, 2000; Bronack, Kilbane, Herbert & McNergney, 1999).

#### **2.4.5 Research on case-based learning**

The literature on case-based learning is dominated by theoretical arguments for its instructional effectiveness and descriptions of the design and application of a case-based approach. There is however little research reporting on the effectiveness of case-based

learning - a shortcoming that is widely acknowledged (see for example Carlson, Quintero & Karp, 1998; Ertmer & Dillon, 1998; Morine-Dershimer, 1996).

This lack of research is evident in the three traditions of case-based learning, with the paucity of well-designed empirical studies particularly problematic in legal and business education (Saunders, 1997; Williams, 1992). Burgoyne and Mumford (2001) characterised the development of the case method in business education as “pragmatic and a-theoretical”, and argued that its long history of use had led to assumptions of effectiveness (p. 5). Other researchers have argued that there is still much to learn about what situations are best presented in cases (Dorn, 1999), the effectiveness of writing and discussion tasks (Forman & Rhymer, 1999a), the role of gender and culture (Forman & Rhymer, 1999b; Thompson, 2000), the use of case method with diverse groups (Booth, Bowie, Jordan & Rippin, 2001) and how students analyse cases (Easton & Ormerod, 2001).

The use of cases in medical education has received comparatively greater attention from researchers, many of whom have been interested in comparing the learning outcomes attained from subject- and case-oriented approaches (see for example Boshuizen, Bongarets, van de Wiel & Schmidt, 1998). After reviewing many of these studies Albanese and Mitchell (1993) warned that poor research design and a diversity of methodologies make it difficult to draw general conclusions about the effectiveness of problem cases. More recently Davis and Harden (1999) have argued that a lack of clarity about the educational underpinnings of the case techniques used in medical education have led to it being misused and misapplied. Much of the early research work focused on the effects of the method on learners’ acquisition of knowledge and ability to solve medical problems, with little effort until recently to investigate two essential features of the medical approach - group work and self-directed learning (Hmelo & Evensen, 2000). These latter studies indicate that there is wide variation in the level of student participation, suggesting that the “fuller and deeper involvement” anticipated from this approach has not been achieved by all (Bereiter & Scardamalia, 2000). As case-based methods have spread from clinical training to other areas of the medical curriculum, some have argued that cases may in fact be misleading (Carson, 2001; Pattison, Dickenson, Parker & Heller, 1999).

As case-based learning has found application in a wider range of disciplines, so a variety of designs and strategies has developed. This is particularly true in the fields most relevant to the current study - instructional design and teacher education. Case-based learning in instructional design education is still a new endeavour and as such few examples of its application exist and so the literature remains descriptive and anecdotal. Table 2.2 summarises two recent publications researching the use of cases in instructional design courses.

| Table 2.2 Summary of research into case-based learning in instructional design courses |   |   |   |   |
|--|---|---|---|---|
| Author(s)  | Setting & activities  | Research methodology  | Key findings  | Implications for case-based learning  |
| Julian et al., 2000  | <ul style="list-style-type: none"> <li>Teams of students took part in a competition to develop the best solution to a case problem.</li> <li>Investigation of reasoning contained in problem solutions, perceptions of professional practice and Web as a medium for delivery.</li> </ul> | <ul style="list-style-type: none"> <li>Involved 42 students working in seven teams.</li> <li>Masters and doctoral students from range of universities.</li> <li>Different levels of ID (instructional design) knowledge and experience.</li> <li>Most had teaching experience.</li> <li>Collected survey data from students (66%) and officials (82%), plus interviews with students (43%) and officials (71%).</li> <li>Analysed using descriptive statistics and coding of issues.</li> </ul> | <ul style="list-style-type: none"> <li>Students valued the experience they had gained and felt motivated by the competitive aspect.</li> <li>Good team management was essential and teams used a variety of strategies.</li> <li>Solutions were judged as successful for beginning designers.</li> <li>For students with less ID knowledge or experience the cases were a good introduction, but they found developing solutions difficult.</li> <li>Some students exhibited more expert approaches.</li> <li>Students reported improved awareness of actual practice.</li> <li>Students found the story and presentation realistic.</li> </ul> | <ul style="list-style-type: none"> <li>Solving case problems helps learners go beyond theory and models to understand ID practice.</li> <li>Case analysis can improve understanding of instructional design in learners with less ID knowledge and experience, however they need more support to develop solutions.</li> <li>Case analysis offers a more advanced learner a chance to expand knowledge of professional practice.</li> </ul> |

| Table 2.2 Summary of research into case-based learning in instructional design courses |   |   |   |   |
|--|---|---|---|---|
| Author(s)  | Setting & activities  | Research methodology  | Key findings  | Implications for case-based learning  |
| Stepich, Ertmer and Lane (2001)  | <ul style="list-style-type: none"> <li>▪ Students analysed 6-10 text-based cases and offered recommendations</li> <li>▪ Case analysis was supplemented with other resources and activities.</li> <li>▪ A range of discussion techniques was investigated, particularly with respect to support of expert-like approaches and the associated coaching strategies.</li> </ul> | <ul style="list-style-type: none"> <li>▪ The study followed 37 participants in three classes.</li> <li>▪ Students were advanced undergraduates and introductory and advanced postgraduates with a range of prior ID knowledge.</li> <li>▪ Qualitative analysis of responses looked for expert- and novice-like characteristics in a) conceptualising the case, and b) considering the impact of suggested solutions.</li> </ul> | <ul style="list-style-type: none"> <li>▪ Students' responses showed expert- and novice-like characteristics at different times throughout the subject, with no pattern emerging over time.</li> <li>▪ Direct instructions on the type of response expected were needed to elicit more analytical responses.</li> <li>▪ Different discussion strategies produced different types of response, eg. reflective practice supported both of the expert characteristics examined, while role-play was better for conceptualising the case than evaluating solutions.</li> </ul> | <ul style="list-style-type: none"> <li>▪ The style of discussion influences the way learners conceptualise the case and consider the impact of their solutions.</li> <li>▪ Learners benefit from being able to take an assigned role or position, and from structured discussion activities.</li> <li>▪ Instructors need to support the discussion activities to promote expert-like approaches.</li> </ul> |

The application of cases to teacher education, however, has received more considerable attention from researchers. A summary of relevant research work undertaken in the past 10 years is summarised in Table 2.3, focusing on studies that have aimed to investigate and characterise aspects of the case experience.

| Table 2.3 Summary of research into case-based learning in teacher education |  |  |  |  |
|---|--|--|--|--|
| Author(s)   | Setting & activities   | Research methodology   | Key findings   | Implications for case-based learning   |
| Grant, 1992   | <ul style="list-style-type: none"> <li>Investigation of student reasoning from a particular case</li> <li>Pre-service teachers in a general secondary methods course</li> <li>Case analysis followed reading, discussion of key concepts and practical activities</li> </ul>                                 | <ul style="list-style-type: none"> <li>Group of undergraduate and graduate students across teaching fields</li> <li>Qualitative approach</li> <li>Teacher as researcher</li> <li>Analysis of individual written commentaries and class discussion</li> </ul>   | <ul style="list-style-type: none"> <li>Students showed understanding of the strategies they had identified from prior reading, but not the context-specific issues from the case</li> <li>Analysis questions did not lead students to the issues intended by teacher</li> <li>One case was insufficient to represent complexity of real-life practice</li> </ul> | <ul style="list-style-type: none"> <li>Learners need guidance to 'uncover' the key issue(s) and consider the specifics of the case situation</li> <li>More than one case may be needed to demonstrate real-life complexity</li> </ul>  |
| Levin, 1994   | <ul style="list-style-type: none"> <li>Investigation of the role of discussion in learning from cases</li> <li>The setting was a subject on child development for teacher preparation and professional development</li> <li>Individual written case analysis and discussion activities</li> </ul>            | <ul style="list-style-type: none"> <li>Mix of 24 student teachers, beginning teachers and experienced teachers</li> <li>Experimental design</li> <li>Compared written analysis for groups with/without small group discussion on two cases</li> <li>Quantitative and qualitative analysis</li> </ul> | <ul style="list-style-type: none"> <li>Discussion promoted reflection and metacognition for experienced teachers, and clarified and elaborated ideas for new and student teachers</li> <li>Without discussion students reiterated and solidified their existing views</li> </ul>   | <ul style="list-style-type: none"> <li>Discussion activities should be a part of the case analysis task to allow learners to clarify and elaborate their views</li> <li>Learners with different levels of relevant experience respond differently to cases</li> </ul>                    |
| Benham, 1996  | <ul style="list-style-type: none"> <li>Investigation of case analysis and writing in a graduate-level subject on school change and reform</li> <li>Students researched relevant topics in depth, analysed cases prepared by past students, and wrote and presented their own cases for discussion</li> </ul> | <ul style="list-style-type: none"> <li>Two small classes (5-7 students)</li> <li>Experienced teachers and administrators</li> <li>Data from students' written analysis, journals, cases and discussions</li> <li>Teacher as researcher</li> <li>Qualitative approach</li> </ul>                      | <ul style="list-style-type: none"> <li>Learners generated 'new' knowledge about practice and its relationship to theory that added to the academic knowledge base</li> <li>Learners identified key themes that supported their thinking about the cases</li> <li>The use of narrative encouraged learners to challenge traditional beliefs</li> </ul>            | <ul style="list-style-type: none"> <li>Case writing by learners who are also experienced practitioners helps them to link theory and practice</li> <li>Cases written by students can also add to the academic knowledge base and be used as a resource for subsequent classes</li> </ul> |

| Table 2.3 Summary of research into case-based learning in teacher education |  |  |   |  |
|---|--|--|---|--|
| Author(s)   | Setting & activities   | Research methodology   | Key findings  | Implications for case-based learning   |
| Kleinfeld, 1996   | <ul style="list-style-type: none"> <li>Study of changes in learners' understanding developed by a case writing task</li> <li>Pre-service teachers each prepared and presented a case describing their teaching placements</li> </ul>   | <ul style="list-style-type: none"> <li>Analysed cases produced by students</li> <li>Compared initial and final conceptual maps of the social world of teaching</li> <li>Qualitative approach</li> </ul>  | <ul style="list-style-type: none"> <li>Cases were personal and analytical</li> <li>Initial conceptions tended to be simple and formulaic</li> <li>Students' revised conceptions were more complex and contextual</li> </ul>   | <ul style="list-style-type: none"> <li>Case writing provides an analytical structure within which learners can reflect on their experiences</li> <li>Students can draw out key lessons to explain how their ideas have changed over time</li> </ul>            |
| Morine-Dersheimer, 1996   | <ul style="list-style-type: none"> <li>Study of case-based learning in a teacher preparation program</li> <li>Students viewed video cases, discussed their reactions and then listed a key idea they took from the lesson and two ideas from other students</li> <li>Aim was to compare the reactions of four classes and considered differences in group size and major</li> </ul>      | <ul style="list-style-type: none"> <li>112 advanced-level student teachers in four class groups studying a generic methods course</li> <li>Mix of elementary and secondary school majors</li> <li>Data derived from videotaped discussion and written 'key idea statements'</li> <li>Qualitative approach</li> </ul> | <ul style="list-style-type: none"> <li>Differences in the way the case teachers defined and structured the analysis task and discussion influenced the key issues identified by learners and the type of thinking they exhibited</li> <li>Less-structured discussion in small groups led to an emphasis on the case context and other students' views, and led to more complex processing</li> <li>Larger groups tended to arrive at more simplistic conclusions</li> </ul> | <ul style="list-style-type: none"> <li>Case analysis discussions should provide opportunities for students to discuss issues in small groups</li> <li>Case teachers should provide opportunities for students to take the lead in group discussions</li> </ul> |
| J. H. Shulman, 1996   | <ul style="list-style-type: none"> <li>A pilot study into changes in learners' attitudes and behaviour through case-based learning in multicultural education program</li> <li>Teacher professional development program for new teachers</li> <li>Students read a series of cases, and then discussed as a class group using a variety of discussion and role-play activities</li> </ul> | <ul style="list-style-type: none"> <li>15 new teachers participated in the study, but only eight attended the full course</li> <li>Data sources were student writing, interviews and discussion transcripts</li> <li>Qualitative approach</li> </ul>   | <ul style="list-style-type: none"> <li>Learners showed an increased sensitivity and awareness of diverse cultural perspectives and of their own biases</li> <li>Some evidence of changes in communication strategies and teaching practice</li> <li>Most students viewed case-based learning as valuable</li> <li>Some discussion was confrontational and conflict caused at least one student to leave the course</li> </ul>   | <ul style="list-style-type: none"> <li>Cases can allow learners to confront their assumptions and beliefs</li> <li>Case teachers must manage the discussion of sensitive issues to promote constructive participation</li> </ul>                               |

| <b>Author(s)</b>            | <b>Setting &amp; activities</b>   | <b>Research methodology</b>  | <b>Key findings</b>  | <b>Implications for case-based learning</b>  |
|-----------------------------|---|--|--|--|
| Lundeberg & Scheurman, 1997 | <ul style="list-style-type: none"> <li>Investigated the effect of repeated case analysis, and previous or subsequent instruction on the topic area</li> <li>Educational psychology course in a pre-service teacher education program</li> <li>Students read and made notes about the cases, then participated in paired discussions and wrote up their conclusions</li> </ul> | <ul style="list-style-type: none"> <li>Two groups of undergraduate students (48 and 18)</li> <li>Qualitative approach</li> <li>Content analysis was used to compare students' first and second written analyses</li> </ul>   | <ul style="list-style-type: none"> <li>Some students made only superficial changes to the first analysis, while others refined or changed their ideas</li> <li>Learners achieved better outcomes when the case was analysed before specific instruction on a topic</li> <li>Students believed they could better identify problems (65%), see other perspectives (50%) and see how theory was relevant to practice (45%)</li> </ul> | <ul style="list-style-type: none"> <li>Opportunities to revisit their case analyses may prompt some students to refine and clarify their ideas</li> <li>Learners should analyse the specifics of case situations prior to more general instruction.</li> </ul> |
| Moje & Wade, 1997           | <ul style="list-style-type: none"> <li>Investigated case discussions and what they reveal about students' thinking</li> <li>Two literacy courses – one for pre-service and the other for practicing teachers</li> <li>Students read or wrote cases and then discussed them in class through analysis, role-playing and evaluating possible plans of action</li> </ul>         | <ul style="list-style-type: none"> <li>Two courses (30 undergraduate pre-service teachers and 10 graduate in-service teachers)</li> <li>Data sources were discussion recordings, debriefing sessions, and focus group and individual interviews</li> <li>Qualitative approach</li> <li>Analysed for within-case and cross-case patterns</li> </ul> | <ul style="list-style-type: none"> <li>Pre-service teachers used their experiences as students, theory and texts, and role-playing to analyse the cases. They also used the cases to understand the theory, but developed simplistic views of teaching practice</li> <li>In-service teachers analysed cases through their classroom experiences and used cases to reflect on their own teaching practices</li> </ul>               | <ul style="list-style-type: none"> <li>Learners use the context of their own experiences to understand cases</li> <li>Opportunities should be provided for learners to make links with relevant experience</li> </ul>  |



| <b>Table 2.3 Summary of research into case-based learning in teacher education</b> |  |  |   |   |
|--|--|--|---|---|
| <b>Author(s)</b>   | <b>Setting &amp; activities</b>  | <b>Research methodology</b>  | <b>Key findings</b>   | <b>Implications for case-based learning</b>   |
| Carlson, et al., 1998  | <ul style="list-style-type: none"> <li>Investigated the effects the Participatory Case-Based Model for Professional Development</li> <li>Professional development course in human services</li> <li>Learners participated in case analysis through writing and discussion, and by writing and presenting cases based on their own experiences</li> </ul> | <ul style="list-style-type: none"> <li>Qualitative study of a small group (11 students)</li> <li>Professionals from a variety of fields who work together on human services problems</li> <li>Main data sources were student work, group and individual debriefing after each class session, meeting records and follow-up interviews six months after the conclusion of the course</li> <li>Qualitative approach</li> </ul> | <ul style="list-style-type: none"> <li>Learners gained new knowledge about current issues related to their professions and about related fields</li> <li>Learners were able to appreciate others' perspectives on an issue</li> <li>Learners also developed new strategies to handle dilemmas in their own work environments</li> <li>Learners were found to have applied these outcomes to their work practices</li> </ul>                               | <ul style="list-style-type: none"> <li>Sharing their perspectives on cases and 'stories' from their own experiences allows learners develop a broader appreciation of complex situations and develop new strategies for practice</li> </ul>               |
| Richards & Gipe, 1998  | <ul style="list-style-type: none"> <li>Investigated changes in the themes found in student-prepared cases over three successive years of a teacher education program</li> <li>Students prepared two case narratives per semester about concerns and problems arising from their practical work experiences</li> </ul>                                    | <ul style="list-style-type: none"> <li>Analysed 688 cases from 344 students over three years of a course</li> <li>Qualitative approach to analysis that examined student work for emerging themes and patterns</li> </ul>  | <ul style="list-style-type: none"> <li>Over the three years the themes identified by students had become more numerous and diverse</li> <li>This was attributed to changes in case teaching strategies that provided more explicit directions for student case writers and better support for critical reflection</li> <li>A number of issues remained major concerns for the student teachers for which highlighted the need for more support</li> </ul> | <ul style="list-style-type: none"> <li>Learners need guidance to prepare their own cases and to encourage them to reflect on their experiences</li> <li>Analysis of learner-prepared cases can highlight areas in which they need more support</li> </ul> |



| Table 2.3 Summary of research into case-based learning in teacher education |   |  |  |  |
|---|---|--|--|--|
| Author(s)   | Setting & activities  | Research methodology   | Key findings   | Implications for case-based learning   |
| Riggs & Serafin, 1998   | <ul style="list-style-type: none"> <li>Investigated the use of student-prepared cases to link practice to theory in reading literacy course</li> <li>Learners prepared cases depicting actual classroom situations from their experiences</li> <li>These contained multiple perspectives and self-analysis</li> </ul> | <ul style="list-style-type: none"> <li>Study of 25 graduate students who were also practicing teachers</li> <li>Analysed student cases for key influences</li> </ul> | <ul style="list-style-type: none"> <li>Learners' cases showed that they were able to take both a subjective and objective stance in analysing their teaching practices</li> <li>The cases enabled learners to examine and critique their teaching practices and to recognise intrinsic and extrinsic factors affecting their classrooms</li> </ul> | <ul style="list-style-type: none"> <li>Case writing about their own experiences encourages learners to analyse and critique their own practices</li> </ul> |

Much of the focus of this research is on student performance and outcomes using particular approaches. Overall, this points to cases as being effective in encouraging students to see the complexity of teaching and the way theoretical knowledge is made conditional by circumstances in the classroom. Researchers also report that students are reflective and that cases challenge their beliefs and, sometimes, influence their teaching practices.

The research studies also reflect the advent of case writing as a significant new instructional strategy (Kagan, 1993), and investigators point to its success as a means of sharing experience, often in very personal ways. The role of discussion has also been investigated and results indicate that it is an important tool for expanding students' perspectives (Levin, 1994). Researchers note however that the limited scope of investigations mean that there is still much to be learned about what types of discussion forums – such as small group, whole class, and electronic – are appropriate (Levin, 1994).

The role and attitude of the instructor have also been found to have significant effects on learning outcomes. Findings suggest that learner-centred approaches achieve better results, although this is an area of research that needs more attention. The body of research also neglects issues such as the design of written tasks, the use of other resources and strategies

in combination with case-based learning, and factors arising from the physical or academic setting.

The increased popularity of case-based learning has also led researchers to consider the needs of a more diverse student group, from undergraduates enrolled in teacher preparation programs to experienced practitioners taking part in a professional development program. Particular interest has been shown in investigating the influence of related experience with research suggesting that the experiences and beliefs learners bring to their analyses influences what they focus on as important, and the strategies, tools and approaches they use (see for example Moje & Wade, 1997). This suggests that different kinds of learning opportunities and supports are needed according to the prior experience of the learners in the group.

This mix of predominantly qualitative studies illustrates the range of issues chosen for investigation. A lack of detailed description of the methods used, and in particular approaches to analysis, makes comparison of the findings difficult, and so these studies do not yet form a connected or comprehensive body of knowledge.

In particular, little is known of how learners make sense of the richly detailed and context-specific information presented in a case and how they then use their understanding to address real-life problems (Kagan, 1993). Studies of case-based learning in clinical disciplines have suggested that learners adopt different approaches with different outcomes depending on their perceptions of the task. These differences have been attributed to both individual characteristics, such as levels of self-regulation (Ertmer & Dillon, 1998; Ertmer et al. 1996) and influences in the learning environment (Whelan, 1988). It is likely that different outcomes and approaches also occur in other forms of case-based learning and that by understanding students' different approaches designers and teachers may be able to assist learners develop effective analysis strategies.

## ***2.5 Summary and relevance of literature to this study***

This review of literature has traced support for authentic activities and contexts from Dewey's and Whitehead's ideas about linking formal education and real-life practice published in the 1920s and '30s to the increasingly popular use of case-based learning. Cases have been used in legal, medical and business education for many years, and three distinct traditions have developed. More recently case learning has spread to a greater range of disciplines, encouraging innovation that has resulted in a plethora of approaches. Despite this popularity, little is known about case-based learning, particularly about the learner's perspective – a gap that this study has sought to address. To this end a learning environment was developed based on the conceptual, developmental and research literature on case-based learning.

The overall learning design was based on Jonassen's (1999) model for a constructivist learning environment (CLE) in which related cases are used to support problem-solving activities. The essential components of the environment are:

- a focal problem-solving or project task that engages learners in thinking like a practitioner from the relevant discipline;
- includes related cases and information sources that help learners understand the context of the problem and possible solutions
- incorporates appropriate cognitive, conversation/collaboration and social/contextual tools.

To support learners in this environment Jonassen (1999) also suggested that activities be designed to encourage learners: to investigate the related cases as part of the process of exploring the problem context; articulate their solutions and explain their strategies; and reflect on performance. Using these ideas as a framework on which to base the learning design and incorporating other ideas from the literature the following three-phase process was developed.

### ***Phase 1: Analysis of related cases***

In the early stages of their group projects, learners undertook a case analysis task that prompted them to explore the related cases provided. The aim of this task was to develop learners' ideas about multimedia design and development issues as they arise in the context of real-life projects. Three principles for their design emerge from the literature:

- The cases should present realistic situations that reflect real-world practice (Knirk, 1991; Stolovitch & Keeps, 1991)
- The cases should incorporate multiple perspectives and preserve ambiguity, complexity and conditionality of knowledge (Spiro & Jehng, 1990)
- The cases should provide a richly-detailed source of information that encourages exploration and interpretation (J. H. Shulman, 1996)

Analysis activities were designed to develop learners' ideas about multimedia design and development through a process adapted from Miller and Kantrov (1998) in which learners begin by working within the case, then expand on the case and finally move beyond the case context to consider the issues more broadly. Four guiding principles identified from the literature were used:

- Learning activities should encourage learners to develop their own interpretations (Duffy & Cunningham, 1996; Hazard, 1992)
- Learners should develop an understanding of the specifics of the situation by working within the confines of the case (Christensen, 1987; Miller & Kantrov, 1998)
- Learners develop understanding of the issues further by participating in case discussions which elicit alternate views (Carlson, et al., 1998; Levin, 1994)
- Learners move beyond the context of the specific case by making connections with relevant concepts from the literature and with their own situations and experiences (Miller & Kantrov, 1998)

### ***Phase 2: The design task***

The project required teams of students to design a learning environment that would address a real-life educational/training problem. The aim was to engage learners with an authentic design and development task through which they would encounter the types of challenges

faced by instructional design practitioners. The key features of the task suggested by the literature are:

- Authentic activities should engage learners with realistic problems (Honebein et al., 1993; Jonassen et al., 1993).
- Learners should face cognitive challenges similar to those present in the real world environment (Savery & Duffy, 1995).
- Learners should be encouraged to develop ownership over the task (Honebein et al., 1993).
- The learning tasks should be set within the global task environment and may be simplified to suit the learners (Honebein et al., 1993, Jonassen, 1999).
- Appropriate contextual supports should be provided (Grabinger, 1996, Jonassen, 1999).

### ***Phase 3: Reflection***

The final phase of the process encouraged learners to reflect on their project experiences and refer back to the case projects they had analysed. The importance of reflection is emphasised throughout much of the case learning literature, with many authors drawing on the research work of J. H. Shulman (1991; 1996) and the ideas of Schön (1987). Learners began their reflections by considering their own responses to a set of focus questions, and then by working in their teams to develop a case telling the story of their own projects. The reflective tasks were designed to complement the case analysis by following similar principles of individual interpretation, focus on the specifics of a situation, learning through discussion and collaboration, and moving beyond the case context to consider the ‘bigger picture’.

These principles were used to guide the design of the learning environment and activities implemented with a class of graduate students. The next chapter describes the research design and methodology, and includes a more detailed explanation of the learning environment.

## **Chapter Three**

### **Research Methodology and Learning Design**

#### **3.1 Introduction**

This chapter describes the inquiry process used in the study. It begins by examining the literature describing the use of qualitative modes of research and in particular the use of a case study design. The remainder of the chapter presents details of the design of this study including the research context, data collection procedures, general analysis strategies and verification methods employed.

#### **3.2 Theory**

##### **3.2.1 A qualitative approach**

Contemporary qualitative inquiry has evolved from a range of traditions in the social sciences – with a rich history that is well documented (Denzin & Lincoln, 2000; Glesne & Peshkin, 1992). Unlike experimental research traditions there is little agreement in the literature about what constitutes a qualitative approach with a “sometimes confusing array of appropriate alternative research methods” presented (Marshall & Rossman, 1989, p. 9). Lincoln and Guba’s (2000) examination of various paradigms highlights the complexity and contradictions that face the qualitative researcher.

Although a shift towards qualitative social science research in the last decade has led to an explosion in publications on the subject, the literature abounds with confusing terminology. For example ‘qualitative research’ is sometimes used interchangeably with case study or ethnography (Savenye & Robinson, 1996). Creswell (1998) sought to clarify the situation by identifying five traditions of qualitative inquiry - biography, phenomenology, grounded theory, ethnography and case study.

From various classifications of qualitative traditions and approaches, agreement emerges that “systematic inquiry must occur in a natural setting rather than an artificially

constrained one such as an experiment” (Marshall & Rossman, 1989, p. 10). Lincoln and Guba (1985) applied the term ‘naturalistic inquiry’ to describe the underlying philosophy of the paradigm as distinct from methods used to collect data of a qualitative nature, such as interviews and surveys, which may be used in any research design.

Despite differences in definition and emphasis apparent in writings about qualitative inquiry (Bogdan & Biklen, 1992; Creswell, 1994; Glesne & Peshkin, 1992; Savenye & Robinson, 1996), the qualitative researcher is commonly seen as someone who:

- views reality as socially constructed, and values the perspective of the participants
- chooses naturalistic contexts, and becomes involved in the setting, acting as the primary data collection instrument
- focuses on meaning, and process and aims to understand participants’ perspectives
- provides rich description, and seeks patterns and themes in the data.

### **3.2.2 The case study as research strategy**

The various definitions of the case study approach to research advanced in the literature shows that, like qualitative inquiry, it is open to interpretation. Merriam (1998) noted “*case study* is a term used by many people in many different ways to mean many different things” (p. xiii). She claims part of this confusion arises from the conflation of the ‘case’ as the unit of study, the ‘case study’ as the method of inquiry, and the ‘case report’ as the end product of research.

Out of these various definitions emerges a notion of the case study as a detailed examination that is limited in scope to a single setting, subject, depository or event (Bogdan & Biklen, 1992). It differs from other traditions of qualitative inquiry in that it focuses on a ‘bounded system’ (the case) that is studied in depth (Creswell, 1998). Furthermore a case is an ‘integrated system’ with a complexity of functioning parts (Stake, 1995).

Case studies vary in purpose. They may seek to explore, describe or explain (Yin 1993).

Stake (2000) identifies three common types of case study:

- an 'intrinsic' case study undertaken to gain a better understanding of a particular case
- an 'instrumental case study', which is studied to provide insights into an issues or examine a generalisation
- a 'collective' case study, which seeks to understand a broader phenomenon through investigation of multiple cases.

Case studies may also differ in application, for example in the role theory plays and in the techniques used for data collection and analysis. A theoretical base may play a role in framing and guiding an explanatory case study or, it may be absent from a study that seeks to describe a case (Creswell, 1998). Case studies may encompass both qualitative and quantitative methods of data collection and analysis where appropriate to the research problem and circumstances (Yin, 1994).

Depending on the type of case study, the findings reported may be couched in terms of understanding the specific situation and/or seeking links to a wider context. Merriam (1998) characterises the case study outcome as particularistic for what it reveals about the situation under study, descriptive because it presents rich textual information, and heuristic in that it illuminates understanding of the phenomenon studied.

Two possibilities for generalisation from a case are considered in the literature – generalisation 'about' the case and generalisation 'from' the case. Stake (2000) argued that researchers need to draw generalisations that encapsulate the complexity of a situation under study to facilitate reporting. This simplification, which is needed to make a report readable, should be accompanied by descriptions of the data that enable readers to draw their own conclusions about the researcher's interpretations. These 'naturalistic generalisations' are generalisations that other people can learn from (Creswell, 1998).



Difficulties arise when generalisations are made too broadly and thus the particular features of a case can be lost (Stake, 2000). Yin (1994) warns against this kind of ‘statistical generalisation’ in which information specific to a case is used to make inferences about a broader population. Instead he suggests that case study results should be compared to previously developed theory in a process of ‘analytic generalisation’.

### **3.3 *The design of this study***

#### **3.3.1 A qualitative case study approach**

The exploratory nature of this study makes it well suited to a qualitative approach. As discussed in Chapter Two, little is known about case-based methods from the learner’s perspective, thus making it difficult to form research questions sufficiently specific for a quantitative study. Qualitative approaches, on the other hand, are considered useful for exploring research problems on topics about which little information exists - specifically when variables are not known, context is important and the theoretical base is undeveloped (Creswell, 1994).

Developing an understanding of learning in a natural rather than artificial context is important in considering the wider implications for the design and implementation of case-based methods. Furthermore, the emphasis placed on the participant’s perspective in qualitative research is consistent with the study’s aim to investigate a learner’s individual interpretations of the case materials.

A case study approach was chosen because it allowed in-depth investigation of a particular application of case-based learning, which was considered important for finding out what learners take from the case materials used and what aspects of the learning context are important in that process. This allowed the researcher to consider the complexity of the situation and the interplay of factors as suggested by Stake (1995). It is also in keeping with the strength of the case study approach in addressing ‘how’ or ‘why’ questions within real-life contexts, particularly important “when the boundaries between the phenomenon and context are not clearly evident” (Yin, 1994, p. 13).

The expected outcome of the study – a better understanding of learners’ use of cases and their implications for the design of case-based learning – is also consistent with the case study approach. The first outcome calls for attention to the specifics of the situation as identified by Merriam (1998). The second requires that the researcher consider how the lessons learned might be more widely applicable, as noted by Creswell (1998).

Another important consideration in deciding to undertake a qualitative case study was the research tradition in the area of technology-supported learning.

Clark (1989) noted that the typical study for many decades focused on comparing so-called traditional methods of instruction with ‘new’ media or strategies. Such studies, he claimed, have produced useless information because they compare carefully developed ‘new’ techniques and often poorly conceptualised traditional instruction. Clark (1989) contended that researchers were asking the wrong questions and using flawed research designs.

Briggs (1984) called for researchers in instructional technology to use alternative types of inquiry that would examine learning outcomes in natural contexts using systematically designed materials. Despite Briggs’ calls, a review of research papers published in the journal *Educational Technology Research and Development* found that less than half reported on empirical research and most of these were based on an experimental model with few reflecting a qualitative or developmental perspective (Driscoll & Dick, 1999). This may change however, as qualitative approaches become more widely accepted and researchers become more skilled in carrying out this type of research (Driscoll & Dick, 1999).

The choice of the qualitative case study as the strategy used in this investigation is in keeping with the recommendations of Briggs (1984), and with the suggestion by Reigeluth and Frick (1999) that designed case studies, in which the researcher develops and implements an intervention based upon instructional theory, offer a powerful means for investigating and furthering theories of instruction.

### **3.3.2 The research context**

The study was conducted with students enrolled in EDGI931 *Interactive Multimedia Design*, an advanced level subject in the Master of Education in Information Technology course offered at the University of Wollongong during Spring Session 2000. This implied natural boundaries to the study in that it involved:

- only the students enrolled in the particular offering of the subject
- their instructor
- the set of case materials designed for the subject
- the other resources and tasks undertaken for the subject
- the limited time frame during which the subject was offered.

The subject was chosen as the focus of the study because of its suitability of redesign as a case-based learning environment. Students form small project teams and work with a real client to develop an interactive multimedia package that will address a specific educational need. The nature of the task requires learners to draw on conceptual knowledge and production skills developed in previous subjects, to work within a team of people with diverse interests and backgrounds, and to manage their relationships with clients who have their own expectations of the process and outcomes. These are also aspects of a real-world multimedia design project, and through this activity learners encounter situations similar to those a professional designer would experience. The focus of the subject on a complex, realistic design problem suggested that cases would provide useful support material.

In the redesigned subject, students analysed two real-life multimedia development cases during the early stages of their projects, and at the end of the subject prepared individual reflective papers and collaboratively written cases of their own projects. Full details of the design of the subject can be found in section 3.3.2.3 of this chapter.

#### **3.3.2.1 The first class meeting**

The subject began with an initial class meeting on the evening of Thursday 13 July 2000. This was an introductory class that aimed to familiarise the students with the contents and requirements of the subject, and to begin the process of project choice and team formation.

Ten students were present out of a total enrolment of 14. Two students were to withdraw from the subject soon after, leaving a class size of 12.

The class began with each of the students introducing themselves and talking about their previous experiences with teamwork and multimedia projects. The instructor introduced the researcher and briefly explained her presence at the meeting. After the introductions were complete the instructor presented the subject outline (Appendix 3.1) and the group discussed issues related to the organisation and requirements of the subject.

Next, discussion turned to the selection of a suitable project. The instructor described some pre-arranged projects from which groups could choose. Students were also encouraged to seek out and initiate their own projects.

The instructor then presented an overview of the possible roles within the multimedia development team, asking students to consider what kind of role might be appropriate for them to take. To initiate the team formation process each of the students was asked to write a list of their skills and interests on the whiteboard. Gradually teams began to form.

Overall, there were not many questions asked during the class. There was some discussion about the availability of software tools and support for the development of production skills, which appeared to be of concern to many of the students. Team formation created some tension with people not wanting to put themselves forward.

At the end of the class students were invited to be a part of this research study in a short presentation by the researcher and provided with information and consent forms. The nature of the study was described to all potential study participants and consent was sought from each person. Participants were also advised that they were free to leave the study at any time and that information collected about them would remain confidential and their identities disguised in the final report.

3.3.2.2 The research participants

All of the students who continued with the class agreed to participate in the study. Table 3.1 outlines each participant’s main occupation at the time of the study and previous experience working on group projects and developing CD-based multimedia products. Pseudonyms have been used throughout this thesis to protect the identity of the participants.

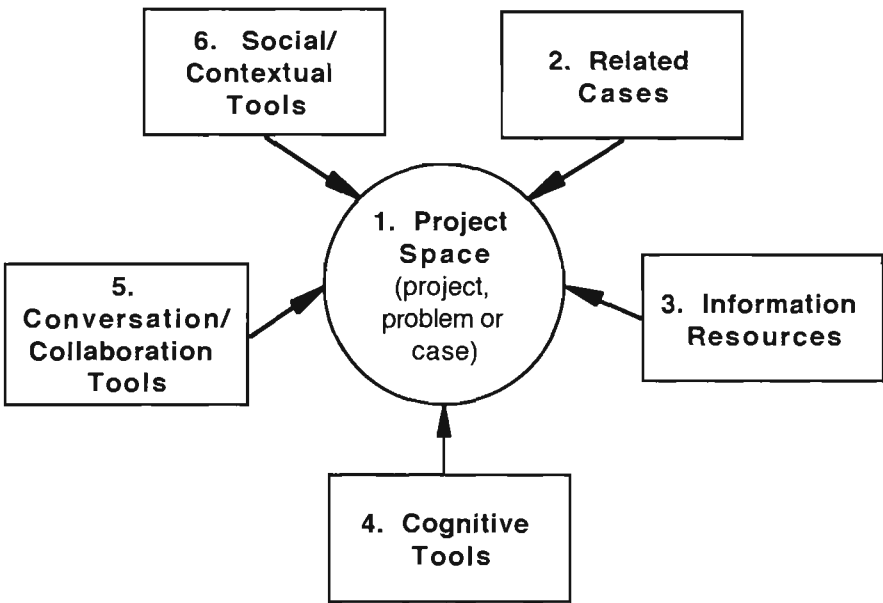
| Table 3.1 The research participants |   |  |
|-------------------------------------|---|--|
| Name                                | Main occupation                                   | Previous group project or multimedia experience  |
| Anna                                | Human resources manager                           | Group project experience working on large human resources project. Recalled that there were many teamwork issues. No multimedia experience except introductory authoring subject.  |
| Rod                                 | Training consultant                               | Professional experience working on multimedia projects in a team of two. Feels that technical skills are out-of-date.  |
| Margaret                            | Primary school teacher-librarian                  | No previous group project experience. No multimedia experience except introductory authoring subject.  |
| Lynn                                | University librarian                              | Has experience developing Web-based training modules for staff and students working in a small team. No multimedia experience except introductory authoring subject.               |
| Sheryl                              | Training consultant                               | Has worked on team projects of 2-30 people. Usually responsible for instructional design of print-based materials. No multimedia experience except introductory authoring subject. |
| Barbara                             | Technical consultant in education department      | Experience with the development Web projects working in a small team. No multimedia experience except introductory authoring subject.  |
| Liz                                 | Primary school teacher                            | Working on a small team project at school in the previous year has been her only project experience. No multimedia experience except introductory authoring subject.               |
| Joanne                              | Full-time student specialising in adult education | No professional team project experience. No multimedia experience except introductory authoring subject.   |
| Simon                               | Secondary school teacher                          | Previously worked on graphic design projects, but not in a team. No multimedia experience except introductory authoring subject.   |
| Ian                                 | Primary school teacher                            | Experience working on long term team project within own school. No multimedia experience except introductory authoring subject.  |
| Kath                                | Primary school teacher                            | No professional team project experience. No multimedia experience except introductory authoring subject.   |
| Steve                               | Primary school teacher                            | No multimedia experience except introductory authoring subject.  |

Half of the participants were classroom teachers, and half were involved in adult education and training. All participants had completed pre-requisite subjects that provided an introduction to educational technology and instructional design, and developed basic Web and multimedia authoring skills. Three of the participants also has professional experience

in instructional design. Only one participant had previous experience in developing CD-based multimedia products, although two had developed materials for the Web and one had graphic design experience. All of the participants commented that they had previously worked on group projects as students, although only half had worked in a team in a work situation.

**3.3.2.3 The learning design**

Jonassen’s (1999) model for a constructivist learning environment (CLE) was used as a framework for designing a learning environment that would support learners as they worked on their own design problems. In this model the related cases present solutions to past problems that are thought to compensate for learners’ lack of experience and help learners develop an understanding of concepts and strategies useful in similar situations. The key features of the model are presented diagrammatically below (Figure 3.1). This followed by a table summarising the rationale for and implementation of each feature in this particular design (Table 3.2).



*Figure 3.1.* Model for a constructivist learning environment (Adapted from Jonassen, 1999)

| Table 3.2 Implementation of key features in the learning design |  |   |
|---|--|---|
| Feature   | Rationale according to Jonassen (1999)   | Implementation in this learning design  |
| 1. Project space  | <p>"The focus of any CLE is the question or issue, the case, the problem or the project that learners attempt to solve or resolve." (p. 218)</p> <p>The project space represents an authentic project/problem/case, sets it within a realistic context and allows learners to manipulate the environment.</p>  | <p>The focal activity in this subject is a design 'problem' for which learners develop a multimedia solution. Students work in small project teams and liaise with a real client. A number of clients are available for learners to choose from or they may find their own.</p> <p>These design problems are ill-structured and complex, and engage learners in the type of thinking required by practitioners in the design and development of a project.</p>  |
| 2. Related cases  | <p>"It is important that CLEs provide access to a set of related experiences that novice students can refer to. The primary purpose of describing related cases is to assist learners in understanding the issues implicit in the problem representation." (p. 223)</p> <p>These related cases should help learners understand the inherent complexity of the domain through multiple perspectives and themes.</p> | <p>The related cases developed for this subject describe two real-life educational multimedia design projects through the experiences of key designers and the project manager, and supporting documentation.</p> <p>These cases present the complex array of design, management, process and technical issues that arise in these kinds of projects.</p> <p>To be useful to students as solutions to past problems the two cases 'tell the story' of the projects from the initial approach by the client through to the distribution of the final product. As such they are full cases rather than case problems.</p> |
| 3. Information resources  | <p>"Learners need information about the problem in order to construct their mental models and formulate hypotheses that drive the manipulation of the problem." (p. 225)</p> <p>An appropriate set of resources will help learners make sense of the problem and its principles. The resources should be organised such that learners can readily find relevant information when they need it.</p>                 | <p>The set of information resources provided for this subject included: suggested readings and optional references on instructional design and project management (as electronic documents and Web links); templates to guide the development of design statements; descriptions of other projects and examples of previous student work and; useful media production resources.</p>  |
| 4. Cognitive tools  | <p>The environment should provide access to cognitive tools that scaffold the learner's performance of the focal task.</p> <p>Cognitive tools may be included to assist learners represent the problem, represent what they know or are learning, automate a low-level task or assist with information gathering.</p>  | <p>Software tools and templates were made available to assist learners with representing their problems through written description and concept mapping; gathering and organisation content; and storyboarding their design ideas.</p>  |

| Table 3.2 Implementation of key features in the learning design |   |  |
|---|---|--|
| Feature   | Rationale according to Jonassen (1999)  | Implementation in this learning design   |
| 5. Conversation and collaboration tools                         | "CLEs should support collaboration within a group of participants, shared decision making about how to manipulate the environment, alternative interpretations of topics and problems, articulation of learners' ideas and reflection of the processes they used." (p. 229) | Asynchronous communication tools, such as electronic mail and on-line discussion forums, were used to support interpersonal, small group and whole class interaction.<br><br>An array of tools, both asynchronous and synchronous, was available to meet the individual communication needs of the project teams.  |
| 6. Social/Contextual support                                    | "Social and contextual support of teachers and users is essential to successful implementation of CLEs" (p. 230)<br><br>Successful implementation of a CLE requires consideration of physical, social, cultural, organisational and technical factors.                      | Face-to-face contact through scheduled class meetings was an important social support for students, providing opportunities for discussion, problem-sharing and peer support.<br><br>Training sessions and skill development workshops were held according to the needs and interests of the group.<br><br>Access to the computer laboratory facilities and other rooms provided spaces for meetings and group-work. |

To design the related cases and learning activities appropriate for this subject it was necessary to identify the knowledge and skills the students should develop through the design task, and then how the learning environment would support the process. Ertmer and Russell (1995) suggested that instructional design students need to develop the problem-solving, critical thinking and reasoned judgement skills that are needed to work with complex, multi-faceted design problems. Table 3.3 outlines the design principles that underpinned the development of the cases in relation to the desired outcomes for this subject and the team design activities.

| Table 3.3 Desired outcomes against project and case analysis tasks   |   |   |
|--|---|---|
| Desired outcomes for learners  | Key features of group design task   | Key features of case materials  |
| Instructional design students need to develop the knowledge and skills to:   | The team design activities aim to develop these skills by engaging learners in a project which requires them to:    | Case materials and activities aim to develop these skills by engaging learners with realistic, detailed design cases which: |
| <ul style="list-style-type: none"> <li>make sense of a complex design problem by identifying and analysing the critical issues in a situation</li> </ul> | <ul style="list-style-type: none"> <li>describe and assess the features of a particular learning problem</li> </ul> | <ul style="list-style-type: none"> <li>contain multiple issues and perspectives</li> </ul>                                  |



| Table 3.3 Desired outcomes against project and case analysis tasks   |  |  |
|--|--|--|
| Desired outcomes for learners  | Key features of group design task  | Key features of case materials   |
| Instructional design students need to develop the knowledge and skills to:   | The team design activities aim to develop these skills by engaging learners in a project which requires them to:   | Case materials and activities aim to develop these skills by engaging learners with realistic, detailed design cases which:  |
| <ul style="list-style-type: none"> <li>consider multiple possibilities for design solutions by applying knowledge of instructional strategies</li> <li>select the most appropriate solution by considering possible designs in light of situational factors</li> <li>communicate design decisions to others and negotiate as necessary</li> <li>document and/or prototype a design solution</li> <li>evaluate a design solution in terms of the initial problem</li> </ul> | <ul style="list-style-type: none"> <li>consider how different strategies might be applied to a particular learning situation</li> <li>determine which design solution would be most appropriate in a particular situation</li> <li>work with a real client to whom they must explain and justify their design decisions</li> <li>prepare a description of the design solution within a design statement template</li> <li>evaluate the design solution by reflecting on their project experiences and their original intentions</li> </ul> | <ul style="list-style-type: none"> <li>illustrate how designers generate their initial ideas from an understanding of instructional strategies</li> <li>illustrate how designers determine which methods are most suitable in a particular situation given a range of contextual factors</li> <li>include details of communication between designers and others</li> <li>include relevant documents and files as part of the case materials</li> <li>include the designer's reflections on the overall process and solution</li> </ul> |

### 3.3.2.3.1 Design of the case materials

The design of the case materials was informed by the general literature on the use of cases from which emerged three principles for their design. Table 3.4 outlines the ways in which these were implemented in the learning environment.

| Table 3.4 Design features of the cases materials  |  |
|---|--|
| Principle from literature   | Features of the case materials   |
| Case should present realistic situations that reflect real-world practice (Knirk, 1991; Stolovitch & Keeps, 1991)                       | <ul style="list-style-type: none"> <li>The cases developed describe the experiences of a team working on a real-life multimedia design project.</li> <li>The cases include archival materials from the project that illustrate the 'story' and provide examples of key artefacts (for example documentation, prototypes and reports).</li> </ul>   |
| Cases should incorporate multiple perspectives and preserve ambiguity, complexity and conditionality of knowledge (Spiro & Jehng, 1990) | <ul style="list-style-type: none"> <li>The cases include first-person accounts from several of the key team-members, each of whom had different responsibilities and concerns.</li> <li>The cases contain multiple issues and themes that convey the complexity of real-life project work. The materials have not been simplified to focus on a single issue or sub-set of issues.</li> <li>The cases trace the history of key design decisions that show how situation-specific factors impacted the project outcomes.</li> </ul> |

| Table 3.4 Design features of the cases materials   |   |
|--|---|
| Principle from literature  | Features of the case materials  |
| Cases should provide a richly-detailed source of information that encourages exploration and interpretation (J. H. Schulman, 1996) | <ul style="list-style-type: none"> <li>▪ The case materials were not simplified and retained original detail as much as possible.</li> <li>▪ The case materials are presented in a simple structure that allows learners to navigate through the materials easily, but leaves them to uncover themes and issues.</li> </ul> |

To meet the need for realism, the researcher decided to develop cases about real-life projects rather than realistic, but fictional ones. This is despite calls for the use of fictional cases or materials (Graf, 1991; McLellan, 1993). It is argued that fictional cases are preferable because they can be created to present a specific situation for analysis and thus would be more manageable and easily matched to objectives (Graf, 1991). However, even when fictional cases are based on real events and experiences, there is a risk that the author will simplify the details and combine unlikely events. By contrast, true-to-life cases that depict actual situations and real people by their very nature have a high external validity (Stolovitch & Keeps, 1991).

The criteria used to select the real-life projects suitable for development into cases were that the people involved were accessible to the researcher, that documentary evidence could be examined and presented, and that the final products could be distributed as part of the case materials. Two projects were chosen and developed as cases, tracing the development of *Exploring the Nardoo* and *StageStruck* by the Interactive Multimedia Learning Laboratory in the Faculty of Education at the University of Wollongong. An overview of each of these projects can be found in Appendix 3.2.

These cases illustrate the nature of design problems as ill-structured and ill-defined, further reflecting the nature of real-life practice. The materials present the approach of the project designers to interpreting the needs of the client and target learners, developing appropriate instructional solutions, representing their design ideas and implementing these in the product. The cases are not presented as exemplars, but instead aim to convey the multiple issues that typically arise during a project and to illustrate the ambiguities and contingencies that are part of the design and development process.

The case materials themselves depart from the traditional narrative form in which the authors summarise situations into “simplified storylike forms” (Milheim, 1996, p. 26). However such narratives are thought to be motivating (L. S. Shulman, 1992) and in some ways reflect the way practitioners often share knowledge (Kleinfeld, 1990). To achieve a format that could maintain complexity and incorporate narrative, the case incorporates a range of materials that are maintained in the ‘rawest’ form possible. This provides learners with a rich information source that they can explore and make sense of themselves. This approach maintains a level of detail, complexity and ambiguity that would be more difficult to achieve in a concise format. Figure 3.2 provides a diagrammatic representation of the materials for the *Exploring the Nardoo* case, a sample of which is provided in Appendix 3.3. The *StageStruck* case has a similar structure. The full versions of both cases may be viewed on the accompanying CD-ROM.

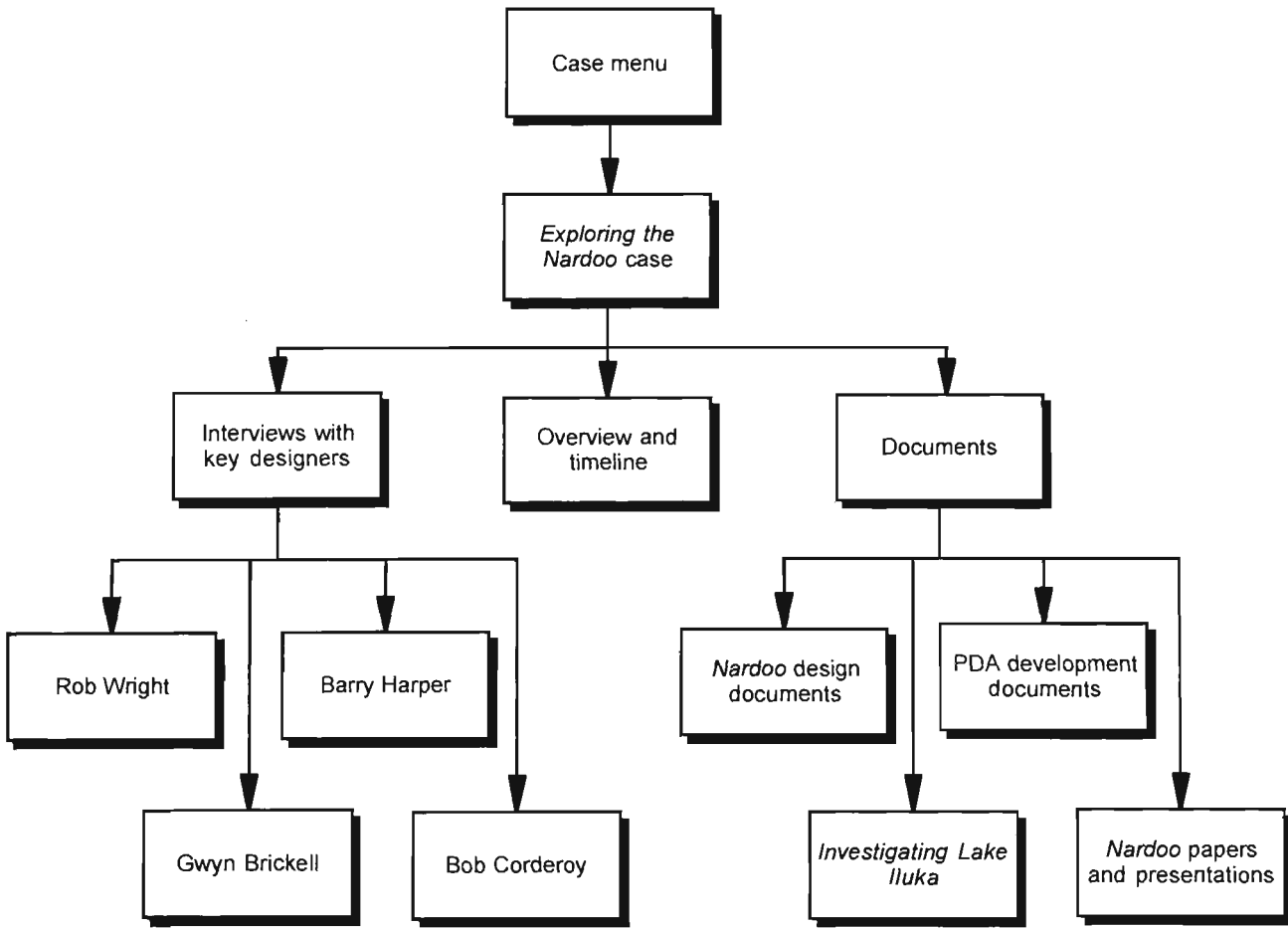


Figure 3.2. The structure of the case materials (showing *Nardoo* case only).

Constructed as a series of Web pages linked from the subject WebCT site, the various components are linked from an introductory page, which provides a brief overview of the project and a timeline of major events. These were developed from archival records of the projects including meeting notes, email communication and diary entries. They are the only 'pre-packaged' materials included, and from here learners can follow links to a range of other resources. Simple navigation allows learners to 'criss-cross' materials (Spiro & Jehng, 1990), following their own paths.

This structure allowed the inclusion of multiple first person narratives. These include accounts from the key project designers and the project manager which, apart from minor editing to improve readability, are included as direct transcripts of interviews conducted with the researcher. This allows learners to read the conversation in its original context and in the interviewee's own words. These multiple narratives allow learners to see that each person has a unique perspective and may interpret events differently to others involved in the same situation. This illustrates the ambiguity of real-life situations and the multiplicity of views individuals bring to a project.

Artefacts from the case projects add to the detail and realism of the materials. Copies of the CD-ROM products are provided to learners so that they can examine them in conjunction with the case accounts. This allows them to make the link between the process and ideas described by the designers and the realisation of these in the final product. Students can also examine original design documents, including versions of the project design statements, storyboards, concept maps and early prototypes. Also included are reviews of the final products and papers written about subsequent research projects.

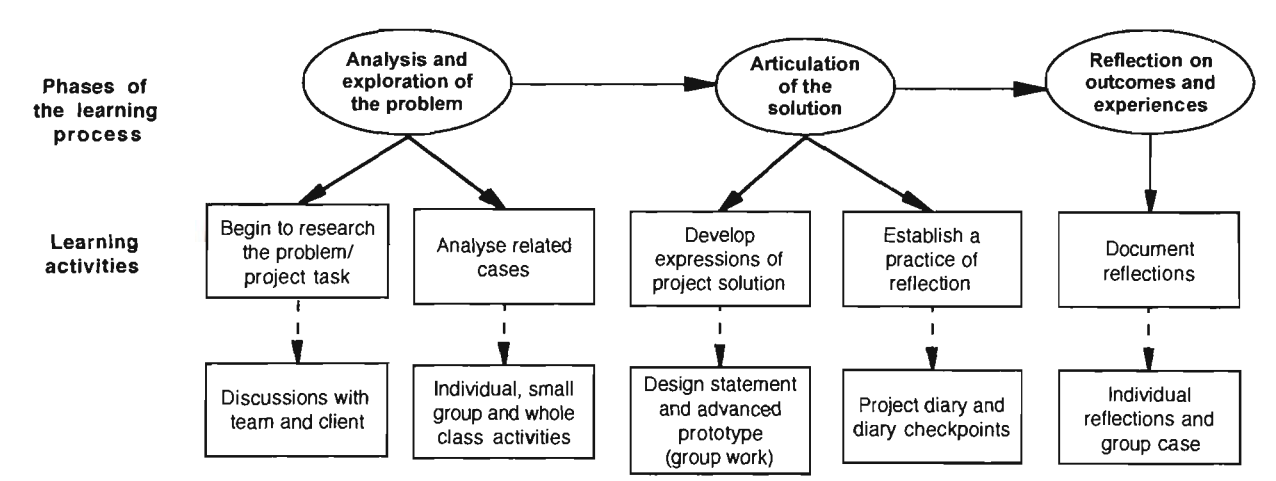
The use of a Web-based format offered several advantages. It allowed a more extensive, richer set of resources to be created than could have been using a print-based format. With the delivery infrastructure already in place through WebCT, Web-based materials were inexpensive to produce and deliver. This meant that the cases could include optional materials that would add to the context and support the key information sources. The simple structure and navigation allowed learners to move easily through the large set of

resources, making the materials manageable. The Web-based format also allowed the inclusion of full-colour visual media, something which has been considerable interest to case developers wishing to create richer, more realistic materials (see for example Bronack et al., 1999). In these two cases graphical mock-ups and screen captures from prototype versions have been used to illustrate how the designers' ideas for the product changed over time.

**3.3.2.3.2 Design of the learning activities**

Jonassen (1999) suggested that learning activities in CLEs should support learners to explore the attributes of the focal problem, articulate their actions and reflect on performance. These ideas and other literature on the design of authentic activities and case-based learning are the basis for the general principles that underpin the learning activities developed for this subject.

The overall structure of the learning experience took learners through a process of analysis, project work and reflection: analysis of the related cases, the design and development of their own projects, and reflection on their experiences (see Figure 3.3). Full details of the class schedule can be found in Appendix 3.4.



*Figure 3.3* The learning process and activities

*Analysis of related cases*

The role of the cases in the CLE model (Jonassen, 1999) is to provide examples of previous situations which learners can use as reference points as they develop their understanding of the focal problem, in this case the group design task. Drawing on the literature, in particular the work of Miller and Kantrov (1998), an analysis task was designed that would encourage learners to develop an understanding of the specific circumstances described in the two cases, and then move on to consider themes and issues more generally. Table 3.5 summarises how these (and other) ideas were implemented in the learning activities.

| Table 3.5 Features of the case analysis activities  |   |
|---|---|
| Principle from literature   | Features of the analysis activities   |
| Learning activities should encourage learners to develop their own interpretations (Duffy & Cunningham, 1996; Hazard, 1992)   | <ul style="list-style-type: none"><li>▪ Learners began their analyses of the cases with an individual task which allowed them to develop ideas about the case projects and focus on the aspects of interest to them.</li></ul>  |
| Learners should develop an understanding of the specifics of the situation by working within the confines of the case (Christensen, 1987; Miller & Kantrov, 1998)                             | <ul style="list-style-type: none"><li>▪ Analysis questions encouraged learners to develop an understanding of the specifics of the situation through an analysis of the project's development over time, and of the issues that arose and their consequences, and through comparison of multiple cases to uncover similarities and differences.</li></ul>   |
| Learners develop their understanding of the issues further by participating in case discussions which elicit alternate views (Carlson, et al., 1998; Levin, 1994)                             | <ul style="list-style-type: none"><li>▪ Learners participated in small and large group discussion of issues which encouraged them to clarify and share their ideas and consider alternative views offered by other students.</li></ul>  |
| Learners move beyond the context of the specific case by making connections with relevant concepts from the literature and with their own situations and experiences (Miller & Kantrov, 1998) | <ul style="list-style-type: none"><li>▪ Analysis questions prompted learners to consider how the experiences of the designers in the cases related to their own experiences and concepts they had read about in the literature.</li><li>▪ Students were also asked to consider what lessons they had learned from studying the cases.</li><li>▪ Small group discussion in project teams prompted learners to consider the similarities and differences between their own design problems and those presented in the cases to help them move beyond the immediate context of the cases and consider issues more generally.</li></ul> |

To guide them in exploring the cases, learners were given a series of analysis questions for which they provided individual responses. These questions asked them to describe the design process and key events, relate the experiences of the case designers to concepts from the literature and/or their own experiences, examine a particular design feature and identify the major management issues. The instructions provided to students for this and other tasks can be found in Appendix 3.5. The purpose of the task was to allow learners to develop their own interpretations of the cases, allowing them to focus on the issues of interest to them.

At the second class meeting small group and whole class discussion helped learners develop their ideas further. Firstly the project teams met to discuss how the design and management issues highlighted in the cases might be relevant to their own projects. These issues were then shared in a whole class discussion. This series of activities was designed to allow the learners to share their ideas about the cases first with the other members of their teams, and take the results of that discussion to a wider forum. The intention was to take learners from specific discussion of the cases to the broader issues in a way that would lead into their own project experiences.

### Collaborative project work

During the period in which the students were working on the case analysis task, the project teams began to form and their early activities were focused on developing their design statements. To do this the teams needed to negotiate the distribution of roles and responsibilities amongst the members, meet with their clients to develop their understanding of the problem and then determine an appropriate course of action. From this they developed an advanced prototype, which was then submitted at the end of session. The key features of the task are described in Table 3.6, in relation to guiding principles identified from the literature.

| Table 3.6 Features of the project activities  |  |
|---|--|
| Principle from literature   | Features of the design task  |
| Authentic activities should engage learners with realistic problems (Honebein et al., 1993; Jonassen et al., 1993).                                     | <ul style="list-style-type: none"> <li>▪ Learners worked in teams in which each member negotiated to take on a particular role consistent with the structure of a typical design team.</li> <li>▪ Teams worked with a real client from outside the university and developed a solution to a real educational/training problem.</li> </ul>  |
| Learners should face cognitive challenges similar to those present in the real world environment (Savery & Duffy, 1995).                                | <ul style="list-style-type: none"> <li>▪ In the course of designing and developing the projects learners faced similar cognitive challenges to real-life designers in that they had to define the problem, develop a viable design solution, and then evaluate, adapt and revise that design through prototyping activities.</li> <li>▪ In addition learners had to work collaboratively and attend to project management issues, such as teamwork, communication and organisation.</li> </ul> |
| Learners should be encouraged to develop ownership over the task (Honebein et al., 1993).   | <ul style="list-style-type: none"> <li>▪ Students were given the option to select from a range of projects that the instructor had identified prior to the session or to seek out their own clients and projects.</li> </ul>   |
| The learning tasks should be set within the global task environment and may be simplified to suit the learners (Honebein et al., 1993, Jonassen, 1999). | <ul style="list-style-type: none"> <li>▪ Learners were required to complete two components of the full projects illustrated in the cases – design statement and an advanced prototype. This simplified the task while still setting it within the broader context.</li> </ul>  |



| Table 3.6 Features of the project activities  |  |
|---|--|
| Principle from literature   | Features of the design task  |
| Appropriate contextual supports should be provided (Grabinger, 1996, Jonassen, 1999). | <ul style="list-style-type: none"> <li>Teams were provided with access to a physical computer lab space in which they could work together. The lab was equipped with hardware and software tools that would be used by real-world designers and developers.</li> <li>Collaborative and communication tools were made available to support group-work.</li> <li>Templates and feedback from the instructor assisted with the learning tasks.</li> <li>Skill development workshops supported learner to develop technical and practical skills.</li> </ul> |

### Reflection

Towards the completion of their group projects learners were also required to respond individually to a series of reflective questions and then submit reflective cases developed collaboratively in their project teams. The design principles derived from the literature and their implementation in the reflective activities is outlined in Table 3.7.

| Table 3.7 Features of the reflective tasks  |   |
|---|---|
| Principle from literature   | Features of the reflective activities   |
| Reflection on action can consolidate understanding of a problem (Jonassen, 1999; Schön, 1987)   | <ul style="list-style-type: none"> <li>The reflective tasks encouraged learners to develop an understanding of the specifics of their situations through the re-telling of the project’s development over time, and of the issues that arose and their consequences, and by comparing their project experiences to the cases.</li> </ul>  |
| Reflective activities should encourage learners to develop their own interpretations (Rowland, 1992)  | <ul style="list-style-type: none"> <li>Learners began their reflections with an individual task that allowed them to develop their own ideas about their projects and focus on the aspects of interest to them.</li> </ul>  |
| Collaborative activities should encourage learners to develop shared meaning (Rowland, 1992)  | <ul style="list-style-type: none"> <li>Developing their own collaborative cases encouraged learners to clarify and share their ideas and consider alternative views offered by the other members of their teams.</li> </ul>   |
| Learners move beyond the context of the specific case by making connections with relevant concepts from the literature and with their own situations and experiences (Miller & Kantrov, 1998) and develop a better or more general solution to it (Schön, 1987) | <ul style="list-style-type: none"> <li>The reflective tasks prompted learners to consider how their project experiences related to the events depicted in the cases and concepts they had read about in the literature.</li> <li>Students were asked to consider what lessons they had learned and what advice they would offer others.</li> <li>The tasks prompted learners to consider the similarities and differences between their own design problems and those presented in the cases to help them move beyond the immediate context of the cases and consider issues more generally.</li> </ul> |

The aim of this task was to draw learners out of the often all-consuming project development tasks and ask them to again examine the main design and management issues, now in terms of their own project experiences. To assist with their reflections it was suggested that learners maintain project diaries and report their activities and thoughts regularly on the class discussion list at designated diary checkpoints.



#### **3.3.2.3.3 Role of the instructor**

The role of the instructor in this learning environment acted as a facilitator and coach rather than taking on a more directive teaching role. As such, she helped the learners identify and locate the resources and tools they required for their particular projects, gave advice on strategies and processes, and raised issues for consideration when relevant. She guided learners on the use of tools and templates and provided technical support as required. Tailoring help to the particular needs of the individual students and the project teams was the focus of her role. These teaching activities are consistent with those suggested for constructivist learning environments (Jonassen, 1999; Williams, 1992).

#### **3.3.2.3.4 Pilot testing**

The design of the learning environment and process was evaluated through pilot testing with two groups of students. In the first stage of evaluation a group of students tested an early case design. The second evaluation stage involved a pilot study of the re-designed subject using one of the final cases.

##### *Stage one – Testing design ideas (April 2000)*

A group of eight students in an advanced level interface design subject participated in a workshop activity that aimed to explore their ideas about the design process. The class' usual instructor led the session and the researcher observed the students as they used the case materials and asked questions during the discussion phase. During the activity the researcher took field notes, which were then expanded and transcribed immediately after the class. The aim of the evaluation was to observe how students used the case and to collect feedback on the design of the materials.

Students began with a 10-minute concept-mapping exercise in which they recorded their initial thoughts about the multimedia design process. They then moved to the computers and spent approximately one hour studying a short case, which described a Web-design project. This case was constructed as a series of Web pages and was presented in narrative format with direct quotes from the designers incorporated into a general commentary.

Resources, such as various prototypes and the final version of the Web site, were linked from the relevant places in the story. (These materials are included on the accompanying CD-ROM.)

The researcher noted that while working with the case:

- Some students followed the linear sequence of the narrative, while others explored the materials in no particular order using the hyperlinks.
- Some students commented that the headings and links allowed them to follow their own interests.
- Some students experienced technical problems because not all of the lab computers were loaded with the required plug-in for the Shockwave components in the original project.
- The limited discussion at this stage was between students helping each other work with the case.
- Some students missed the key resources section and did not realise they could look at the products until it was pointed out to them.
- After an hour the students had reached saturation point even though they had not covered all of the material.

After studying the case, the students then spent a further 10 minutes updating their concept maps with new ideas and annotations. They were then asked to contribute the main ideas from the concept maps to a general discussion. The range of issues raised covered the concept and purpose of the package, its specifications, the content included, use of evaluation and the project team. A nebulous category 'nature of the package' emerged and defied further definition. There was some debate over the terminology as students struggled to communicate 'what they really meant'. Few issues relating to the design process emerged.

It appeared that in their concept maps students had recorded highly personalised and individual versions of the design process, and that they had difficulty contributing to the class discussion without being able to generalise from it first. This indicated that even

advanced level students, many of whom had recently completed the team project subject, did not have a clear conception of the design process and the related activities and issues. While they were familiar with many of the aspects of designing and developing a multimedia project, they were yet to generalise from their own experiences in a way that might enable them to discuss the issues more generally.

This suggested that learners might benefit from reviewing resources that explain the design process in a more general way to equip them with terminology and common definitions. It may also be that the instructor can do more in encouraging learners to develop a shared understanding.

Overall the trial of the case materials suggested that:

- The Web-based case materials offered multiple paths for navigation. However, restructuring the materials might provide better support for learners wanting to follow a non-linear path through the materials, as well as those preferring to follow the chronological development of the project.
- Structural cues, such as headings and sections, in the materials assisted navigation, however some learners needed more help comprehending the contents of the case.
- Students need prolonged exposure to the materials over multiple sessions to explore them completely.
- More consideration needed to be given to the avoidance of technical problems.
- It cannot be assumed that even advanced level students have a well-formed, easily communicated understanding of multimedia design. Discussion and writing activities should encourage students to document and analyse their own ideas and convert them to a form more readily understood by others. These activities should revise models and terminology encountered in previous subjects.

These ideas were incorporated into the final design as described above.

### *Stage two – Pilot version of one case (July - October 2000)*

The *Exploring the Nardoo* case was included as an optional resource for students enrolled in the first version of the re-designed subject *Interactive Multimedia Design*, which was run with a class of 19 students based in Hong Kong. The subject began with an intensive weekend workshop in July 2000 with their Wollongong-based instructor and ran for 10 weeks during which they participated in on-line activities and communicated with the instructor back in Australia. Additional support was provided through tutorial sessions with a local tutor.

The researcher discussed the nature of the pilot study with students at the initial workshop and, after returning to Australia, observed the progress of the subject through the class Web site. Four students from the group were interviewed when the researcher returned to Hong Kong at the end of the subject. The purpose of the pilot study was to evaluate the case materials and the design of the subject.

In this version of the subject, the case analysis task was included as a non-assessable activity requiring individual preparation and submissions to the on-line discussion forum. Unsurprisingly, most students did not complete the activity because it was not connected to a specific assessment task. Discussion with the four students interviewed at the end of the subject revealed that although the cases had given them some ideas for the design and management of their projects, they couldn't afford to spend much time on the case analysis activity because they needed to get started on the project as quickly as possible. The low priority placed on the activity was reflected in the small number of submissions received (four only) and the low level of participation in the on-line discussion. The student interviews also indicated that once the project was established and development had started there was little time available to consult readings, and that other subject resources were also under-utilised.

This version of the subject required students to prepare individual reflective cases at the end of the subject as part of the assessment (but did not include the group task that appeared in the final version of the learning design). These indicated that the team projects had helped

learners develop their ideas about the design process, and some were able to relate these to concepts from the literature. This seemed particularly so if the student had a difficult and unsatisfying project experience. There were few references to the cases however, with only one student commenting on the value of the cases for prompting her to consider alternative approaches and ideas.

This phase of evaluation suggested that those students who had read the case materials at the beginning of the subject were at least aware of some of the issues they might face in their project teams and incorporated some of the design ideas from the case projects. However, the analysis task must be integrated into the assessment to ensure that students value and complete the task. Also, the individual reflective cases enabled learners to analyse their experiences and make links to the literature. It may have been of further benefit to learners to be able to share these with others.

### **3.3.3 Data collection and analysis**

#### **3.3.3.1 Ethics approval**

Prior to the commencement of data collection a Human Research Ethics application was submitted for review to the University of Wollongong's Human Research Ethics Committee in April 2000 and approved shortly after. The application undertook that:

- The students be fully informed about the study.

The researcher discussed the nature of the study with the student group. Questions about the purpose of the study, research activities and treatment of the data collected were addressed at this time. Opportunity was also provided for individuals to discuss any concerns privately with the researcher. An information sheet was also provided for future reference (see Appendix 3.6).

- Participation would be voluntary.

Students were free to leave the study at any time, and told that should they withdraw, data collected from them would not be used in the study. Students were also assured that withdrawal would not affect their studies.

- Information collected would remain confidential.

Students were advised that their identities would be protected by the researcher and that pseudonyms would be used in any publications arising from the study.

- Consent would be obtained in writing.

Students were asked to complete and return a copy of the consent form (see Appendix 3.7)

### **3.3.3.2 The role of the researcher**

The role of the qualitative researcher as the main research instrument - observing and interacting with participants, collecting and analysing data - contrasts to the objectivity and impartiality valued in the quantitative investigator.

This feature of qualitative research raises issues of subjectivity in data collection and interpretation in that the evidence collected and the conclusions drawn come from a single perspective. While this may be seen as a critical flaw in the qualitative approach, Peshkin (1988) argues that all researchers should systematically identify the ways in which their subjectivities shape their inquiries, and report these influences with their findings for scrutiny by readers.

The researcher recognises that her own subjectivities influence the choice and design of the study, and the collection, presentation and interpretation of data. This study is likely to reflect the researcher's biases towards a constructivist view of learning, acknowledgement of individual's perspective and questioning of the claims made for a case-based approach.

In this study the researcher adopted the role of non-participant observer at class meetings. Most of the students knew the researcher prior to the study either as a tutor in one of their previous subjects or as a member of the teaching team. The students were accepting of the researcher's role as observer rather than teacher and seemed unaffected by her presence in the class.

3.3.3.3 Data collection process

When choosing data collection methods for a qualitative case study the researcher seeks a wide array which will help “build an in-depth picture of the case” (Creswell, 1998, p. 123). Merriam (1998) divides data collection techniques into three main types - interviews, observations and documents – noting that selection depends on “the researcher’s theoretical orientation, by the problem and purpose of the study, and by the sample selected” (p. 70). Further elaboration of these is offered by Yin’s (1994) summary of sources of evidence for case study research in which he distinguishes between direct and participant observation, separates archival records from other forms of documentation and includes physical artefacts. Creswell (1998) includes audio-visual materials as a separate form of data, which reflects increased use of non-print and non-text forms of qualitative data, although this could be considered a sub-set of Yin’s artefact category.

Gillham (2000) suggests that in selecting data techniques appropriate for a study researchers should consider what methods will help them answer their research questions. Multiple sources of evidence should be collected. The researcher should look for “what people *say*, what you see them *doing*, what they *make* or *produce*, what the documents and records *show*” (Gillham, 2000, p. 20). Table 3.8 was constructed to identify the data required, data collection tools and protocols, timing for data collection and proposed analysis methods for each of the research questions.

| Table 3.8 Data collected to answer the research questions for this study |  |  |   |
|--|--|--|---|
| Research question  | Data required  | Data types   | Details   |
| How do learners interpret case materials?                                | <ul style="list-style-type: none"><li>▪ Case interpretations (individual, small group and class)</li><li>▪ Approaches to studying with case materials</li><li>▪ Attitudes and conceptions</li></ul>                                  | <ul style="list-style-type: none"><li>▪ Documents (student work)</li><li>▪ Observations</li><li>▪ Semi-structured interviews</li></ul> | <ul style="list-style-type: none"><li>▪ Individual case analysis assignments</li><li>▪ Summaries of group discussion</li><li>▪ Observation of whole class discussion</li><li>▪ Student responses to interview questions</li></ul> |
| How do learners develop solutions to their project tasks?                | <ul style="list-style-type: none"><li>▪ Problem selection, interpretation &amp; representation</li><li>▪ Selection of instructional strategies</li><li>▪ Instructional features of projects</li><li>▪ Teamwork and process</li></ul> | <ul style="list-style-type: none"><li>▪ Documents (student work)</li><li>▪ Semi-structured interviews</li></ul>                        | <ul style="list-style-type: none"><li>▪ Group design statements</li><li>▪ Group prototype products</li><li>▪ Student responses to interview questions</li></ul>   |

| Table 3.8 Data collected to answer the research questions for this study                 |  |  |   |
|--|--|--|---|
| Research question  | Data required  | Data types   | Details   |
| What aspects of the projects and cases do learners reflect on at the end of the subject? | <ul style="list-style-type: none"> <li>▪ Main issues after case and project work</li> <li>▪ Reflections on experience</li> <li>▪ Reflections on cases</li> </ul> | <ul style="list-style-type: none"> <li>▪ Documents (student work)</li> <li>▪ Semi-structured interviews</li> </ul> | <ul style="list-style-type: none"> <li>▪ Individual reflective papers</li> <li>▪ Group reflective cases.</li> <li>▪ Student responses to interview questions</li> </ul> |

Individual student work and student interviews comprised the primary data sources for addressing the research questions. A summary of the data collected from the students can be found in Table 3.9.

| Table 3.9 Summary of data collected from students |       |               |                  |                  |         |                 |                 |           |
|---|-------|---------------|------------------|------------------|---------|-----------------|-----------------|-----------|
| Name  | Group | Case analysis | Group discussion | Design statement | Project | Focus questions | Reflective case | Interview |
| Lynn  | A     | X             | X                | X                | X       | X               | X               | X         |
| Margaret  | A     | X             | X                | X                | X       | X               | X               |           |
| Steve   | A     | X             | X                | X                | X       | X               | X               |           |
| Kath  | A     | X             | X                | X                | X       | X               | X               | X         |
|   |       |               |                  |                  |         |                 |                 |           |
| Anna  | B     | X             | X                | X                | X       | X               | X               | X         |
| Barbara   | B     | X             | X                | X                | X       |                 |                 | X         |
| Ian   | B     | X             | X                | X                | X       | X               | X               |           |
| Sheryl  | B     | X             | X                | X                | X       | X               | X               | X         |
|   |       |               |                  |                  |         |                 |                 |           |
| Simon   | C     | X             | X                | X                | X       |                 |                 |           |
| Joanne  | C     | X             | X                | X                | X       | X               | X               | X         |
| Liz   | C     | X             | X                | X                | X       | X               | X               | X         |
| Rod   | C     | X             | X                | X                | X       | X               | X               |           |

Student work came from writing activities and instructional design tasks undertaken for assessment. During the case analysis phase, documentary evidence was collected in the form of learners’ individual responses to a series of open-ended questions and summaries of the small group discussions which were posted on the class discussion list. The design statements and prototype products developed by each of the groups was collected to provide insights into the design phase. Reflections in the form of individual responses to a set of focus questions and group reflective cases were collected from all but two students who, not being enrolled in the full eight credit point subject, did not complete this task. All of these documents were submitted and stored in electronic form.



Semi-structured interviews were conducted with seven of the participating students who volunteered towards the end of session. Interview guides were used to ensure that similar questions were posed to each participant, but flexibility allowed exploration of related issues raised by interviewees (see Appendix 3.8). The sequence of questions sought learners' perspectives on the materials and activities encountered throughout the subject. The interviews were tape-recorded and later transcribed into word-processed documents.

Observations of the small group and whole class discussion activities made at the second class meeting were also important for learning about how learners interpreted the cases. During the session the researcher moved around the room, observing the groups rather than joining the discussion and taking brief field notes. These notes were then typed up as a word-processed document immediately after the session.

While it is important to collect data to address the research questions, Gillham (2000) also emphasises the importance of keeping an open mind. This means collecting other forms of data that allow the researcher to develop an understanding of the setting and allows for the emergence of unanticipated issues.

Observations made during other class meetings, records of electronic discussions, the perspective of the instructor, notes kept by the researcher and other subject materials were collected to support the interpretation of primary data and build a detailed picture of the learning environment.

Observations were made at a further two class meetings. From the first class meeting the researcher was able to become familiar with the students in the group, observe the instructor's introduction of the subject and obtain consent from the participants. At the final class meeting the researcher observed presentations of the final prototypes by each of the project groups and the subsequent discussion of issues. At these meetings data were collected in the form of field notes, which were then developed into a full account after the class meeting.

Administrative tools in WebCT allowed the researcher to compile the contributions to the discussion list as a text file. This captured not only the summaries of the group discussion task mentioned above, but also diary checkpoints posted by groups and individuals. Diary checkpoints were neither required nor assessable, but students were encouraged to participate in the activity and nearly all made contributions at some stage in the session. Other messages, for example to organise meetings or clarify assessment expectations, were also included.

A semi-structured interview was also conducted with the instructor using the protocol included in Appendix 3.9. This allowed the researcher to capture the instructor's perspective and reflections on design of the subject, the issues the students raised with her, the learning outcomes, and her role as the teacher. Informal discussions with the instructor throughout the session were also noted.

The researcher maintained a reflective diary throughout the study, documenting its development from inception. It contains both description of events and the researcher's reflections on them. Erlandson and colleagues (1993) recommend this approach as a means of recording "the researcher's own feelings, attitudes, learnings, and insights and which chronicles the researcher's growth over time" (p. 108). This is necessary because the researcher is the primary instrument of data collection whose interaction with the setting must be documented.

A full set of the class materials was also collected. This includes the subject outlines, details of the assessment tasks, the case materials analysed and other resources such as readings and templates. These are included on the accompanying CD-ROM.

#### **3.3.3.4 Data analysis**

Data analysis involves "making sense out of the data" in a process of consolidation, reduction and interpretation (Merriam, 1998, p. 178). A voluminous set of information is reduced to patterns, categories and themes, and then interpreted using some framework (Creswell, 1994). During this process of analysis and synthesis the researcher exercises subject judgement "all the while realizing their own consciousness" (Stake, 1995, p. 41).

Preliminary data analysis usually occurs concurrently with data collection rather than beginning after the full data set has been gathered as in a quantitative study (Merriam, 1998). This preliminary analysis is often in the form of memos and notes made by the researcher to record developing ideas about the study, assess progress and make connections to the literature.

However, there is little in the literature to guide a qualitative researcher who instead must rely on rigorous thinking, adequate presentation of evidence and consideration of alternative interpretations (Yin, 1994).

Creswell (1998) reviews some of the general analysis strategies suggested in the literature and from this develops a spiral model of the analysis process in which the researcher moves through stages of activity from data collection through description and interpretation to a final representation. While the general process is similar for all qualitative studies the techniques used may differ depending on the nature of the investigation.

Merriam (1998) identifies three levels of analysis that occur in case study research. The most basic of these is the descriptive account for which the researcher compresses and links data together to create a narrative for the reader. At the next level the researcher looks for categories and themes from which they interpret the meaning of the data. The final level involves the development of theory which explains the data. A purely descriptive study would involve just the most basic level of analysis, but more commonly at least two, if not all three levels, are used.

Miles and Huberman (1994) offer one of the few practical guides which describes common analytic procedures for the qualitative researcher. Their sourcebook details specific methods that researchers can use from the design of their studies, through data reduction and display, to drawing and verifying conclusions.

The main data analysis activities undertaken for this study are summarised in Table 3.10 based on Creswell's (1998) key analysis stages for case study research (see p. 148).

| <b>Table 3.10 Data analysis techniques used in this study</b> |  |  |
|---|--|--|
| <b>Data analysis and representation</b>                       | <b>For a case study</b>  | <b>Analysis and presentation techniques used</b>   |
| Data managing   | Create and organise files for data                                   | <ul style="list-style-type: none"> <li>Files were converted to electronic form (if necessary). They were then stored on computer according to data type, with their location recorded in a spreadsheet.</li> </ul>   |
| Reading and memoing   | Read through text, make marginal notes, form initial codes           | <ul style="list-style-type: none"> <li>Each data file was examined multiple times.</li> <li>Text files were printed and marginal notes were added at the time of reading. Further notes were made in the researcher's journal.</li> <li>Non-text files were examined on computer and notes made in the researcher's journal.</li> <li>Early ideas for coding were recorded.</li> </ul>   |
| Describing  | Describe the case and its context                                    | <ul style="list-style-type: none"> <li>Information about the setting was collected and added to the data set.</li> <li>Multiple sources were collected to represent the evolution of the case, including 'official' documents such as the subject outline, discussion list posting and interviews to represent the student perspective, and interview and informal discussion to include the instructor's perspective.</li> <li>Descriptions of the case and context were developed and refined throughout the study, often for use in work-in-progress publications.</li> </ul>   |
| Classifying   | Use categorical aggregation<br><br>Establish patterns of categories  | <ul style="list-style-type: none"> <li>Coding categories were developed from:               <ul style="list-style-type: none"> <li>issues emerging from the data</li> <li>the research sub-questions</li> <li>taxonomies from the research literature.</li> </ul> </li> <li>Data display techniques from Miles and Huberman (1994) were used to develop concept maps, matrices and diagrams. These were examined to determine patterns present in the data.</li> <li>Qualitative analysis software was also used to code data and reveal patterns.</li> <li>A discussion section in each analysis chapter discusses the patterns revealed by examination across categories.</li> </ul> |
| Interpreting  | Use direct interpretation<br><br>Develop naturalistic generalisation | <ul style="list-style-type: none"> <li>Individual data sources were examined and characterised by the instances of categories and patterns therein.</li> <li>These were summarised and presented with both brief and extended quotes.</li> <li>The final chapter of this thesis develops naturalistic generalisations based on the researcher's interpretation of the data.</li> </ul>   |
| Representing and visualising                                  | Present narrative augmented by tables and figures                    | <ul style="list-style-type: none"> <li>The outcomes of the analysis process are presented in three chronological Chapters (4, 5 &amp; 6).</li> <li>These present data and description with the researcher's interpretive commentary, using tables and figures to summarise where appropriate.</li> <li>Quotes from students' written work appear in original form. Errors of punctuation and spelling have been corrected only when the original form might be misleading to the reader.</li> </ul>  |

The analysis of the data for this study was conducted in three phases which reflect the main research foci – learners’ analysis of the cases, their group projects and their reflections. The details of the analysis, including the specific approaches used, are presented in the next three chapters.

The remaining chapters in this thesis adhere to Stake’s (1995) suggestions that a case study be reported through:

- extensive description of relatively uncontested data (Chapters 4, 5 and 6)
- themes, assertions and interpretations which are related to the evidence (Chapters 4, 5 and 6)
- naturalistic generalisation (Chapter 7).

### **3.3.3.5 Assessing the quality of the study**

All researchers strive to produce “valid and reliable knowledge in an ethical manner” – and this is particularly important “in applied fields, such as education, in which practitioners intervene in people’s lives” (Merriam, 1998, p. 198). Qualitative research has been criticised for being “largely intuitive, soft and relativistic” (Creswell, 1998, p. 142), and there is debate in the literature about how the quality of qualitative research should be judged.

Validity and reliability are concepts well-defined in experimental research, but require some re-thinking in terms of the qualitative case study. Merriam (1998) takes up this challenge, drawing together new perspectives that consider the different nature of qualitative research. Creswell (1998, p. 201) draws these ideas together into eight verification procedures that can be used to provide legitimacy for qualitative research. He suggested that at least two of the following be employed in any study: prolonged engagement and persistent observation; triangulation using multiple data sources; peer review or debriefing; negative case analysis; clarification of researcher bias; member checks; rich, thick descriptions; and external audits. Of these, Stake (1995) placed particular emphasis on triangulation and member checking as important for verification in a qualitative case study.

This study used a number of measures to enhance quality and promote verification. These are summarised in Table 3.11

| Table 3.11 Verification measures used in this study                                     |  |
|---|--|
| Procedure used  | Details  |
| Prolonged engagement and persistent observation in the field                            | <ul style="list-style-type: none"> <li>▪ The researcher was present throughout the subject, attending class meetings and checking the class Web site regularly.</li> <li>▪ The researcher kept continuous notes both during observations and in her reflective journal.</li> </ul>   |
| Triangulation using multiple data sources to provide corroborating evidence             | <ul style="list-style-type: none"> <li>▪ Multiple forms of data were collected including student assignment work, student and instructor interviews, observations of class meetings, discussion list transcripts and subject documents.</li> <li>▪ These provided multiple sources of evidence to address each of the research questions.</li> </ul> |
| Peer review or debriefing to provide an external check on the research process          | <ul style="list-style-type: none"> <li>▪ The researcher consulted a number of research colleagues throughout the study, including the subject instructor and another member of the teaching team who was not directly involved the study.</li> </ul>   |
| Clarifying researcher bias from the outset of the study                                 | <ul style="list-style-type: none"> <li>▪ Researcher bias was addressed in the proposal assessed and approved by a panel from the Faculty and then further reflected on in the researcher's journal.</li> </ul>   |
| Member checks in which the researcher solicits the informant's views of the findings    | <ul style="list-style-type: none"> <li>▪ Member checks were conducted by two of the participants. These students were provided with drafts of sections in which they appeared.</li> </ul>  |
| Rich, thick descriptions which allow the reader to make decisions about transferability | <ul style="list-style-type: none"> <li>▪ As noted above the researcher has provided a detailed description of the analysis process, making it available for the reader to assess. Furthermore the original data and various analysis stages are provided on an accompanying CD-ROM to explicate the process further.</li> </ul>                      |

Two of the participants in the study performed member checks on sections that described their individual and group work. A copy of the consent form that outlined this task is included in Appendix 3.10. The participants’ comments and subsequent discussions with each verified the researcher’s description and interpretations.

In addition to the measures detailed above another researcher was asked to code one of the student’s case analysis assignments to allow cross-checking and verification of the coding scheme. A comparison of the codes assigned and discussions with the second coder revealed a high level of agreement about the coding categories. Feedback from the second coder also indicated that detailed knowledge of the cases was needed to code the response types and support correctly, and familiarity with the large number of issues codes was required before assigning some of the lower level sub-categories. Most of the differences in

coding came from differences in interpretation of the coding categories, something that is to be expected in qualitative research. These differences were resolved to the satisfaction of the second coder upon further discussion.

### **3.4 Summary**

This study adopted a qualitative case study approach, which allowed in-depth investigation of a particular application of case-based learning. This required the development of a case-based learning environment, the design of which evolved through two stages of formative evaluation. For the main study, data was collected from the group of 12 students enrolled in the subject in Spring Session 2000 and from their instructor. Multiple forms of data were collected including student assignment work, interviews with students and the instructor, observations of class meetings, discussion list transcripts and subject documents. These were analysed through a process of classifying, summarising and interpretation, which took account of emergent themes, the research questions guiding the study and concepts from the literature where appropriate. Verification procedures were used throughout the study to enhance the quality of the study and to enable readers to assess the researcher's interpretations themselves.

## Chapter Four

### Learners' Interpretations of the Cases

#### **4.1 Introduction**

This chapter presents an analysis of the learners' interpretations of the case materials. The chapter begins with a description of the case analysis task, followed by an explanation of its relevance to the study and the strategies used to analyse the student's responses. The analysis results for the learners' individual papers, and the small group and whole class discussions are then presented. This is followed by a discussion of these results.

#### **4.2 The case analysis task**

The case analysis task consisted of three parts: an individual paper, small group discussion in project teams and then a discussion involving the whole class. The case materials were made accessible through the subject *WebCT* site and students were provided with copies of the CD-ROM products at the first class meeting.

The weekly schedule (see Appendix 3.4) suggested that students work on their individual case analyses from week two to week four (when this assignment was due). The task encouraged learners to study the materials and develop an understanding of the 'story' behind each of the products. To assist students with their analyses they were asked to develop responses to the following questions for each case:

1. Describe the major stages and decision points in the process of developing the product. What are the major issues at each stage?
2. How do the experiences of the designers in this case relate to:
  - a. other literature you have read about multimedia design and development or
  - b. your own experiences as a designer (for example in your work or for EDGI913 [an earlier subject in the course])?
3. Choose a particular feature of the product which is discussed in the case.
  - a. Describe how you think it relates to the original concept and goals of the project.



- b. From the information in the case what do you think were the major design issues in developing this feature?
  - c. Do you think the feature is effective? Explain your reasoning.
4. What are the major project management issues in developing a multimedia CD-ROM that are highlighted by this case? (Use example situations from the case to support your ideas.)
5. What are the main things that you think you learnt from studying this case?

In addition, it was suggested that students complete their assignments with a brief comparison of the two cases, highlighting the main points of similarity and difference.

The second class meeting was a full-day workshop held on Saturday 12 August, 2000 (Week Five). Part of the morning session was set aside for the project teams to discuss the cases. They were asked to focus on the following questions and then to post a summary of their main points on the class discussion forum:

- Are there any design issues or strategies highlighted by the cases that you think will be important in developing your team's project?
- Are there any project management issues raised by this case that could be important for your project team?

When all of the teams had posted their summaries, the class was re-convened and the instructor facilitated a discussion that encouraged the team members to share their perspectives.

A reproduction of the assessment instructions provided to students appears in Appendix 3.5. An overview of the case projects and samples from the case materials are included in Appendices 3.2 and 3.3. The full set of case materials can be found on the accompanying CD-ROM.

### **4.3 Relevance to the study**

The main research question was broken down into several sub-questions, the first of which is concerned with how learners interpreted the case materials provided. This in turn prompted a further series of sub-questions:

- What ideas do learners develop about the process by which the products in the cases were developed?
- How do learners relate their own experiences in their professional lives and as student designers to the experiences of the designers in the cases?
- How do learners describe the design issues raised by the cases, both in general terms and with reference to a particular feature?
- What do learners identify as the main project management issues raised by the cases?
- What do learners write about when comparing the two cases?
- What general principles do learners derive from the cases?
- What types of response are evident in the learners' analyses?
- What resources do learners use to support their responses?
- What approaches do learners adopt when working with the cases?
- What components of the case materials do the learners find most useful?
- What difficulties do learners experience when working with the materials?
- What aspects do small groups focus on when discussing the cases?
- What aspects of the cases feature in the whole class discussion?

Four sources were analysed to address these questions:

- The individual case analysis papers prepared by students as part of the first assignment.
- The summaries posted to the discussion list after the small group discussions.
- The researcher's observations of the small group and whole class discussion.
- Interviews conducted with seven of the students at the end of the subject.

The specific analysis strategies applied and the results are presented below for each of the data sources.

## **4.4 Approach to analysis**

### **4.4.1 Analysing the individual case analysis assignments**

#### **4.4.1.1 Reading and memoing**

The analysis process began with the researcher reading each of the assignments multiple times and added her notes in the margins. More general notes and ‘hunches’ were recorded in the researcher’s reflective journal.

#### **4.4.2.1 Classifying issues**

The next stage involved classifying the issues raised in the learners’ case analyses. This began with an examination of five student assignments from which issues were extracted and listed under the broad categories of ‘design’, ‘management’ and ‘process’. Each instance was summarised in a short phrase and these were then allocated to sub-categories. Concept mapping was then used to explore links between categories and derive a hierarchy.

#### **4.4.1.3 Classifying response types**

In addition to identifying what learners wrote about in the case analysis assignments, the researcher was also interested in ‘how’ the learners answered the analysis questions. A preliminary coding system was developed from the reading and memoing stage and was used to categorise answers according to different response types, such as descriptive, explanatory and so on. These were further developed with reference to similar approaches found in the literature, for example Newman’s (1990) indicators of classroom thoughtfulness, thinking styles categorised by Marland, Patching and Putt (1992) and Herrington and Oliver’s (1999) characteristics of higher order thinking. The final version was developed with reference to Allen’s (1995) use of frameworks for classifying reflective writing developed by Hatton and Smith (1995) and Sparks-Langer, Simmons, Pasch, Colton & Starko (1990). The simplified scheme, developed by the researcher, coded responses according to type (reproductive description, summarising description, interpretation, judgement or generalisation) and the type of support used (not identified, personal opinion, case evidence, own experience, literature and irrelevant).

The issues, response type and support codes, were then re-created in the *NVivo* software package and used to code the full set of case analysis assignments.

#### **4.4.1.4 Use of *NVivo***

*NVivo* is one of a range of software tools now available specifically to assist in the analysis of qualitative data and to support a wide variety of research approaches (Weitzman, 2000). These tools have found particular application in managing large volumes of data and supporting collaborative enquiry (see for example Cannon, 1998; Higgins, Ford & Oberski, 1996).

*NVivo* allows researchers to code, annotate links, and retrieve any form of data that can be saved as rich text. Reporting and profiling tools can be used for content analysis and data display based on the full data set or sub-set defined by the researcher. The modelling tool allows researchers to create visual representations as their ideas about the data develop. *NVivo* offers greater flexibility than its predecessor *NUD\*IST* through new features, such as the ability to edit documents already imported and to select any section of data for coding, and a much-improved interface. The full details of *NVivo*'s functionality can be found in the reference manual for the software (Fraser, 2000).

*NVivo* was used in this study to analyse the student's case analysis assignments. The text was coded at the sentence level, rather than word or line, as this represented the "units of meaning" (Herrington & Oliver, 1999, p. 11) presented in the documents. In assigning a code, the researcher also took into account the context of the sentence within the passage. This was particularly important when coding response types in which different forms might be used to develop an argument or idea. A sentence could be coded with multiple issues, but was allocated only one response type and support category.

It was necessary to refine categories during the coding process as new issues were found or new definitions suggested by the data. A full set of the codes developed, a definition for each code and an example can be found in Appendix 4.1. The researcher made use of annotation tools within the software to document this changing understanding of the data.

These tools also allowed the researcher to attach unobtrusive notes to the document to highlight features of interest and to create memos to record thoughts and ‘hunches’.

Table 4.1 provides an example of how one student’s work was coded. In the first column the text of the student’s response appears. The next two columns contain the codes characterising the type of response and support provided, and the issues identified. The text is divided into passages to allow easy reference across the rows. These do not represent paragraphs from the original document.

| Table 4.1 Example of coding for an individual case analysis paper   |   |   |
|---|---|---|
| Text from Anna's case analysis  | Response type and support                     | Issues identified   |
| <b>1. Describe the major stages and decision points in the process of developing the product. What are the major issues at each stage?</b>  |   |   |
| <i>StageStruck</i>  |   |   |
| <i>Proposal and Acceptance</i>  |   | Initiation stage (3.3.5.1)  |
| The initial decision point was the original decision to participate in the consortium. The proposal makes it clear that participation is intended to be a learning experience for participants in terms of working with multimedia.   | Summarising description (1.1.2)<br>Case (2.3) | Managing the client (3.2.1.1)   |
| NIDA's lack of familiarity with multimedia projects probably contributed to some issues associated with the management of the project In particular the issue of intellectual property rights later highlights the difference between performing arts and multimedia production.  | Interpretation (1.2)<br>Case (2.3)            | Managing the project resources (3.2.2.5)<br>Managing the client (3.2.1.1)                           |
| <i>Team formation and roles</i>   |   | Initiation stage (3.3.5.1)  |
| Preliminary working relationships were established and the participants indicated their interest in this project as part of the proposal.   | Summarising description (1.1.2)<br>Case (2.3) | Managing the client (3.2.1.1)   |
| They appear to have put limited resources into formalising the consortium agreement and clarifying roles until the outcome of the proposal was known.   | Interpretation (1.2)<br>Case (2.3)            | Team roles (3.2.1.2.1)<br>Managing the client (3.2.1.1)   |
| The Project Director is a NIDA representative however from early stages the nature of the decision-making and reporting arrangements within the consortium appear unclear. Co-ordination and responsibility for decision-making appears to continue as an issue, resulting in conflicts and issues with the UOW Project Manager making some decisions, the NIDA Project Director others, and the management committee reportedly making none. | Interpretation (1.2)<br>Case (2.3)            | Managing the client (3.2.1.1)<br>Working as a team (3.2.1.3)<br>Project management role (3.2.1.2.2) |
| After acceptance of the proposal a number of additional professionals were identified to work on the project.   | Summarising description (1.1.2)<br>Case (2.3) | Selecting the team (3.2.1.2.3)  |
| Choice of graphic designer later proves to be problematic.  | Interpretation (1.2)<br>Case (2.3)            | Selecting the team (3.2.1.2.3)  |

| <b>Table 4.1 Example of coding for an individual case analysis paper</b>  |   |   |
|---|---|---|
| <b>Text from Anna's case analysis</b>   | <b>Response type and support</b>              | <b>Issues identified</b>  |
| Structures established at this time also appear to contribute to some of the communication and co-ordination problems experienced in later stages. There are initially three teams working in separate locations on components of the project - NIDA on content sourcing and creation; graphic designers on graphic design and UOW on package construction (instructional design and programming). This separation of functions and geographic separation of teams appears to have exacerbated the co-ordination and communication issues and contributed to the difficulties experienced obtaining required drafts from the graphic designers. | Interpretation (1.2)<br>Case (2.3)            | Managing the team (3.2.1.2)<br><br>Working as a team (3.2.1.3)  |
| <i>Initial concept design</i>   |   | Design stage (3.3.5.2)  |
| The original project proposal submitted includes a very high level description of the concept of the package.   | Interpretation (1.2)<br>Case (2.3)            | Documentation (3.2.2.4)   |
| With notification of acceptance of the consortium's proposal further decisions regarding the details of the design and intent of the package are required.  | Interpretation (1.2)<br>Case (2.3)            | Design stage (3.3.5.2)  |
| At this stage it is apparent that NIDA in initiating the project have goals associated with showcasing a range of performing arts, associated institutions and performers however they do not have a strong vision for the package and how it will operate especially as an educational tool.   | Interpretation (1.2)<br>Case (2.3)            | Background to the project (3.1.1)<br><br>Managing the client (3.2.1.1)<br><br>Instructional design (3.1.3.1)                      |
| Research and a series of early prototypes are needed to help develop concepts and strategy for the package, to be included in the design statement.   | Interpretation (1.2)<br>Case (2.3)            | Documentation (3.2.2.4)   |
| <i>Review of project concept and design</i>   |   | Design stage (3.3.5.2)  |
| The concept development and early design statement work commences without ownership issues being finalised. As a result, ownership of code developed during development of the package does not emerge as an issue until the after initial concept development and design.  | Interpretation (1.2)<br>Case (2.3)            | Design stage (3.3.5.2)<br><br>Managing the project resources (3.2.2.5)  |
| This delays the project and appears to be remain effectively unresolved. The key decision here is whether to continue with the project at all.  | Interpretation (1.2)<br>Case (2.3)            | Factors affecting the process (3.3.4)   |
| A review of the design occurs to adapt the original ideas and complete the project on schedule using different technology. This necessitates a revised design statement incorporating revised functionality.  | Summarising description (1.1.2)<br>Case (2.3) | Functionality (3.1.3.4)<br><br>Documentation (3.2.2.4)<br><br>Design stage (3.3.5.2)<br><br>Factors affecting the product (3.3.4) |
| <i>Production</i>   |   | Production stage (3.3.5.3)  |
| Design, and production overlap significantly.   | Interpretation (1.2)<br>Case (2.3)            | Nature of the process (3.3.1)   |
| Production commences while design decisions are being finalised, and the technology needed to actually produce the package and materials is still being developed and trialled.   | Interpretation (1.2)<br>Case (2.3)            | Production stage (3.3.5.3)<br><br>Technical issues (3.4)<br><br>Design stage (3.3.5.2)  |
| Practical issues associated with location of resources include obtaining copyright permissions, managing and classifying the expressions, movements and images that form part of the database, and ongoing difficulties locating graphic designers.   | Summarising description (1.1.2)<br>Case (2.3) | Managing the project resources (3.2.2.5)<br><br>Selecting the team (3.2.1.2.3)  |
| Responsibility for producing instructional strategies and writing associated content (other than obtaining media) appears to be neglected at this time.   | Summarising description (1.1.2)<br>Case (2.3) | Production stage (3.3.5.3)<br><br>Instructional design (3.1.3.1)<br><br>Product content (3.1.3.3)                                 |

| <b>Table 4.1 Example of coding for an individual case analysis paper</b>  |   |   |
|---|---|---|
| <b>Text from Anna's case analysis</b>   | <b>Response type and support</b>              | <b>Issues identified</b>  |
| New technology is required replace the proposed 3-D images with video animations. This process of managing design and development concurrently puts increased time pressures on the project.  | Interpretation (1.2)<br>Case (2.3)            | Factors affecting the process (3.3.4)<br><br>Technical issues (3.4)<br><br>Production stage (3.3.5.3)<br><br>Design stage (3.3.5.2) |
| Choice of technology and in particular the earlier decision to use Quicktime emerges as an issue during this phase.   | Interpretation (1.2)<br>Case (2.3)            | Technical issues (3.4)  |
| Upgrading of Quicktime to Version 3 contributes to a decision to discard video material originally planned for inclusion in the package.  | Summarising description (1.1.2)<br>Case (2.3) | Factors affecting the product (3.1.4)<br><br>Product content (3.1.3.3)<br><br>Technical issues (3.4)                                |
| There is a late request from the DCA for minimum machine specifications to be varied.   | Summarising description (1.1.2)<br>Case (2.3) | Technical issues (3.4)  |
| This represents a significant threat to the project as it is currently proposed and the DCA is persuaded to remain with minimum specifications previously proposed.   | Interpretation (1.2)<br>Case (2.3)            | Factors affecting the process (3.3.4)<br><br>Technical issues (3.4)   |
| <i>Testing and review</i>   |   | Evaluation stage (3.3.5.4)  |
| Testing appears to go relatively smoothly.  | Interpretation (1.2)<br>Case (2.3)            | Evaluation stage (3.3.5.4)  |
| In response to feedback that more up front user guidance is required, the decision is taken not to provide it in favour of a "game approach".   | Summarising description (1.1.2)<br>Case (2.3) | Features of the product (3.1.3.5)<br><br>Factors affecting the product (3.1.4)<br><br>Functionality (3.1.3.4)                       |
| This is a key decision that in my view impacts negatively on the ultimate effectiveness of the package. The game metaphor is itself very weak as the package contains few of the elements of a successful game.   | Judgement (1.3)<br>Opinion (2.2)              | Implementation considerations (3.1.2)<br><br>Features of the product (3.1.3.5)  |
| <i>Mastering</i>  |   | Implementation stage (3.3.5.5)  |
| This appears to go smoothly.  | Interpretation (1.2)<br>Case (2.3)            | Implementation stage (3.3.5.5)  |
| <i>Packaging and Distribution</i>   |   | Implementation stage (3.3.5.5)  |
| There is a decision taken earlier and at this time confirmed to not provide support materials as part of the project. This combined with the decision not to provide explicit guidance to users other than the help files (see above) impacts ultimately on the use of the package. | Interpretation (1.2)<br>Case (2.3)            | Implementation considerations (3.1.2)<br><br>Factors affecting the product (3.1.4)  |
| Distribution appears to have occurred haphazardly.  | Interpretation (1.2)<br>Case (2.3)            | Marketing and distribution (3.2.2.6)  |
| <i>Nardoo</i>   |   |   |
| <i>Initial negotiations and project proposal</i>  |   | Initiation stage (3.3.5.1)  |
| Initial concept development and decision to participate in the process. DLWC initiates the project in response to a specific perceived need.  | Summarising description (1.1.2)<br>Case (2.3) | Background to the project (3.1.1)   |
| Intensive liaison with the DLWC and relevant parties occurs to scope the project and concept, resulting in a project proposal that contains sufficient details to form the basis of a project management document and contract..  | Interpretation (1.2)<br>Case (2.3)            | Documentation (3.2.2.4)<br><br>Initiation stage (3.3.5.1)   |

| <b>Table 4.1 Example of coding for an individual case analysis paper</b>  |   |  |
|---|---|--|
| <b>Text from Anna's case analysis</b>   | <b>Response type and support</b>                  | <b>Issues identified</b>   |
| <b>Team formation and roles</b>   |   | Initiation stage (3.3.5.1)   |
| Following acceptance of proposal identification of relevant parties from both IMMLL and DLWC occurs. Other team members are identified at this stage and brought on-board later. Team members from IMMLL are in some cases inexperienced and learning to work with multimedia tools. Part of the contract includes regular access to DLWC staff for preparation of content.                         | Summarising description (1.1.2)<br><br>Case (2.3) | Team issues (3.2.1.2)<br><br>Selecting the team (3.2.1.2.3)<br><br>Managing the client (3.2.1.1)                                     |
| <b>Design</b>   |   | Design stage (3.3.5.2)   |
| Choice of instructional strategy is resolved and ideas for specific content are developed. Review of school curricula occurs to link project to school education objectives and initial objectives are specified. Questions of how to engage students best and the basic philosophy to be adopted (constructivist) are dealt with.  | Summarising description (1.1.2)<br><br>Case (2.3) | Instructional design (3.1.3.1)<br><br>Product content (3.1.3.3)<br><br>Learning situation (3.1.2.1)<br><br>Target learners (3.1.2.3) |
| Other issues considered are choice of information landscape, metaphor.  | Interpretation (1.2)<br><br>Case (2.3)            | Features of the product (3.1.3.5)  |
| Design process is to start small and narrow and expand if necessary. This is an iterative process incorporating feedback and review, and revisions to design and design statement as much as possible. There are a series of sign-off points at Stage 1, Stage 2 and finally sign-off on the Design Statement (Milestone One) and development of a simple prototype signal the close of this stage. | Summarising description (1.1.2)<br><br>Case (2.3) | Design stage (3.3.5.2)<br><br>Nature of the process (3.3.1)  |
| <b>Development</b>  |   | Production stage (3.3.5.3)   |
| The distinction between design and development is blurred with each clearly including elements of the other.  | Interpretation (1.2)<br><br>Case (2.3)            | Design stage (3.3.5.2)<br><br>Nature of the process (3.3.1)  |
| Development includes development of options in practice; prototyping, trial of ideas and review of design.  | Interpretation (1.2)<br><br>Case (2.3)            | Managing the client (3.2.1.1)<br><br>Production stage (3.3.5.3)<br><br>Design stage (3.3.5.2)  |
| There is a need to demonstrate in practice concepts agreed in principle by the client but perhaps not fully comprehended.   | Interpretation (1.2)<br><br>Case (2.3)            | Managing the client (3.2.1.1)  |
| Implementing navigation for instructional purposes (through time and space) as well as building PDA is difficult.   | Interpretation (1.2)<br><br>Case (2.3)            | Functionality (3.1.3.4)<br><br>Instructional design (3.1.3.1)  |
| Also the authoring tool is being developed at the same time as PDA.   | Summarising description (1.1.2)<br><br>Case (2.3) | Features of the product (3.1.3.5)<br><br>Instructional design (3.1.3.1)  |
| DLWC works with production team on development of content.  | Summarising description (1.1.2)<br><br>Case (2.3) | Working as a team (3.2.1.3)<br><br>Team issues (3.2.1.2)<br><br>Managing the client (3.2.1.1)  |
| Various components including simulators are developed incrementally.  | Summarising description (1.1.2)<br><br>Case (2.3) | Features of the product (3.1.3.5)<br><br>Production stage (3.3.5.3)  |



| <b>Table 4.1 Example of coding for an individual case analysis paper</b>   |   |   |
|--|---|---|
| <b>Text from Anna's case analysis</b>  | <b>Response type and support</b>                  | <b>Issues identified</b>  |
| The project makes use of previous related work (eg on simulators).   | Summarising description (1.1.2)<br><br>Case (2.3) | Features of the product (3.1.3.5)<br><br>Background to the project (3.1.1)                                  |
| Ultimately there is too much content (eg extra simulators) and determining what goes in and what doesn't is one issue to be resolved.  | Summarising description (1.1.2)<br><br>Case (2.3) | Product content (3.1.3.3)<br><br>Factors affecting the product (3.1.4)                                      |
| Issues around navigational structures are identified and the functionality of the PDA further developed to deal with these.  | Summarising description (1.1.2)<br><br>Case (2.3) | Functionality (3.1.3.4)   |
| Additional resources - especially graphic design - are required to keep the project on track.  | Summarising description (1.1.2)<br><br>Case (2.3) | Managing the project resources (3.2.2.5)<br><br>Factors affecting the product (3.1.4)                       |
| <i>Testing and review</i>  |   | Evaluation stage (3.3.5.4)  |
| There is ongoing review by the client, DLWC, revision and testing with target audience and further revision prior to mastering. Most but not all functionality is in place for beta testing.   | Summarising description (1.1.2)<br><br>Case (2.3) | Evaluation stage (3.3.5.4)  |
| <i>Packaging and Distribution</i>  |   | Implementation stage (3.3.5.5)  |
| A formal launch is scheduled prior to finalisation of the product, however it is sufficiently developed to proceed with the launch and finalise distribution later.  | Summarising description (1.1.2)<br><br>Case (2.3) | Implementation stage (3.3.5.5)<br><br>Marketing and distribution (3.2.2.6)                                  |
| <b>2. How do the experiences of the designers in these cases relate to your own experiences as a designer?</b>   |   |   |
| There is always have too much content by the time you work out how to include it, do the associated graphics etc. You need to develop more than you need to try out a variety of options and the things you'd like to do generally end up too time consuming or costly.  | Generalisation (1.4)<br><br>Not identified (2.1)  | Nature of the process (3.3.1)<br><br>Factors affecting the product (3.1.4)<br><br>Product content (3.1.3.3) |
| It is better to work on design and development issues with as many people in the same space.   | Generalisation (1.4)<br><br>Experience (2.4)      | Working as a team (3.2.1.3)   |
| In my experience even being on a different section or floor to other team members or related cuts you out of informal communication loops that are crucial and impossible to replicate through formal meetings or email and documentation.   | Interpretation (1.2)<br><br>Experience (2.4)      | Team issues (3.2.1.2)   |
| I've worked on projects (not multimedia) that have been funded by someone else.  | Interpretation (1.2)<br><br>Case (2.3)            | Funding for the project (3.2.2.1)   |
| Some of the Stagestruck issues related to this concept of it being someone else's money.   | Interpretation (1.2)<br><br>Experience (2.4)      | Team roles (3.2.1.2.1)<br><br>Managing the client (3.2.1.1)   |
| People commonly put up their hand for projects in order to attract the resources without having a clear vision of the goals of the project (other than obtaining the funds). Also contractors treat it differently if they are aware of this type of funding arrangement, often being less rigorous about specifying their role in the contract. | Interpretation (1.2)<br><br>Case (2.3)            |   |

| <b>Table 4.1 Example of coding for an individual case analysis paper</b>   |  |  |
|--|--|--|
| <b>Text from Anna's case analysis</b>  | <b>Response type and support</b>                               | <b>Issues identified</b>   |
| In contrast to the Stagestruck experience I've been involved in a project managed well by a committee, however there was a Project Manager with clear responsibilities and accountability for the project, a clear brief and a project sponsor who fulfilled his responsibilities for supporting the Project Manager and ensuring that the committee noted and acted on important decisions.   | Interpretation (1.2)<br><br>Case (2.3)<br><br>Experience (2.4) | Managing the client (3.2.1.1)<br><br>Planning and organisation (3.2.2)<br><br>Project management role (3.2.1.2.2)                              |
| Practical constraints limit what you can do and knowledge of the technology and its capabilities informs design decisions.   | Generalisation (1.4)<br><br>Experience (2.4)                   | Design stage (3.3.5.2)<br><br>Factors affecting the product (3.1.4)<br><br>Technical issues (3.4)  |
| Sometimes your design can only go as fast as your exploration of the technology involved in implementation.  | Generalisation (1.4)<br><br>Experience (2.4)                   | Design stage (3.3.5.2)<br><br>Factors affecting the product (3.1.4)<br><br>Factors affecting the process (3.3.4)<br><br>Technical issues (3.4) |
| This is definitely my experience of EDGI913. I couldn't write the design statement until I had worked out what I could do with the authoring tool. What I then learnt to do with the application then informed what I wanted or could have in the design. The parallel in both these projects is the development of new authoring tools and other technologies. The design and implementation of both the projects was limited to what the developers could make the new tools do. | Interpretation (1.2)<br><br>Experience (2.4)                   | Technical issues (3.4)<br><br>Factors affecting the process (3.3.4)<br><br>Design stage (3.3.5.2)  |
| <b>3. Choose a particular feature of the product which is discussed in the case. Describe how you think it relates to the original concept and goals of the project. From the information in the case what do you think were the main design issues in developing this feature? Do you think the feature is effective? Explain your reasoning.</b>   |  |  |
| The stage area in Stagestruck allows the user to take parts in the production processes associated with performing arts.   | Summarising description (1.1.2)<br><br>Case (2.3)              | Target Learners (3.1.2.3)<br><br>Features of the product (3.1.4)   |
| Its also intended to showcase artists and performances and to link to students' educational experiences, featuring relevant pieces from works featured in High School curricula.   | Summarising description (1.1.2)<br><br>Case (2.3)              | Learning situation (3.2.1.2)<br><br>Target learners (3.2.1.3)  |
| This was part of the "immersive 3-D world" originally envisioned for the package. From the outset the intention was to give users the perspective of Directors, actors and other participants in performing arts. The emphasis is on flexibility and providing the opportunity for manipulation and creativity.  | Summarising description (1.1.2)<br><br>Case (2.3)              | Background to the project (3.1.1)<br><br>Features of the product (3.1.4)<br><br>Functionality (3.1.3.4)  |
| Design issues related to the need to program an interaction that allowed for creativity and flexibility within the limits of an authoring tool.  | Interpretation (1.2)<br><br>Case (2.3)                         | Functionality (3.1.3.4)<br><br>Factors affecting the product (3.1.4)<br><br>Technical issues (3.4)   |
| This was linked to the development of Mediaplant and the subsequent intellectual property issues.  | Interpretation (1.2)<br><br>Case (2.3)                         | Technical issues (3.4)<br><br>Managing the project resources (3.2.2.5)   |

| <b>Table 4.1 Example of coding for an individual case analysis paper</b>  |   |  |
|---|---|--|
| <b>Text from Anna's case analysis</b>   | <b>Response type and support</b>                  | <b>Issues identified</b>   |
| Consequently the design issues relate to the production of animations from video images, stripping out the backgrounds and retaining the image in a format that was usable and the associated memory problems.  | Interpretation (1.2)<br><br>Case (2.3)            | Technical issues (3.4)<br><br>Product content (3.1.3.3)<br><br>Factors affecting the product (3.1.4)                   |
| Other design issues included locating enough resources where copyright permissions could be obtained and the practical problems of choosing, collating, sorting and classifying a range of movements, expressions, intentions etc to provide a realistic range of Directorial choices.                      | Interpretation (1.2)<br><br>Case (2.3)            | Managing the project resources (3.2.2.5)<br><br>Factors affecting the product (3.1.4)<br><br>Product content (3.1.3.3) |
| This feature works well within a number of constraints that emerged but probably doesn't deliver the kind of experience that NIDA representatives might originally have had in mind.  | Judgement (1.3)<br><br>Case (2.3)                 | Features of the product (3.1.3.5)  |
| In her interview Amanda Morris says, in "performing arts there is a response between the actor and director and we were trying to work out how to capture that interaction and provide an experience of the creative process".  | Interpretation (1.2)<br><br>Case (2.3)            | Background to the project (3.1.1)  |
| The stage area gives users an "experience of the creative process" but it doesn't include an experience of the human elements Amanda refers to - the response between director and actor.   | Judgement (1.3)<br><br>Case (2.3)                 | Functionality (3.1.3.4)  |
| This is difficult to capture in a multimedia environment especially with the decision not to use video.   | Interpretation (1.2)<br><br>Case (2.3)            | Technical issues (3.4)<br><br>Factors affecting the product (3.1.4)  |
| By virtue of the medium this aspect of the package feels more like a tool for educating people on the construction of multimedia: positioning images, choosing backgrounds (sets) sequencing sounds and timing events using the package give a multimedia feel to the experience.                           | Interpretation (1.2)<br><br>Case (2.3)            | Implementation considerations (3.1.2)<br><br>Product - general (3.1.3)   |
| Also the multiple perspectives referred to early on is largely lost.  | Judgement (1.3)<br><br>Case (2.3)                 | Product - general (3.1.3)  |
| There is exposure to a range of elements of performing arts production and components of stage design and production but the concept of switching from audience to actor to director perspective is not demonstrated here.  | Judgement (1.3)<br><br>Case (2.3)                 | Product - general (3.1.3)  |
| Limited explicit instructions to users has apparently been the subject of some debate and ultimately a conscious choice by the designers. Nevertheless this feature would benefit from some clearer instruction at the outset and direction to link this feature with others.                               | Judgement (1.3)<br><br>Case (2.3)                 | Implementation considerations (3.1.2)<br><br>Features of the product (3.1.3.5)   |
| Given the democratic nature of the landscape used in this package it is possible to visit this space without visiting other areas like the set design and writing studio.   | Interpretation (1.2)<br><br>Case (2.3)            | Instructional design (3.1.3.1)   |
| The implication of this is that users may not appreciate the ways in which the different features interact.   | Interpretation (1.2)<br><br>Case (2.3)            | Product - general (3.1.3)<br><br>Features of the product (3.1.3.5)   |
| There's little educational or interest value added by not giving the user some hint of this in stage instructions.  | Judgement (1.3)<br><br>Case (2.3)                 |  |
| In Exploring the Nardoo there are a number of simulators, allowing users to test cause and effect relationships associated with water management.   | Summarising description (1.1.2)<br><br>Case (2.3) | Features of the product (3.1.3.5)<br><br>Functionality (3.1.3.4)<br><br>Target learners (3.1.2.3)                      |
| This is associated with the DLWC requirement that the package be motivating and involving and educational and are included as resources to provide users with additional information about water management and the opportunity to experiment with different actions and their effects on water management. | Summarising description (1.1.2)<br><br>Case (2.3) | Target learners (3.1.2.3)<br><br>Background to the project (3.1.1)   |

| <b>Table 4.1 Example of coding for an individual case analysis paper</b>   |                                    |  |
|--|------------------------------------|--|
| <b>Text from Anna's case analysis</b>  | <b>Response type and support</b>   | <b>Issues identified</b>   |
| Design issues include locating and developing appropriate and representative mathematical and scientific models and incorporating them into the authoring tool.  | Interpretation (1.2)<br>Case (2.3) | Technical issues (3.4)<br>Team roles (3.2.1.2.1)<br>Product content (3.1.3.3)          |
| In some cases this was simple and in others more complex, requiring input from content experts to confirm the model and additional programming to implement the models successfully.   | Interpretation (1.2)<br>Case (2.3) | Evaluation (3.3.5.4)<br>Team roles (3.2.1.2.1)<br>Product content (3.1.3.3)            |
| They simulators are also designed to accommodate the interests and abilities of a range of students - from primary to secondary levels.  | Interpretation (1.2)<br>Case (2.3) | Target learners (3.1.2.3)  |
| There were design issues associated with the way in which information was presented - graphically and visually and well as in numerical form. All three formats are included to assist users to interpret and understand each in terms of the others. Feedback and support to users in operating and understanding the output from the simulators is largely absent. | Interpretation (1.2)<br>Case (2.3) | Factors affecting the product (3.1.4)<br>Instructional design (3.1.3.1)                |
| This was intended for inclusion but omitted because of resource constraints.   | Interpretation (1.2)<br>Case (2.3) | Factors affecting the product (3.1.4)<br>Managing the project resources (3.2.2.5)      |
| The simulators are effective from a motivational and educational perspective. They increase the interactivity of the package and provide information in multiple formats.  | Interpretation (1.2)<br>Case (2.3) | Product content (3.1.3.3)<br>Instructional design (3.1.3.1)<br>Functionality (3.1.3.4) |
| I expect that they exceeded the expectations of the initiators of the project.   | Judgement (1.3)<br>Case (2.3)      | Managing the client (3.2.1.1)  |
| They touch on relevant water-management issues that are either under individuals' control (household water usage) or which commonly impact on peoples lives (blue-green algae and dam management).   | Interpretation (1.2)<br>Case (2.3) | Target learners (3.1.2.3)<br>Product content (3.1.3.3)                                 |
| In addition to providing the relevant information to users on these issues in a format that is likely to encourage experimentation and exploration they also assist users to develop their skills in understanding scientific data.  | Interpretation (1.2)<br>Case (2.3) | Product content (3.1.3.3)<br>Target learners (3.1.2.3)<br>Functionality (3.1.3.4)      |
| The representation of cause and effect numerically, graphically and in visual format gives a dramatic demonstration and aids understand of the raw numerical data.   | Interpretation (1.2)<br>Case (2.3) | Product content (3.1.3.3)  |
| The absence of more specific feedback to users and assistance in interpretation is noted as a weakness which could be improved.  | Interpretation (1.2)<br>Case (2.3) | Instructional design (3.1.3.1)   |
| <b>4. What are the project management issues in developing a multimedia CD-ROM that are highlighted by this case? (Use example situations from the case to support your ideas).</b>  |                                    |  |
| Agreeing the scope and design of the project is critical.  | Generalisation (1.4)<br>Case (2.3) | Design stage (3.3.5.2)<br>Planning and organisation (3.2.2)                            |
| Neither project could do this initially, however by investing some time and revisiting this a number of times the Nardoo project was able to address it successfully.  | Interpretation (1.2)<br>Case (2.3) | Initiation stage (3.3.5.1)   |
| Having team members work together in same space is important and cuts down communication barriers, miscommunication and makes it easier to obtain what is needed.  | Generalisation (1.4)<br>Case (2.3) | Team issues (3.2.1.2)<br>Working as a team (3.2.1.3)                                   |
| The experience in Stagestruck with multiple teams in 3 locations appears to have contributed to their difficulties especially with graphic design expectations.  | Interpretation (1.2)<br>Case (2.3) |  |

| <b>Table 4.1 Example of coding for an individual case analysis paper</b>  |                                    |   |
|---|------------------------------------|---|
| <b>Text from Anna's case analysis</b>   | <b>Response type and support</b>   | <b>Issues identified</b>  |
| In planning a project allow time for a number of iterations of the design process and trial of ideas and reworking.   | Generalisation (1.4)<br>Case (2.3) | Ideal process (3.3.3)<br>Scheduling (3.2.2.2)   |
| Both projects clearly revisited ideas, reworked content and had to allow time for ideas to form and be discussed, discarded or finally agreed.  | Interpretation (1.2)<br>Case (2.3) | Nature of the process (3.3.1)   |
| Version control is important with multiple workers.   | Generalisation (1.4)<br>Case (2.3) | Production tasks (3.2.2.7)  |
| Stagestruck highlights the difficulty in not controlling this tightly enough and having people inadvertently delete work. My personal view is don't allow anyone to discard anything until you are sure you are finished - provided you can afford the space for multiple prototypes. | Interpretation (1.2)<br>Case (2.3) |   |
| Rob Wright in Stagestruck alerts us to the hazards of balancing project management and doing design or production work at the same time.  | Interpretation (1.2)<br>Case (2.3) | Production tasks (3.2.2.7)<br>Project management role (3.2.1.2.2)   |
| It is difficult to balance both and something usually gets neglected.   | Generalisation (1.4)<br>Case (2.3) |   |
| Getting resources is time intensive:  | Generalisation (1.4)<br>Case (2.3) | Scheduling (3.2.2.20)<br>Managing the project resources (3.2.2.5)   |
| both Nardoo and Stagestruck referred to the time invested in collecting, checking and storing content in a usable format.   | Interpretation (1.2)<br>Case (2.3) |   |
| Like the overall project plan additional time should be factored in.  | Generalisation (1.4)<br>Case (2.3) |   |
| Both projects highlight that you at times have to make arbitrary decisions to exclude content for reasons of time and resources (eg simulations in Nardoo and various performances in Stagestruck).   | Interpretation (1.2)<br>Case (2.3) | Scheduling (3.2.2.2)<br>Managing the project resources (3.2.2.5)<br>Factors affecting the product (3.1.4) |
| Clear role definition, responsibilities and the project management role itself are critical to good project management.   | Generalisation (1.4)<br>Case (2.3) | Project management role (3.2.1.2.2)<br>Team roles (3.2.1.2.1)   |
| Stagestruck doesn't really appear to have a project manager with overall control.   | Interpretation (1.2)<br>Case (2.3) | Managing the client (3.2.1.1)<br>Project management role (3.2.1.2.2)                                      |
| In contrast Nardoo appears to have a clear reporting structure and a clear client.  | Interpretation (1.2)<br>Case (2.3) | Managing the client (3.2.1.1)<br>Project management role (3.2.1.2.2)<br>Working as a team (3.2.1.3)       |
| While the DCA served as the ultimate client for the Stagestruck project and the NIDA Project Director notionally as project manager comments indicate that the requirements of the department did not give the project the direction it needed.                                       | Interpretation (1.2)<br>Case (2.3) | Managing the client (3.2.1.1)<br>Project management role (3.2.1.2.2)<br>Working as a team (3.2.1.3)       |
| <b>5. What are the main things you think you learned from studying this case?</b>   |                                    |   |
| Never work in a consortium?   | Generalisation (1.4)<br>Case (2.3) | Working as a team (3.2.1.3)   |



| <b>Table 4.1 Example of coding for an individual case analysis paper</b>  |   |   |
|---|---|---|
| <b>Text from Anna's case analysis</b>   | <b>Response type and support</b>  | <b>Issues identified</b>  |
| Seriously, Stagestruck highlights the issues when the role of client and project manager are unclear and when relevant decision-making structures are not put in place or are not utilised.   | Interpretation (1.2)<br><br>Case (2.3)                                  | Project management role (3.2.1.2.2)<br><br>Managing the client (3.2.1.1)<br><br>Working as a team (3.2.1.3) |
| Stagestruck also highlights the importance of getting the user hooked into your project.  | Generalisation (1.4)<br><br>Case (2.3)                                  | Target learners (3.1.2.3)   |
| My initial impression of Stagestruck was that it was a weak product with very little content of educational use.  | Interpretation (1.2)<br><br>Opinion (2.2)/ Case (2.3)/ Experience (2.4) | Product content (3.1.3.3)<br><br>Product - general (3.1.3)  |
| I would not have bought it and even if I had trialled its use would not have pursued it. By the end of this exercise however I was impressed with the resource materials -in the stage and green room and especially available through the search function. I would not have explored the product to this extent except for the academic exercise.  | Interpretation (1.2)<br><br>Opinion (2.2)/ Case (2.3)/ Experience (2.4) | Implementation considerations (3.1.2)<br><br>Factors affecting the product (3.1.4)                          |
| In contrast Exploring the Nardoo directed me and set up my expectations in a way that made it clear that there was something of interest and use for me here.   | Interpretation (1.2)<br><br>Case (2.3) /Experience (2.4)                |   |
| Exploring the Nardoo demonstrated that authentic experience in multimedia is as much about the task users perform as the environment displayed on the screen.   | Generalisation (1.4)<br><br>Case (2.3)                                  | Features of the product (3.1.4)<br><br>Target learners (3.1.2.3)<br><br>Instructional design (3.1.3.1)      |
| The impact of Stagestruck visually and aurally is much more realistic than that initially encountered in Nardoo. It does look and feel like a theatre foyer while the opening section of Nardoo does not really feel like a river or a national park.   | Interpretation (1.2)<br><br>Case (2.3)                                  | Features of the product (3.1.3.5)<br><br>Graphic design of the product (3.1.3.2)                            |
| But the information obtained and the activities performed in Nardoo feel authentic in that they provide experiences that equip users to deal with the problem of water management. The stage activities in Stagestruck are also realistic in that they contain media from actual performances but what the user is asked to do with them and the ways we asked to manipulate them provide less of an introduction to the problem of managing an actual performance. | Interpretation (1.2)<br><br>Case (2.3)                                  | Target learners (3.1.2.3)<br><br>Instructional design (3.1.3.1)   |
| This also reminds me that some topics are better suited to some media.  | Generalisation (1.4)<br><br>Case (2.3)                                  | Factors affecting the product (3.1.4)   |
| The decision to not use video in Stagestruck because of the Quicktime problems probably contributes to this sense that the activities are not as authentic as they could be.  | Interpretation (1.2)<br><br>Case (2.3)                                  | Product - general (3.1.3)<br><br>Product content (3.1.3.3)  |
| The other main learning from both these cases is that the design and development processes are rarely separate and nearly always iterative.   | Generalisation (1.4)<br><br>Case (2.3)                                  | Production stage (3.3.5.3)<br><br>Design stage (3.3.5.2)  |
| Even though the Design Statement is presented as a formal statement and preferably done in advance it is apparent that unless you are replicating an existing product the creative process will require change and rethinking throughout.   | Interpretation (1.2)<br><br>Case (2.3)                                  | Nature of the process (3.3.1)<br><br>Documentation (3.2.2.4)  |
| <b>Complete your analysis with a brief comparison of the two cases highlighting the main points of similarity and difference.</b>   |   |   |

| <b>Table 4.1 Example of coding for an individual case analysis paper</b>  |                                    |  |
|---|------------------------------------|--|
| <b>Text from Anna's case analysis</b>   | <b>Response type and support</b>   | <b>Issues identified</b>   |
| Both packages show evidence of the usual problem of the scope of the project being larger than the resources available allow the managers to produce. To this extent both are to some extent acknowledged to be incomplete.   | Interpretation (1.2)<br>Case (2.3) | Managing the project resources (3.2.2.5)<br><br>Factors affecting the product (3.1.4)                |
| The explicit goals of each package vary. Nardoo appears to have had from the outset a much more clearly defined set of goals, audience and scope. The participating entity in DLW appears to have had a much more sophisticated understanding of what could be achieved and what they wanted.   | Interpretation (1.2)<br>Case (2.3) | Background to the project (3.1.1)  |
| In Nardoo there appears to be intensive resources invested in scoping the project before parties commit to proceeding according to an ongoing contract. Compared to Stagestruck this occurs over a relatively short period of time (2-3 months) and enables contractual expectations to be set out in some detail before further investing in further development work. I suspect this was possible because unlike NIDA the DLWC had a clearly formed view of the type of product they required and the needs they were trying to meet. | Interpretation (1.2)<br>Case (2.3) | Initiation stage (3.3.5.1)<br><br>Managing the client (3.2.1.1)                                      |
| In Stagestruck the design process utilised prototypes to actually assist the teams to decide what they want. In contrast prototypes in Exploring the Nardoo are not developed until the design of the package is formalised. This probably reflects the extent to which concepts and requirements were already defined by DLWC and the team's familiarity with a similar product, Lake Iluka which provided a common conceptual model.  | Interpretation (1.2)<br>Case (2.3) | Design stage (3.3.5.2)<br><br>Managing the client (3.2.1.1)<br><br>Background to the project (3.1.1) |
| Both programs provide ample opportunities for the user to play with and create within the package. The range of choices is significant. Both products are trying to simulate creative processes and put tools in the hands of users to do this.   | Interpretation (1.2)<br>Case (2.3) | Functionality (3.1.3.4)<br><br>Instructional design (3.1.3.1)<br><br>Target learners (3.1.2.3)       |
| There subject matters are very different and Nardoo's is more contained and well-defined (i.e. there is generally a correct answer to water usage and consumption questions). In that sense the nardoo project is easier.   | Interpretation (1.2)<br>Case (2.3) | Instructional design (3.1.3.1)<br><br>Background to the project (3.1.1)                              |
| Stagestruck seems however to have given less thought to how the user will access the information. There is a significant amount of information but this user only stumbled across them by accident and the instructional strategy, in the absent of the original game idea seems to be weak.  | Interpretation (1.2)<br>Case (2.3) | Target learners (3.1.2.3)<br><br>Instructional design (3.1.3.1)<br><br>Product content (3.1.3.3)     |
| Similarly the presentation of information and content to users seems to be much more thoroughly addressed and complete in Nardoo.   | Interpretation (1.2)<br>Case (2.3) | Product content (3.1.3.3)  |

Reporting options allowed the researcher to examine the coding within a document or the units coded under a particular node. The researcher also used a matrix search to retrieve the intersection between two nodes or sets of nodes for a particular document. This technique was used to develop a profile of a student's response, an example of which can be found in Appendix 4.2. The profile was used to gain an overall view of a student's response rather than in attempting to quantify the features of the answers.

The full set of profiles together with the coding reports generated for each by *NVivo* can be found on the accompanying CD-ROM.

**4.4.1.5 Summarising and interpreting the case analyses**

The process of summarising and interpreting the data in preparation for presentation in this thesis required the researcher to return to each student’s case analysis and examine it according to elements derived from the research questions. The focus of each sub-question and the elements within the case analysis that correlate to it are summarised in Table 4.2.

| <b>Table 4.2 Elements of learners’ individual responses examined</b> |  |
|--|--|
| <b>Focus of sub-question</b>   | <b>Elements within response</b>  |
| Ideas about the process  | <ul style="list-style-type: none"><li>▪ Discussion of the process by which each case was developed</li><li>▪ Comments on the nature of the process</li><li>▪ Reference to a model from the literature</li><li>▪ Development of an original framework</li></ul>                                       |
| Relation to own experience   | <ul style="list-style-type: none"><li>▪ Comparison of their experiences to the experiences of the designers from the cases</li><li>▪ Impressions of the packages made from the perspective of a user</li><li>▪ Other comments which relate to own experience as a profession or a learner</li></ul>  |
| Issues raised by the design of the product                           | <ul style="list-style-type: none"><li>▪ Discussion of a particular design feature</li><li>▪ Comments on design in relation to other project issues</li><li>▪ Discussion of the experiences of the designers</li><li>▪ Other comments about the design of the product or the design process</li></ul> |
| Project management issues  | <ul style="list-style-type: none"><li>▪ Discussion of the main project management issues raised by the cases</li><li>▪ Comments on design in relation to other project issues</li><li>▪ Other comments about the management of the product’s development</li></ul>                                   |
| Comparisons made between the two cases studied                       | <ul style="list-style-type: none"><li>▪ A section which compared and contrasted the cases</li><li>▪ Other comparative remarks in the assignment.</li></ul>   |
| General principles   | <ul style="list-style-type: none"><li>▪ Discussion of what can be learnt from the cases</li><li>▪ Other general remarks made in the assignment (includes general observations made about the case, general principles of wider relevance and practical implications/guidelines.)</li></ul>           |

A description of each student’s response is presented in Section 4.5. These descriptions are accompanied by the researcher’s interpretive commentary, which is supported by direct quotes from the data. A summary of the responses from each of the seven students who were interviewed appears at the end of their respective sections to provide further insights into their perspectives on the task. This is followed by a discussion that presents a tabular summary of the features of the responses, and comments on the patterns and differences across the set.



#### **4.4.1.6 Analysing the small group discussion**

Each team posted a summary of the discussion to the discussion space on the *WebCT* site and these provided the primary data source for this stage of the investigation. The researcher also made informal observations of the groups. Messages posted to the discussion list during the first five weeks of session were also examined. These provided insights into the early stages of project development leading up to the class meeting and set the discussion in context.

Section 4.6 summarises the small group discussion session. This includes each team's activities prior to the class followed by descriptions of the discussion summary posted by the group. A discussion of these results follows.

#### **4.4.1.7 Analysing the whole class discussion**

Data collected for this component of the task came from the researcher's observations. During the session the researcher took notes while seated at the back of the room. These field notes were then typed up immediately after the class meeting.

Section 4.7 summarises the design and management issues raised by the learners within the context of the class discussion. A discussion of this activity concludes the chapter.

### ***4.5 The individual analysis tasks***

#### **4.5.1 Anna**

##### **4.5.1.1 Model of process**

In Question One of her case analysis, Anna discussed the events in each project's development under a series of headings representing broad stages of the process. Although she used a different series of headings for each case, some of the terms appear in common or are very similar. This suggests that Anna has abstracted some general stages in project development, but that she still saw the process in terms of the associated case rather than in terms of a more generic model.

Within each section Anna both presented events and pointed to their consequences, for example:

The Project Director is a NIDA representative however from [the] early stages the nature of the decision-making and reporting arrangements within the consortium appear unclear. Co-ordination and responsibility for decision-making appears to continue as an issue, resulting in conflicts and issues with the UOW Project Manager making some decisions, the NIDA Project Director others, and the management committee reportedly making none.

This reference to events later in the project suggests that Anna has developed an ‘overview’ of the project, having drawn together information from different parts of the case materials.

This linking is also used to explain and interpret the events, evident in statements such as:

Implementing navigation for instructional purposes (through time and space) as well as building PDA is difficult.

Comments in the nature of the development process are also included:

[The] Design process is to start small and narrow and expand if necessary. This is an iterative process incorporating feedback and review, and revisions to design and design statement as much as possible.

The use of language such as “They appear to have...” and “...appears to go relatively smoothly” indicates that Anna has reached some tentative conclusions about the process.

Elsewhere she clearly stated her judgement of proceedings:

This is a key decision that in my view impacts negatively on the ultimate effectiveness of the package.

Overall Anna has used detail from the cases both to describe the events and as support for her own interpretations. She has also drawn general conclusions about the case, but did not move beyond it to make comments about multimedia development more broadly.

There is some mention of process issues in the remainder of her assignment, focusing mainly on the stages and activities in the project, and on the nature of the development process and factors that influence it. In reflecting on what she learned from the cases Anna concluded that:

The other main learning from both these cases is that the design and development processes are rarely separate and nearly always iterative. Even though the Design Statement is presented as a formal statement and preferably done in advance it is apparent

that unless you are replicating an existing product the creative process will require change and rethinking throughout.

This indicates a sophisticated understanding of the nature of the process as being iterative rather than a step-wise progression.

#### **4.5.1.2 Own experience**

In relating her own experience to the experience of the designers in the cases Anna provided general insights supported by specific description:

It is better to work on design and development issues with as many people in the same space. In my experience even being on a different section or floor to other team members or related cuts you out of informal communication loops that are crucial and impossible to replicate through formal meetings or email and documentation.

Her observations were not always related explicitly to the case, however connections to prominent events in the case are apparent. For instance the above example relates directly to comments made in the interview materials in the *Exploring the Nardoo* case.

In comparing her own and the designers' experiences, Anna drew out high-level commonalities, such as the consequences of working on projects "that have been funded by someone else" and being "involved in a project managed well by a committee". This indicates that while the projects she has worked on have not involved the development of a multimedia product she was able to see similarities in the way project teams work and are managed.

With respect to her own experience as a student designer, Anna related the limitations that her authoring skills placed on what she could implement to what the developers could achieve with the software tools available in the case projects. While this may be more of a production issue, Anna has noted its importance as a factor that may influence the design of a product. Seeing this interplay between issues is an important part of understanding the complexity of the design process.

Anna also commented on her own experiences in using the CD-ROMs and described the impressions she formed of the packages. From these reflections and her reading of the cases she drew her own conclusions about the design of the products.

#### **4.5.1.3 Design of the product**

In discussing the design of a particular feature from each of the products Anna traced its origin to the aims of the package and described issues that influenced its design and development. In judging the effectiveness of the features she referred back to the designers' intentions and the constraints placed upon them, and made reference to the way learners would interact with these features. She made a critical judgement and stated the reasoning behind it, for example:

Limited explicit instructions to users has apparently been the subject of some debate and ultimately a conscious choice by the designers. Nevertheless this feature would benefit from some clearer instruction at the outset and direction to link this feature with others. Given the democratic nature of the landscape used in this package it is possible to visit this space without visiting other areas like the set design and writing studio. The implication of this is that users may not appreciate the ways in which the different features interact. There's little educational or interest value added by not giving the user some hint of this in stage instructions.

The design issues Anna focused on are discussed with respect to process and management factors, and are described within the context of the project, for example:

Design issues related to the need to program an interaction that allowed for creativity and flexibility within the limits of an authoring tool.

This pattern of linking issues together is also evident elsewhere in the assignment.

Further discussion ranged over almost the full set of design issues coded and focused particularly on the learner; instructional design, content, functionality and features of the product and; factors that influence the design of the product.

As mentioned above Anna also offered her own perspective as a user of the products, indicating how working with the CDs has influence her thinking about the design of the packages:

Stagestruck also highlights the importance of getting the user hooked into your project. My initial impression of Stagestruck was that it was a weak product with very little content of educational use. I would not have bought it and even if I had trialled its use would not have

pursued it. By the end of this exercise however I was impressed with the resource materials –in the stage and green room and especially available through the search function. I would not have explored the product to this extent except for the academic exercise. In contrast Exploring the Nardoo directed me and set up my expectations in a way that made it clear that there was something of interest and use for me here.

#### **4.5.1.4 Management issues**

In response to the question specifically related to project management Anna drew out a number of general issues each of which are explained in reference to either one or both of the cases. These are mainly concerned with management of the team and the process.

Management issues are also raised throughout the remainder of the assignment and focus most heavily on management of the client and the team, and the management of project resources. Overall, Anna placed less of an emphasis on management issues than design issues, although her discussion referred to thirteen of the fifteen categories coded.

#### **4.5.1.5 Comparison of cases**

In a direct comparison of the two cases Anna focused on four main points - the scope of the project, resource management, the use of prototyping and the role of the learner. She presented both similarities and differences making general statements followed by specific details from the cases and their meanings or consequences.

Elsewhere in the assignment there is some direct comparison of the cases in highlighting management issues (“Neither project could do this initially...”) and describing key learning points:

*Exploring the Nardoo* demonstrated that authentic experience in multimedia is as much about the task users perform as the environment displayed on the screen. The impact of Stagestruck visually and aurally is much more realistic than that initially encountered in Nardoo. It does look and feel like a theatre foyer while the opening section of Nardoo does not really feel like a river or a national park. But the information obtained and the activities performed in Nardoo feel authentic in that they provide experiences that equip users to deal with the problem of water management.

#### **4.5.1.6 General principles**

As mentioned above Anna extracted a number of general principles from her analysis of the cases. Most of these statements are observations about what is important to a successful project, for example “agreeing the scope and design of the project is critical” and “version control is important with multiple workers”. These observations imply lessons to be learnt

from these cases that could be applied to other projects, although this link is not stated explicitly.

#### **4.5.1.7 Use of other resources**

Anna did not refer to any literature and appeared to have used only the case materials provided.

#### **4.5.1.8 Summary**

Anna's response to the case analysis questions was analytical throughout and provided explanations of her ideas using details from the cases and her own observations in support. She readily related her own experience both as a professional and a learner to events and issues in the cases. She highlighted a broad range of issues with an emphasis on design. Issues are often linked together, indicating their influences on each other. This indicates a sophisticated understanding of the design and development process. Anna drew out some general points from the cases, though these tended to be observations and did not make any links to future practice.

#### **4.5.1.9 From the interview**

In her interview at the end of the subject Anna reflected on her approach to the case analysis task. Her initial approach had been to scan over all of the material to get a general idea of what was available and to review the CD-ROMs. She revealed that she "had a great deal of difficulty with the task" and submitted it very late. She felt that the reason for this was that she "got stuck on *StageStruck*":

When I tried to get into the disc I really couldn't find my way around it and use it that well. So I kind of had answers to my questions but not as completely as I needed. So I'd given up.

After some prompting from the instructor Anna decided to go back to the task and try again:

I went and had another look at the disc by which time I'd read the interviews. I'd got what I could out of the other documents. So I was revisiting the disc a second time and what I ended up writing about was one of the things about the disc. That particular package for me was that I had no idea the range of things that was in it and what was possible with it and it was only that I was doing it as an academic exercise that I stumbled across it.

These impressions formed by Anna as a user of the *StageStruck* package were prominent in her analysis. Furthermore the opportunity to compare *StageStruck* and *Exploring the Nardoo* led Anna to consider how realism features differently in each of the packages:

I was struck by the fact that StageStruck seems so realistic, the presentation of it is more realistic than Nardoo. But that in fact the tasks that were in Nardoo were more realistic than the tasks in StageStruck. And I'm still not sure how to use it, but I think it's as much about what you ask a person to do when they get in there as opposed the presentation and the impact of it. I think that's what we kind of get hung up on because of the possibilities of multimedia.

Anna judged the interviews and timeline to be the most useful components of the case materials, in addition to the packages themselves. It seemed to her that these contained more of these answers needed for the case analysis questions and that the original documents were less useful. In focusing on the interviews she had less detail to digest.

Anna felt that the interviews were successful in bringing out the process issues and that by also viewing the CDs students could judge the consequences for themselves:

You could actually see StageStruck and the way it was put together and the way the material was presented. They [the designers] do talk about it in the interviews, but you actually get to see it for real. But I do think they do convey two fundamentally different things, you get the process and [then] the content in the package and ultimately you want to know both.

Having access to the interviews and the CDs was one of the reasons Anna felt that she was able to complete the task on her second attempt:

So it was disc, interviews and disc again but I couldn't have done it unless I'd revisited the disc with the benefit of having read the interviews.

For Anna being able to read interviews with the designers helped her to access the CD itself, to know something of what happened 'behind-the-scenes' and to draw her own conclusions about the design of the final product.

## **4.5.2 Rod**

### **4.5.2.1 Model of process**

In describing the development process Rod structured his response in a series of stages, which he first mapped onto the *Exploring the Nardoo* project. These stages reflect a

standard development model as evident in much of the literature on this topic and represent a chronology of events. This section is mainly descriptive, summarising information from the case and placing it within the framework. There are some instances where Rod has tried to interpret the events, such as:

It appears to be a common feeling among the design team that there is only so much you can do on paper before you need to see it work (or not work) on screen.

His account of the *StageStruck* process is prefaced by:

Broadly speaking, the Stagestruck project went through the same stages and in the same order as have already been discussed under 'Exploring the Nardoo.' There are however a number of distinctions evident between the 2 projects which are outlined below.

Rod identified four main areas of difference which he sees as setting the two projects apart - the greater number of stakeholders, difficulties with multiple teams working independently, problems with out-sourcing the graphic design and the need to create large amounts of original content. He then moved on to describe the consequences of these differences and relate example situations from the case. Here Rod's attempts at explanation are more evident:

Some of the interviews give a hint that at times the two teams found themselves out of step with each other which often forced some re-thinking of priorities and direction.

In relating the experiences of the designers in the cases to other accounts found in the literature, Rod likened the iterative nature of the design and development process that Phillips & Jenkins (1998) discuss with the multiple versions produced in the *Nardoo* project:

They speak of a development cycle consisting of numerous iterations of design, development and evaluation. Development on the prototype and production versions of The Nardoo clearly follows this pattern.

Rod also noted that unknown factors, such as an unfamiliar authoring tool, made these iterations necessary to work the design "into a more achievable form". This shows that he is developing a view of the design process as cyclical and complex.

#### **4.5.2.2 Own experience**

In discussing the experiences of the designers in the *StageStruck* case, Rod drew upon his own professional experience writing that:



Although never having worked in such a large team as this, I can see parallels between the StageStruck process and my own experiences as a designer.

Clearly he did not see that the differences between the case designers' experiences and his own prevented him from making a more general comparison. In a similar way to Anna, Rod made links to high-level similarities between his work and the case, specifically in working with external contractors as part of the *StageStruck* team. He explained the specifics of the situation and then drew the general conclusion that:

Both of these simply underline the crucial importance of being able to communicate and work alongside those people and groups external to ones own organisation.

This pattern of linking a general observation with a specific situation is also evident in Rod's discussion of his experience as a student designer, in which he related the difficulties he faced in trying to implement his vision of the package using an unfamiliar authoring tool. The general conclusion he drew from this experience is that it is necessary "to go back to the drawing board when the original direction becomes untenable for whatever reason".

#### **4.5.2.3 Design of the product**

In discussing a particular design feature from each of the cases Rod provided accurate and clear summaries of information provided in the case materials about the origin and development of the chosen feature. He then judged each feature's effectiveness in terms of its usability and the goals of the package.

Rod has not offered a personal assessment or given a detailed explanation of his judgments. He discussed the usability in general rather than specific terms and, unlike Anna, did not place himself in the role of learner.

Overall Rod's discussion of design issues focused very much on the product's functionality and features, and factors that affect their design. Furthermore Rod seemed to see the experiences of the (case) designers in terms of process and management issues rather than their task of developing the product design.

#### **4.5.2.4 Management issues**

When writing about what he considered to be the main project management issues in the cases, Rod highlighted one or two major issues and then explained these within the context of specific events presented in the cases. He then made a general observation about the role of the project manager in handling these situations:

All of this underlines the importance of clearly defining roles within the project and as far as possible sticking to those roles. Let the managers build an appropriate environment and manage the sticky issues and let the creative team get on with what they do best.

Rod drew management issues into both his discussion of the development process and the experiences of the designers, explaining how factors such as budgetary pressure and choice of personnel can affect the progress of a project and its final product. Overall Rod placed a greater emphasis on management issues, tending to focus on client, team and working together issues.

#### **4.5.2.5 Comparison of cases**

Rod did not include a separate comparison section in his assignment, but instead presented his analysis of the *Nardoo* case first and then within the *StageStruck* analysis made some statements comparing the two development processes. There is very little by way of comparison elsewhere, with only two statements about similarities between the projects:

Although changes are inevitable and occurred in both of the cases at hand, having a detailed design was crucial to the success of the products.

Both projects began with an initial idea which quickly expanded in detail and size as people contributed new ideas and possibilities.

#### **4.5.2.6 General principles**

Rod has drawn out a number of general principles related to the design process and project management. These statements are observations, for example noting the “importance of a detailed design statement” or; directions, such as “these call for a degree of flexibility and cooperation within the team as people find their feet and establish themselves in their roles”. Both suggest that Rod moved beyond the specific context of the cases and considered the importance of those issues more generally in the development of multimedia software.

#### **4.5.2.7 Use of other resources**

Rod's bibliography indicates that apart from the case materials he consulted two references, both of which were provided as readings for the subject.

#### **4.5.2.8 Summary**

In his case analysis assignment Rod concentrated on summarising case events and then drawing on detail where necessary to support his main points. Generally he made little attempt to interpret or explain the events, although he did make relevant links to the literature and his own experience working on smaller-scale multimedia projects. The small number of general observations made within his assignment indicates that Rod was able to see some of the issues within a broader context. Rod's analysis emphasised management issues with less discussion of design factors and tends to focus on several main issues rather than cover a broad range. However, comments on the iterative nature of project development and the interrelations between process, design and managements issues indicate that Rod is developing a sophisticated view of the process.

### **4.5.3 Margaret**

#### **4.5.3.1 Model of process**

In her response to Question One, Margaret described case events under a series of headings that is different for each case. She did not use a model to provide a framework for the case events, but has selected major activities or aspects of the process to describe each of the main stages and this gives a sense of the chronology. These stages do not conform to those generally found in the literature, but might be considered sub-stages. For example "the development and refinement of graphics" and "the development and inclusion of content", which Margaret includes as two stages in the *StageStruck* project, might appear as activities within the Development or Production phase in a process model.

Margaret's response to this question sought to explain the process as well as summarise information from the case, with a response type analysis showing nearly twice the number of interpretative statements compared to those coded as descriptive. Margaret has drawn

together information from different components of the case materials to present the key issues at each stage, for example:

Obviously each revision or update of the design statement involved major decisions. The team and its management needed to have a very clear idea of where the process was going and how the individual elements would interact together. These statements were presented to the consortium so they needed to provide as much detail as possible about all aspects of the production.

She also evaluated aspects of the process, adding her own interpretation as part of her analysis:

The decision to have the graphic designers work in-house and collaborate together when necessary seems to have paid off with the final product retaining a consistent look and feel throughout.

As Anna also did in her analysis, Margaret drew some conclusions about the events with comments such as “it was possible the project may have lost some of its consistency as a result of using various graphic artists” and in so doing has sought explanation beyond the information presented directly in the case.

The series of stages identified is different for each project, suggesting they have been derived directly from the case materials. Margaret neither referred to a model from the literature nor has developed her own. She made few further comments about the development process in the remainder of her analysis and so did not reveal her understanding of the nature of the process in general.

#### **4.5.3.2 Own experience**

Although Margaret saw her own experience of multimedia design as limited she could “recognise similarities between my experiences and those of the members of the professional team involved in this case”. She related her experiences both to general issues such as “the problem of combining all of the elements of the project into a harmonious product” and accepting compromise when features could not be included in the product. She also related directly to some of the designers who were featured either as interviewees or discussed in the personal accounts. For example she writes:

I struggled with the same dilemma as Gwyn Brickell when attempting to use a constructivist approach to the development of instructional tasks. It is easier to simply locate and present the content than to develop meaningful tasks which meet the overall goals of the project.

The challenge lies in designing tasks which allow the user to choose their own direction and to empower them with the ability to solve problems and create meaning.

She focused mainly on the factors that affect the end product and the process of designing it, such as the pressures of time, the need to develop new skills and the challenge of combining the media effectively. Her explanation shows she was able to look beyond superficial differences and draw out more general similarities. For example, although her previous experience of multimedia development was working alone on small student projects, she sees some similar issues in team projects:

My experience was as an individual designer so I am surprised that many of the issues I faced mirror the problems of a large team. Although the experience of the team members are more extensive and their respective skills are far more developed in this case than mine were the issues that arise concern the broader picture rather than the finer detail.

Margaret also used her own experience of the CDs to support her judgement of the effectiveness of various design features in the packages. In these instances she combined her own observations with information from the case materials to support her assessments.

#### **4.5.3.3 Design of the product**

In discussing a major design feature of the product, Margaret chose to focus on the Wardrobe Room in *StageStruck*. This feature wasn't prominent within the case materials and so Margaret would have had to imagine what some of the design issues might be, based on the wider context of the design. Although her description of the feature is thorough and she relates it to the overall goals driving the product's development, she isn't able to draw on and interpret specific experiences of the designers.

The limitations of this approach are evident when comparing this response to her analysis of content presentation techniques used in *Exploring the Nardoo*. Here Margaret was able to present some of the story behind the design as well as describing the outcome of that process evident in the final package.

These limitations are again apparent in Margaret's assessment of the effectiveness of the features. Margaret supported her evaluation by describing how the functionality of the wardrobe is consistent with the overall goals of the product and then reflecting on her own

experiences using the product. In evaluating the content presentation in *Nardoo* she was able to refer to the specific goals the designers had for that feature and comment on the rationale behind it.

This suggests that there is value in allowing learners to see “behind-the-scenes” of project development in addition to providing access to the product of the design. Although Margaret was able to compensate in part for the lack of specific information, the further insights she shares in her second answer show that she is better able to account for the design of the product when she has access to information about the process of design.

Margaret’s discussion of design issues touched on all of the categories coded except two, with particular attention paid to designing for the learner and discussion across all aspects of product design issues. Like Rod, Margaret showed an awareness of the different factors that can impact on the design of the project, but she also commented on the challenges on design itself:

All of the different media including graphics, audio, video and text need to work together with the instructional tasks. These elements need to combine to become part of the overall metaphor built around the interface and navigation. Not only do all of the elements need to work together and complement each other but they need to combine to achieve the overall goal of the project.

#### **4.5.3.4 Management issues**

Margaret presented a detailed discussion of the main project management issues within a number of major themes. Time, client, team and production management are common to both cases, with content management added for *Nardoo* and contracts for *StageStruck*. Within each of these themes Margaret tried to interpret the events, looking for the story behind the ‘facts’:

Keeping to the time scale was obviously very difficult with the amount of time used for each element needing careful management.

She has also drawn together multiple perspectives and instances to build and support her arguments:

Rob Wright explains how the original idea was for a much larger environment before decisions were made to scale it down. Gwyn Brickell also outlines how the list of student investigations the DLWC originally wanted included was reduced to a manageable number. Gwyn details how the content experts from the DLWC and the instructional designers

worked together to ensure the resulting product matched both the needs of the client and the curriculum.

This particular explanation is used to support a more general conclusion that:

As part of content management the scope of the project needs to be clearly defined during the early stages of development to ensure the team can successfully complete the project.

Margaret made a number of general observations in relation to project management, but for the most part her discussion remains within the context of the case. As with her discussion of design issues, Margaret covered all but two of the relevant categories, again showing the breadth of her analysis. She concentrated mainly on client and team management issues. It is also interesting to note a fairly even balance between design and management issues in Margaret's analysis.

#### **4.5.3.5 Comparison of cases**

In structuring her assignment Margaret presented answers for each case and then added a separate comparison section. The formatting of the document suggests that the analysis for each case was prepared separately and then the final section added. This is also reflected in the absence of direct comparison of the cases outside of the last section.

In drawing out the main points of similarity Margaret highlighted the departure from the initial design ideas, the inclusion of innovative and untested ideas in the products, the use of prototyping and the difficulty in completing the projects. These are general observations, again demonstrating Margaret's ability to look beyond superficial similarities. She did not provide specific examples from the cases to support these points however.

In discussing the differences between the projects Margaret noted general points again, such as the size of the teams, but also explained these in terms of the specifics of the cases:

'Exploring the Nardoo' placed more value on the educational aims and objectives than 'StageStruck' and was more concerned with how the product would be used in schools. School curriculums were checked and educational outcomes included in the first design statement.

#### **4.5.3.6 General principles**

As noted above Margaret made some general observations about project management, which were then supported by examples from the case. She also expanded on these observations to make suggestions for management practice:

Managers need to consider not only intellectual property issues but also predetermine the provisions that will apply in certain conditions. For example, it should be made clear if any extension of time will be made available and under what conditions this would apply. Similarly there needs to be written agreement on costing and budget considerations. Details such as who will supply the content and who will have overall control of the project and the project design all need to be predetermined.

Here Margaret was going beyond the confines of the case information to consider how this issue might be important in other projects.

General observations were also made about the challenges that face designers of multimedia software and the role of evaluation in the process of development, and in the latter case Margaret explained how this could be implemented in practice. Margaret's generalisations focused on management and process issues, suggesting that perhaps she found these more relevant or accessible.

#### **4.5.3.7 Use of other resources**

Margaret did not refer to any of the readings provided or other relevant literature.

#### **4.5.3.8 Summary**

Overall Margaret's case analysis response is analytical rather than descriptive. In framing answers to the questions she summarised relevant case information and added her own explanation-seeking interpretations. To support her arguments she presented specific examples from the cases. Her answers include the perspectives of the people appearing in the case and her own experiences as a learner and novice designer. She made general observations and drew conclusions about the case events, often turning these into guidelines for future development.

Although Margaret did not appear to draw any conclusions about the nature of the development process in general, her reference to a broad range of design, management and process issues and their interrelations suggests an awareness of the complexity of the



process. Margaret's analysis also showed a balance between design and management issues.

#### **4.5.4 Lynn**

##### **4.5.4.1 Model of process**

Lynn structured her discussion of the process under a series of broad stages, which, while slightly different for each case, are sufficiently similar to conclude that she has imposed an overall structure. This structure is similar to generic development models common in the multimedia literature and, although each case process begins with a stage called "Scoping the Project" (England & Finney, 1999), Lynn did not make any mention of a specific source for her framework.

Although her response is based within the case context she has drawn some conclusions from the materials such as:

The team were very aware of the constraints of both time and money, with [m]any ideas put aside due to time or budgetary restraints. (One concrete example of this is that at one stage two CD ROMs were required in order to include a particular concept, so that idea was shelved.)

This passage also illustrates the way Lynn has used specific information from the cases as evidence for her arguments. Within each of the main stages Lynn presented an unfolding narrative that describes the events from the case, but also tries to explain the situations and relate their consequences:

A part of the process included identifying possible contacts, and bringing a graphic designer into the project. This was to cause problems throughout the project, as the selected designer did not suit the needs of the development team.

This suggests Lynn has developed her own overview of the project and has chosen to highlight major themes across the development process. She was also 'reading between the lines' and commented on the limitations of the materials she has access to:

While not alluded to in the interviews, this may have caused problems for the team, as there would have been a new software to work with, and transferal of information from *Hypercard* to *MediaPlant*. An interview with the programmer who developed the new software may have been useful for eliciting this information.

In discussing the experiences of the designers in the cases, Lynn also compared the development process to models from Phillips and Jenkins (1998), concluding the teams adopted their IMM Development Model. She has based this conclusion on the use of formative evaluation and prototyping to incrementally rework the packages. Lynn has also compared some of the specific activities mentioned in the literature with the case:

According to Phillips [and Jenkins] (1998, p.44) the most important thing is not to assume anything, as experience shows that when problems have occurred in projects, it is often that a team member has assumed that they knew what was required. This was highlighted in *StageStruck*. Although this situation was alluded to in *Nardoo*, each of the members realised that they had to work for the good of the team.

It is interesting to note that the case materials included a paper that describes the process used for each of these projects (Harper & Hedberg, 1997), which is quite different to the IMM Development Model mentioned above. The absence of any reference to the Harper and Hedberg (1997) model indicates that Lynn hasn't referred to this paper. Instead she has compared the models offered by Phillips and Jenkins (1998) to the case, and decided upon the IMM Development Model as the most 'realistic' approximation. This suggests that she views the development process as an iterative one, although doesn't explicitly state this.

#### **4.5.4.2 Own experience**

Lynn compared her experiences as a student designer trying to develop her own small product to the process of prototyping described by Phillips and Jenkins (1998). She explained this particular experience in detail and reflected on how she might have approached the task differently:

In an exuberant effort to have a finalised version of my product, I developed too many screens, with associated links. This "prototype" had navigational flaws, and I had wasted many hours. Had I merely done a shell and tested it, changes would have been easier to make.

Further key issues such as teamwork and time management were highlighted. These were supported by concepts from the literature, details from the cases, literature and personal reflections. That Lynn has drawn conclusions and suggested alternative approaches indicates that she considered these issues to have relevance beyond their specific contexts.

In judging the effectiveness of a feature from each package Lynn relies heavily on her own impressions of the CD to support her conclusions.

#### 4.5.4.3 Design of the product

In discussing a particular feature for each product Lynn chose to examine the use of metaphor and navigation in each of the packages. She described the design of these aspects of each package with reference to the underlying constructivist philosophy. No mention is made of the specific design challenges posed by each however, despite significant discussion of these in the case materials.

Lynn judged the effectiveness of the approaches based on her own impressions of the packages:

While each metaphor provides a realistic learning environment (one can almost smell the must [on the] sets) as stated in the original goals and concepts, I felt that the *Nardoo* metaphor assists with navigation, while the *StageStruck* metaphor was a barrier to effective navigation. The initial screen of *StageStruck* was difficult to maneuver, as I felt quite queasy with the way the screen moved in a 360° angle. Although a very clever approach, I felt that it detracted from the learning environment. I also had trouble determining points of entry into the various features 'backstage'. While the realistic metaphor approach was very effective with *Nardoo*, using intuitive navigation which allowed the student to work through various conditions and to check current affairs regarding a topic, I found *StageStruck* was not intuitive navigation, and that the metaphor obstructed my use (possibly because it is designed for kids not adults).

While she did mention the intended audience in the final line above there was no further discussion about how the target learners might use this product. This contrasts to other students for whom learner usability was a major criterion in their assessment.

Lynn did not draw any general conclusions about design from this examination and paid little attention on design issues elsewhere her case analysis assignment. She concentrated most on product design issues with little or no consideration of the background to the project and the implementation environment.

#### 4.5.4.4 Management issues

Lynn highlighted a range of management issues important to the cases, placing considerably more emphasis on these than on design issues. She focused specifically on client and team issues, and funding, scheduling and documentation.

Her general observations were supported by references to events in the cases and Lynn has drawn on the multiple perspectives of the designers:

Communication methods are a consideration for the project manager. The *Nardoo* team used meetings and Email to exchange ideas and discuss issues... Also, development on *Nardoo* was facilitated when the key people moved into a shared office space, as this allowed informal discussions of various elements of the project.

While management issues are discussed very much within the context of the relevant case, in drawing out general issues Lynn has moved beyond the confines of the case materials:

Other issues to be considered include the skills of each of the team members, and ensuring there is adequate knowledge to ensure that the job is done effectively and that all areas are covered. As the *StageStruck* team originally did not have a graphic designer, one was employed. This caused problems, as the team was delayed by his working style.

Lynn also made some mention of how issues are interrelated, such as how budgetary constraints can determine what features can be included in the product. However, these are mentioned only briefly rather than their consequences being fully explained.

#### **4.5.4.5 Comparison of cases**

Rather than including a separate comparison section at the end of the document, Lynn compared and contrasted the two cases throughout her assignment, for example:

The project manager must also have well developed "people skills", for example, when *Nardoo* employed a second graphic designer it was "a balancing act because I (Rob Wright) did not want to tread on Margaret's toes"... Also, the *StageStruck* developers saw tempers frayed "they wouldn't tell us what they wanted".

In this way Lynn demonstrates an awareness of how similar issues manifest themselves differently in each of the projects. These comparisons were often prefaced or appended with a general issue or 'lesson'. For example, Lynn argued that the importance of recognising constraints is exemplified by the omission of features in both products.

The *Nardoo* team mapped out six simulations, but cut this to three due to time constraints, while the *StageStruck* project is "very much cut back from the original idea".

#### **4.5.4.6 General principles**

Lynn drew a number of general conclusions from her analysis of the cases. Generally these pertained to management issues with minor reference to process issues. (This is in keeping with an overall emphasis on management issues throughout her analysis.) Such statements

are mostly observations about what seems to be important to the smooth running of a project and of the issues a project manager should be aware of, for example:

One of the major issues reinforced in the case studies is the development of a design statement, which then acts as a blueprint, protecting the major stakeholders against major change in direction.

Rarely however are these operationalised to suggest specific strategies that might be undertaken, however Lynn's closing remarks indicate that she saw analysing the cases as a way to avoid some of the same mistakes:

It can be seen from the above analysis that project management for interactive multimedia is not an easy task, with many pitfalls. However, by examining case studies of previously developed works, and reading appropriate literature, the project manager can be aware of many of the issues which may arise and take measures to try to ensure that the same issues do not plague their own project.

#### **4.5.4.7 Use of other resources**

Lynn cited two of the suggested readings for the subject in her case analysis. Development models described in Phillips and Jenkins (1998) were compared with the cases, as were some of the difficulties these authors note.

#### **4.5.4.8 Summary**

Throughout her assignment Lynn's discussion is analytical and interpretive, rather than just descriptive. She has not structured her response in distinct sections corresponding to each question. Instead, she combined some general comments on the projects with specific discussion drawing on the case materials, constantly comparing each of the cases. She drew her own conclusions about the events in the cases, 'reading between the lines' when there is not enough information, and was willing to make her own conclusions and judgments. Her own experiences as a student designer offered points for reflection as she considered alternative approaches. She also shared her impressions as a user of the packages, but neglects the learner's perspective in assessing the effectiveness of the navigation strategies.

Lynn focused mainly on management issues with little discussion of design, although she did show some appreciation of how issues can impact on each other. She reconciled her analysis of the case-specific events to Phillips and Jenkins' (1998) model, suggesting a view of the development process as one of constant review and revision. General

observations were made about the management of the project indicating some movement beyond the case contexts, but these were not developed into specific guidelines for future practice. Although Lynn seems aware of many of the issues her analysis seems more piecemeal than other students' suggesting that she is yet to bring her ideas together to form a coherent strategy.

#### **4.5.4.9 From the interview**

Lynn's approach to the case analysis task was to first look in detail at the *Nardoo* materials and package to develop answers to the analysis questions, and then repeat this process for *StageStruck*. This resulted in two separate documents that she then needed to bring together. She remarked that she felt the final document was a bit disjointed as a result, and further added that the instructor had also remarked on this. In addition to the case materials she also searched the Internet for further information, but found little to add to the resources she had.

Lynn identified the interviews as the most interesting source of information for addressing the analysis questions. She also felt that these were very honest accounts. Further information was gleaned from the overview and timeline, that latter being particularly interesting for "seeing how long some things took". She commented that the original design statements were of interest as a model for her own project work. Lynn did not look at the prototypes though, feeling that it wasn't necessary because she had the finished product:

If we'd had an unfinished product I would have looked at it and thought this is really cool, this is where they're going.

In identifying difficulties she had with this task, Lynn revealed that she initially had trouble navigating through the *StageStruck* CD-ROM:

I had trouble navigating StageStruck. I was going around and around on a 360 trying to get into the thing. Until all of a sudden the mouse changed and I thought oh I go in there. Because to me it wasn't intuitive. I don't know whether it's my style of learning. And I got dizzy going around and around. Whereas with Nardoo it sort of comes in, you click on the person and hear what they've got to say and you go into the next layer and it was more logical to me. It was more comfortable.

She also found the *Nardoo* case materials easier to work with. She attributed this to not being an ‘Arts’ person and feeling more comfortable with Science topics. She also felt that the process was easier to understand:

[With StageStruck] It was really hard to figure out at which stage they were doing things. I got really confused about where they were up to in that documentation. Whereas with *Nardoo* it was really straight down the middle, you knew what was happening.

Lynn also felt that differences between the materials, in particular the timelines, also made the task difficult, remarking that:

it was really hard to do a comparison of two things when the two things were really different, when the documentation was really different as well. Some issues weren't addressed in StageStruck from what I could see. If you wanted to do a comparison you really had to dig in and analyse.

## **4.5.5 Sheryl**

### **4.5.5.1 Model of process**

In her response to Question One for each case, Sheryl described the events from the case under a series of main headings. The series is different for each case, although some similar terms are used. This, and the use of terms not generally used in the literature to describe developmental stages indicates that she has used neither her own nor a traditional model as a framework for her answer. Within each stage Sheryl provided a summary of the key events, often as a list, with no evidence that she has attempted to interpret these further.

In subsequent sections however, Sheryl recognised that both projects were developed according to “an iterative design process in which early design ideas are re-visited and reworked throughout the project”, despite the fact that “the Stage Struck project was much more a ‘journey into the unknown’ than the *Nardoo* project”. This suggests that Sheryl has drawn conclusions about the nature of the design process in these cases and perhaps could develop a more generic model if she were specifically asked to do so.

### **4.5.5.2 Own experience**

In discussing the experiences of the case designers, Sheryl described her own experiences as a training professional and a student designer. She discussed both similarities and

differences and commented that although her work has not “incorporated multimedia packages, there are some similarities between a project to design a training program (and materials) and the *Nardoo* project”. In these observations Sheryl linked specific experiences she has had to an observation about the case, for example:

The Nardoo design process started with the ‘big picture’ and moved into the detail over time. This is the way I work in designing classroom based training. In some project teams I have worked with people who want to work on the detail straight away – my experience is that this leads to sections of content being missed or a design which doesn’t cover all of the issues and needs to be adjusted at a later point to accommodate additional materials.

In this way Sheryl explained how her own understanding and beliefs about the design process are related to the case. This suggests that her professional experience helped her develop an understanding of the case. Sheryl’s use of her experience as a reference point is further illustrated in her discussion of what she has learned from reviewing the case:

Some projects will be more open-ended in design terms than I am used to in my own work. This is a major point for me to learn, as I have always worked with clients who have very specific ideas on the outcomes of a project. I have never worked on a project such as this one, where there is funding for an idea, with the design and scope determined after approval is given.

This passage also suggests that Sheryl has developed some firm ideas about instructional design, but is prepared for these to be challenged. Sheryl’s writing style is personal and reflective, using the case as a starting point, but then moving beyond it to consider future projects:

I would like to work on a project like this, as I would imagine there would be a more creative approach, but I sense that I would be out of my ‘comfort zone.’ I am used to starting with a very clear picture of the end result (at least in terms of scope and general content).

#### **4.5.5.3 Design of the product**

Sheryl chose to examine the PDA (the Personal Digital Assistant from *Exploring the Nardoo*) and the stage area (in *StageStruck*) - both of which are discussed extensively in the case materials. She described the origin of each feature, the issues that influenced their design and their implementation in the final product by drawing together information from the case materials. To judge the effectiveness of the feature she compared its final implementation with the design goals and considered how learners would use the product.



In contrast to some other students, the issues Sheryl raised are only those that directly influence the design of the feature, rather than issues that relate more to the management of the design process or have a wider influence on the product. This suggests that Sheryl's experience in instructional design may have allowed her to separate 'design' issues from other factors.

Overall, Sheryl's discussion of design issues is broad ranging, corresponding to all but two of the issues coded. These issues are explained in detail with specific events from the cases and her own experience used for support. Emphasis is placed on issues related to the background of the project, designing for the learners, the product's content, functionality and features, and factors that influence design. Discussion of issues in this last category show that Sheryl is aware that process and management issues can affect the design of the product, though she did not explain this fully in her analysis:

In both projects designs were developed and produced which were not included in the final package. Both project teams referred to the fact that they had developed much more than went into the final product. The Nardoo team referred to having enough content and design to make another package. One of the Stage Struck team members said that only about 30% of their design ideas made it into the final package.

#### **4.5.5.4 Management issues**

Sheryl presented the major project management issues as a list of observations and conclusions about the challenges facing a project manager and strategies he or she may need to adopt in response. Sheryl presented these ideas in general terms with little direct reference to details from the cases:

The advantage of separating responsibility for the legal and contract issues (especially in the case of a dispute) from the people working with the client on a day to day basis.

Without further elaboration it is difficult to know how Sheryl arrived at these conclusions, in what circumstances such strategies might be needed and how other factors might limit their effectiveness.

Sheryl's discussion of management issues through her assignment ranged across nearly all of the categories coded. In general, however, management issues are discussed in less detail than design issues and are not supported by examples from the cases or her own experience.

#### **4.5.5.5 Comparison of cases**

Comparison of the two cases appeared in a separate section at the end of the assignment with no comparison evident in the previous sections. This discussion of similarities and then differences was a mix of description and interpretation. Statements about the similarities tended to be descriptive, summarising information directly from the case materials:

While project team roles were well defined, the ideas and production of each package was a team effort and involved collaboration between a number of experts in different fields.

In discussing the differences Sheryl was more expansive and analytical:

The Nardoo team seemed to use documentation (such as design statements) as part of the design process – it helped them to refine and evaluate ideas. The Stage Struck team, on the other hand, did not seem to place as much emphasis on documentation. The documentation seemed to be something which was required to fit in with the client's project management process, rather than something which was inherently valuable to the design process.

However, Sheryl stopped short of drawing any conclusions about these differences, giving no indication of the consequences for the projects.

#### **4.5.5.6 General principles**

In her discussion of the major project management issues Sheryl made some general observations, for example that there was a “need to prioritise the ideas and content so that the project can be delivered by the due date”. These were not explained further so it is difficult to know what such statements are based on, and to what extent they might be important in other situations.

The origin of other general conclusions is more obvious. For example, in discussing her experience as a student designer Sheryl wrote:

The experiences of the Stage Struck team also related to my experience producing prototypes for EDGI913 last semester. Because there was no real client for last semester's project, the prototypes I designed were based on my ideas of what could be covered in a multimedia package – rather than being the result of a specific client need or brief. This is similar to the open-ended design approach to Stage Struck, in which there were few specific objectives at the outset. In my own experience, this open-ended design approach was not as successful as the alternative, which would have been to start with some very specific objectives or outcomes.

She concluded that:

While it is a more interesting and creative approach, from a design point of view, it leads to problems such as knowing when to stop and becoming overwhelmed with the potential scope of the content.

This passage is another example of Sheryl's firm expression of ideas and of how, once derived from her reading of the cases, they become more generally applicable.

#### **4.5.5.7 Use of other resources**

Sheryl did not refer to any literature in her case analysis.

#### **4.5.5.8 Summary**

In contrast to some other students who confined themselves to tentative statements and judgments, Sheryl seemed more confident to express her views and beliefs. Although in many places her responses to the questions were more descriptive than analytical, elsewhere she tried to make sense of the cases - often using her professional experience as a reference point rather than information from the cases.

Sheryl also appeared more willing to discuss design issues in detail, with little explanation provided for the project management issues highlighted. She tended to separate design, management and process issues more clearly than many of the other students. This may reflect her greater familiarity with the development of instructional materials, but in so doing she does not refer to the interrelations between issues.

Sheryl's discussion of the issues moved beyond the specific case contexts as she considered how to apply what she learned to her own future work. This ability to draw general principles from the case is also evident in her discussion of project management issues, although the practical implications of these are not alluded to.

#### **4.5.5.9 From the interview**

In describing her approach to the task Sheryl said that she began to read the material on *Exploring the Nardoo* but after finding she couldn't understand some of the references to the product decided to look at the product before reading further. After this, she browsed through the materials to get an idea of what she had available to her. She then read the

material more closely, this time with the assignment questions in mind, looking for the answers:

So for the stages for example I did a timeline and then as I went through I'd add to that.

After reading through the interviews and documents Sheryl also went back to the CDs occasionally to check on a detail or examine a feature more closely.

Sheryl rated the interviews with the designers as the most useful component of the case materials, and in particular was interested in “what they had to say about what had happened”. Through these personal accounts Sheryl felt she was able to “get an overall feel for how it [the team] did work and how it didn't work together”.

When asked if she encountered any difficulties with the case materials, Sheryl replied that they weren't difficult to use but she was “a bit overwhelmed by how much there was”. Feeling she needed to cover all of the material, she went through everything so she knew what she could “come back to”. Sheryl commented however that she did not know if this was the ‘right’ approach.

Overall Sheryl felt she got a better sense of management issues from the cases. She felt that the interviews made these very accessible, and her interest in management issues led her to focus on them more. She did comment however that she “certainly got a sense of the design” from the cases:

There was plenty of stuff in StageStruck on the design and I got a good idea of where they had originally come from, and what they couldn't achieve and how they had to rework that.

However she also felt that without access to the team's original mock-ups it was not easy to understand the design issues in detail.

## 4.5.6 Barbara

### 4.5.6.1 Model of process

In setting out her version of the development process for the *Exploring the Nardoo* case, Barbara wrote:

The iterative process of producing multimedia makes things less clear cut than a linear progression would. However, this is it as far as I can see.

And then for the *StageStruck* project:

The 'Stagestruck' production does not appear as structured as the 'Nardoo' production, and breaking the process down into stages is a bit arbitrary, but here it is.

Although the series of stages Barbara arrived at for each case are different, similar terms are used in each. Some of these correspond to standard terminology used to describe multimedia development (eg. 'Alpha version'). This indicates that Barbara incorporated information from beyond the cases, though she did not use a specific model from the literature to frame her response.

In discussing *Exploring the Nardoo* Barbara described events and activities at each stage while also adding her own commentary:

There was a previous project, 'Lake Iluka', that was a point of reference. It attracted the client's interest and it also provided an experience base for what worked and what didn't and how to do it better, which I think was significant.

She also drew together information from different time periods to comment on issues of overall importance to the process:

Training needs needed to be addressed (this caused a problem later with graphic design, as it took the designer longer to learn to use Photoshop then anticipated and this created a bottleneck with graphic design).

Her subsequent discussion of the *StageStruck* development process was much briefer, tending towards description rather than interpretation. Barbara referred to some events, but did not offer more detail:

Concerns following the alpha version are design. For some reason the graphic designers are changed, the reasons are not stated.

This suggests that although Barbara recalled this event from reading the cases material, she may have been unable to locate it again to find out more about the circumstances or that she overlooked the detail. This lack of detail results in a superficial account of the process.

In discussing the experiences of the designers in the *Nardoo* case Barbara focused on the process, concluding that the major milestones are closely related to text-book accounts with the “the main difference between the case notes and the literature is that the case notes are descriptive and the literature is prescriptive, in other words the first is real and the second ideal”. In this section she compared models found in the subject readings to the development processes described in the cases. *Nardoo*, she concluded, followed a fairly standard (textbook) process, though allowed for improvisation. On the other hand:

The development process of Stagestruck seems to align more with the communicative paradigm in the Visscher-Voerman, I. et al. text, with a bit of pragmatism thrown in, than with the very structured development process detailed in the other readings.

Barbara concluded that from studying the *Nardoo* case she learnt that “multimedia development is not a simple linear process but iterative and essentially messy”. This conclusion further confirmed for her by the *StageStruck* case account.

#### **4.5.6.2 Own experience**

In relating her own experiences to those of the case designers Barbara described both her activities and reactions as a student designer. For example she recalled “having to go back and do things over a number of times because you changed something later on” and “feeling dissatisfied with some parts of the package”.

In discussing both projects Barbara noted that because she hadn’t worked on a group project before the comparisons she could make between her own experiences and those of the case designers were limited because “with a project the size of ‘*Nardoo*’ the team aspect is an important part of the experience”. Her comments suggest that she was aware of the added complexity of team projects:

There would be a whole lot of issues in getting a team to work together efficiently on something that is complex and iterative and where changes will affect what has been produced earlier by a number of people.

This did not prevent her from making the observation that although in her own work she neglected graphic design in favour of instructional design and programming, “with a real commercial project the last thing you could afford to neglect would be graphic design and professional-looking media, while a lot of packages seem to be getting away with poor instructional design”. Here Barbara put her own experience in perspective by considering how issues are dealt with in a ‘real’ project - a concern also expressed elsewhere in her assignment.

#### **4.5.6.3 Design of the product**

Barbara chose the PDA (from *Nardoo*) and the Stage area (from *StageStruck*) to focus on as particular design features from each product. She traced the origin of each in terms of the project aims, the development of the feature and some of the design issues.

Like some of the other students, Barbara based her judgment of each feature’s effectiveness on its functionality and the interactivity offered to learners, and in the case of the PDA its appeal to both learners and other designers as described in the case materials. She did not offer a personal comment.

Overall, Barbara gave consideration to a range of design issues placing most emphasis on the background factors, learner designing for the target learners and the features and functionality of the product. Some mention was made of factors that affect the design of the product, indicating that Barbara had developed some awareness of the interplay between design, management and process issues.

#### **4.5.6.4 Management issues**

Management issues were highlighted for each case through a series of general observations linked to examples from the cases. Here Barbara identified the aspects she considered important to the successful management of a project:

Importance of team members with the right skills and of providing training in areas where skills are lacking, e.g graphic design caused problems because the artist was not familiar with some of the applications she needed to use, so a second artist had to be employed, which had the potential for friction and also caused some style problems.

Her discussion ranged across the categories coded with most emphasis placed on management of the team and the client, although little reference was made to issues of working together. Barbara also focused on the use of documentation as a management tool and its function in various stages of project development.

#### **4.5.6.5 Comparison of cases**

Comparison of the two cases is limited to a final section of the assignment. Here Barbara noted some fundamental differences between the two projects and drew some conclusions about these:

I think the Nardoo benefited very much from being a 'second generation' product, i.e. Lake Iluka had gone before and Nardoo had the benefit of lessons that were learnt from it. Another version of Stagestruck or a similar open-ended package will similarly benefit, both in a smoother development process and a better product.

Barbara offered her interpretation of these differences both to explain them ("*StageStruck* was more experimental in its original conception, so perhaps more problems should be expected.") and suggest what might be done in response ("Perhaps this needs to be factored in as well, although it is hard to think of everything."). This communicates some of the general ideas she formed about these cases.

#### **4.5.6.6 General principles**

Throughout her discussion of major project management issues Barbara drew out general principles based on her own interpretations of the case events. These are broad statements and relate to managing the design and the process, as well as the people. For example she argued "the importance of experience in project management" noting that:

Rob Wright had to rely a lot in the initial stages on Barry Harper, who had had experience with managing 'Iluka' in how to manage the process, the details of how long things would take (e.g. video production) etc.

In writing about the lessons she learned from studying the cases Barbara wrote that "the difficulties mentioned encourage you to try and avoid those sort of pitfalls yourself", indicating she has considered the wider relevance of some of the issues. For example:

The other issue is clearly client relations, which also need to be managed carefully. A go-between as buffer seems useful. Communicating ideas is a nebulous process and everyone can easily imagine something different, so getting everything clarified and tied down in writing before anyone gets hideously disappointed is essential. There is a danger of



'creeping features syndrome' where more and more features need to be added to keep the client happy because communication and documentation were lacking in the first place.

#### **4.5.6.7 Use of other resources**

Barbara referred to four sources from the literature, although none are correctly cited and referenced. All were provided as part of the subject resources and appear only in responses specifically requiring reference to the literature (Question Two, Part a).

#### **4.5.6.8 Summary**

Although much of her writing is descriptive and many points are made without further elaboration, Barbara has tried to interpret and explain some events in the cases, in places drawing more general conclusions that look beyond the specific contexts presented. Her own ideas about interactive multimedia seem to be derived from her observations and experiences, and sources from the literature are also referred to in her analysis.

Overall, the assignment suggests that Barbara's main interest was in the process of multimedia development and its management. Barbara's writing shows a concern with how things should be and are done in 'real-world' projects, not just how they are presented in the literature. While interested in the practicalities of specific strategies and activities, Barbara has also developed an overall view of the process as iterative and complex.

#### **4.5.6.9 From the interview**

Barbara did not reveal much about her approach to the case analysis task other than to say that she first read some of the suggested readings for the subject and then went to the case materials.

She found the analysis task time consuming and quite difficult, for which she offered two main reasons. Firstly, she felt that she had to "read between the lines" in the interviews because they were too cordial and didn't "get down to the nitty gritty" because of people's reluctance to have their true opinions published. She argued that:

It would have been interesting to talk to people when they know this wouldn't be published and they would have been confidential, and that would have been more instructive I think.

The other source of difficulty was what Barbara felt to be a mismatch between the questions that were asked and the format of the information provided:

The relevance between those things and the questions we had to answer wasn't immediately apparent because you had to find decision points and decision stages and you looked at the timeline and some of the decision points weren't in the timeline and there were some things there that weren't decision points they were just major steps along the way. So it didn't sort of mesh all that well.

Barbara said because of this she couldn't find the information she needed. Furthermore, she thought the cases were too big and rather than requiring students to answer particular questions the task should have been more open. She felt that for her the assignment was not as useful as it might have been.

Commenting on other components of the case, Barbara said that she found the design statements useful, partly because her group would have to develop their own, and also because the evolution of the design statement showed how the project changed over time:

It was interesting to know the process you go through to arrive at a design statement because you think 'oh yeah we're just going to put out a design statement' and you're going to do what it says. Well there's a lot more to it. In fact every one of those cases I think had two design statements where they are gradually refining the process. So I think that was useful to know that because I think you go at it fairly naively and think yes this is the way you are going to do it.

By comparison Barbara found that the prototypes were not particularly useful because:

There really was not much there. I mean it was just a blank screen with squares on it or something. I couldn't get much out of it other than 'gee there's not much there', you don't have to do much to call it a prototype.

Overall Barbara preferred the subject readings to the cases because they offered practical advice written in a non-academic style. In these she felt developers were "passing on their pearls of wisdom", information not readily available in the two cases.

#### **4.5.7 Liz**

##### **4.5.7.1 Model of process**

Liz has used Phillips & Jenkins' (1998) model as a framework for her analysis and is explicit about this approach:

I have employed the 'Interactive Multimedia Development Model' of Phillips and Jenkins whereby "production proceeds through a cycle consisting of design, develop, and evaluate" to assist with my conceptualisation of the design process experienced by team members in both parties.

This is followed by a discussion of each of the stages, and the events that occurred during them. In so doing Liz has provided a commentary on the projects, but their individual chronologies are not clear. The discussion is focused on interpretation of the information in the cases which seeks reasons behind the events:

It can be said that at the "design" stage of development described by Phillips and Jenkins, the stakeholders for both groups, namely the Federal Government supporting the National Institute of Drama (NIDA) and the Department of Land and Conservation (DLWC) had placed their demands on the production team with detailed budget requirements; huge content for both projects; and possibly a lack of expertise and knowledge in understanding the complexity of producing multimedia material. *Exploring the Nardoo*, however, seemed to undergo a smoother "kick-off" described by Blum, possibly due to the experience of the team members most of whom had been involved in producing *Investigating Lake Iluka*.

Liz used references to the literature throughout her discussion of the process:

Such inadequacies in planning in initial stages are reflected by Phillips and Jenkins who claim "IMM poses an even larger problem, due to its novel nature and because most people are unsure of what is possible with this medium."

These however are not always relevant to the surrounding discussion, for example the Blum (1995) reference below seems out of place:

Key figures from *Nardoo* and *Stagestruck* seem to express concern about co-ordinating team members all of whom have varying experiences and skills which is reflected in the difficulties experienced by both teams in hiring a suitable graphics designer. Blum defines graphic designers as two types of people – "animators" and "artists" and claims "they don't come cheap."

Although there is reference to information from the case materials, in using the Phillips and Jenkins' (1998) framework Liz's response does not give insights into the complexities and differences in the development process. In some places Liz has tried to interpret the events or the perspectives of the key players, but these are asides to the main thread of discussion. Ideas and themes are often not well explained, further glossing over the detail of the cases.

#### **4.5.7.2 Own experience**

In relating her own experience to those of the designers, Liz began by discussing her own role as project manager in the current subject rather than her previous experiences as a

student designer. She referred to concepts from the literature and the experiences of Rob Wright (project manager in both of the case projects), putting forward her own ideas about this role:

Within my own design team, I feel I have a very broad and significant role as 'Project Manager' this role being defined by Blum as the person who "takes responsibility for organising and whipping into shape those people who are hands-on creating the product." The reflections expressed by Rob Wright (Project Manager) in *Stagestruck* often hint at undertones of frustration and exasperation. Representing the University side in his liaison with NIDA and the other consortiums much of his time seemed to be spent attending executive level meetings to seek approvals for design briefs, as well as managing and inspiring his own team. My feelings are that the Project Manager really determines the type of relationship that will be maintained between the client and the working team.

She then commented on the importance of good communication as a "legitimising factor for decision-making" (from Visscher-Voerman et al., 1999) in project work and her own professional environment:

I apply this logic to my own work situation as a teacher of primary school children and feel that many of the issues within the school environment whether they be curriculum based, student-welfare issues or even parental concerns can be dealt with in a communicative, open manner.

In discussing the experiences of the case designers her concern is with management issues, rather than on design issues. This suggests that Liz may have been trying to make sense of her role in the team as project manager, and therefore saw these issues as the most relevant.

#### **4.5.7.3 Design of the product**

In discussing a particular design feature from each case Liz recalled each project's aims and then described the feature with a brief mention of its development. She did not trace the development of the feature in as much detail as other students, nor did she discuss specific design issues. She also did not offer a judgment of the effectiveness of the feature beyond mentioning that she liked the simulator and that the scrapbook "proved quite versatile and multifunctional".

Overall, Liz gave little consideration to design issues in her analysis and where examples from the cases are used to support her argument these tend to be isolated points rather than placed in context:

Instructional design problems were experienced by the *Nardoo* team when incorporating some of their content from *Illuka* (produced on Hypercard) and applying it to their new

authoring tool – MediaPlant. Despite *Stagestruck* having the resources provided through their funding from the Federal Government, Amanda Morris (NIDA representative) would have ideally appreciated more time to construct support material for teachers to be used in conjunction with the software in schools.

#### 4.5.7.4 Management issues

Liz emphasised project management throughout her assignment, focusing on client and team management rather than covering a broad range of issues. This close attention to management is most noticeable in Liz's discussion of the development process. This was a deliberate strategy on Liz's part, which is evident from the opening sentence of her response to question four:

I attempted to examine the major project management issues in my discussion of the design phases of the project.

Her response identified other major management issues, such as time management, working with external designers and instructional design problems. In this response she highlighted events from the cases to explain the issue and explain the consequences. Here she raised the issue of time management and imagined how the teams might have felt when their progress was delayed:

...particularly during the implementation stage when both *Stagestruck* and *Nardoo* teams were applying the fine details. Both groups felt their design processes had been slowed by the frustrations of not being able to find suitable graphic designers who could envisage the overall look and apply their ideas appropriately to the respective projects.

This passage exemplifies Liz's attention to the people in the cases. This concern featured throughout her assignment in the way she drew on the perspectives of the team members to illustrate her points, and considered the impact on teamwork.

The quote above also illustrates Liz's tendency to summarise events in both cases, making a high level comparison that filters out the details that make the cases different. In this instance, the difficulties in finding graphics designers and working with them to produce the desired results were a problem in both projects, however the circumstances and outcomes were quite different in each. The detail is lost. This lack of attention to detail is also evident in Liz's consideration of further issues, which appeared as a list of general points with no further elaboration:

Other issues would be based on applying appropriate planning in selection of group members, determining that all team members feel that they have valuable input into the overall product and educating client parties about the fundamentals of instructional design.

#### **4.5.7.5 Comparison of cases**

In her assignment Liz addressed each question but had tried to do so in a more ‘holistic’ way by combining her responses in continuous text rather than setting out her answers separately. In discussing the cases together she had an opportunity to compare the projects throughout her response, but did not take advantage of this. Instead she tended to present the cases side-by-side focusing on high-level commonalities with little use of contrast that could have brought out some of the complexity of the projects. For example:

Decisions as to the scope of content and its contribution to the overall product have to be evaluated at this stage of the process. Both stakeholders – the Water Resources and NIDA were anxious to “pump” more content into the design and priorities had to be applied.

#### **4.5.7.6 General principles**

Only three statements in Liz’s analysis could be regarded as general conclusions drawn from the cases, literature or her own relevant experience. For example, the following statement expresses a general observation and then places that in a context:

If decisions are negotiable, then all members feel they are part of the ownership of the product, which could be in terms of the “school image” in my case or in the case of instructional design [of] the final achievable product.

Elsewhere, Liz combined the literature and cases to arrive at her conclusions:

Tasks and responsibilities often remain unclarified and specified in this “design” phase. [from Phillips & Jenkins (1998)] The post-production reflections of Rob Wright in his role as Project Manager for Stagestruck seem to reflect on a type of “juggling act” between responsibilities with instructional design issues and scheduling a project of this magnitude.

These passages show how Liz discussed the cases and their relationship to relevant literature and experience in a general way, but her analysis was still grounded within those sources and did not move beyond the context of the cases. She did not take issues and extend them beyond simple comparison to develop principles or guidelines that might apply to other projects.

#### **4.5.7.7 Use of other resources**

Liz cited three sources in her assignments - all of which are suggested readings for the subject. The Phillips and Jenkins (1998) reference appears most frequently, as Liz used one of their models as a framework for discussing the development of the case projects.

#### **4.5.7.8 Summary**

In both trying to take a more holistic approach to addressing the case analysis questions and adopting the Phillips and Jenkins (1998) model as a framework for discussing the development process, Liz may have overlooked some of the complexity of the two projects. Liz's analysis tends to be more descriptive than interpretive. In dealing with the cases together, she made high-level comparisons, which are not always linked, to detailed information or explanation for support. Nor did she draw out generalisations about the cases themselves or how issues might be of wider relevance. Liz drew on her own experience, but did not place herself in the role of designer. Instead, she focused on management issues, particularly how they related to her role as manager of the project team.

#### **4.5.7.9 From the interview**

Liz said her first reaction to the case analysis task was realising there was a large amount of material to absorb, estimating that there were more than 100 pages of reading materials on *Exploring the Nardoo* and *StageStruck*. Her strategy was to print out what she considered the most important documents and then marked sections of interest to her with a highlighter. During this process she extracted key words and assigned these to headings relating to the assignment questions. She also used a table format to compare the two cases. When asked why she used these strategies she said that it came from her own teaching practice and what she had used successfully with her own students.

Liz commented that she focussed mainly on the interviews because she felt they were most useful and within each followed a theme:

I might have been thinking of their frustrations or whatever. Rob Wright seemed to grab me more than anyone because he mentioned how he seemed to be doing a multitude of jobs. So I tended to read someone I was more interested in reading about.

Liz found that she could identify with many of the people in the cases. For example in the *StageStruck* case:

[I could see] where NIDA was coming from with their content. I can imagine there would have been a bit conflict with the ideas the multimedia people had as well.

She attributed this to her own artistic background and also felt this was why it was *StageStruck* that interested her more with *Nardoo* being “a bit too technical”.

The main difficulty Liz encountered with the task was collating and making sense of the information - “getting it all together”. This was partly because the multiple perspectives presented meant she had to “try to pull everyone’s ideas together and their own experiences”. And this was not the kind of task Liz was used to:

It was such a personal reflection. I suppose what I’ve been used to is reading scholarly works or journal articles. ... It’s mostly our feelings and reflections rather than saying who is a scholarly source I can use here or an academic source which I’m a lot more used to. And maybe I tend to think that those people have all the answers, rather than me personally. So it was hard that way.

Liz felt her response focused more on management issues than on design because of her lack of multimedia skills. For example:

When it came to the more technical stuff like the simulations that were described, I found that quite difficult to interpret because I couldn’t imagine being on the computer and experiencing it because I haven’t been trained in that area. So my own skills as such couldn’t quite relate to that area.

#### **4.5.8 Joanne**

##### **4.5.8.1 Model of process**

Joanne’s discussion of the process in response to Question One is organised within a framework of four stages - “Project Proposal/Concept”, “Project Design”, “Project Development” and “Project Implementation”. This framework is used to structure the response for each case and the less detailed treatment of the second case suggests that framework was established first, and then the details were filled in.

It is difficult to determine the origin of this model. The terms are consistent with the general literature on multimedia development, but there is no reference given. It may be



that this generic framework has arisen from the Joanne's prior knowledge of the topic. This section of Joanne's assignment is generally descriptive with only two statements that could be classed as interpretation of events. For example, in the following excerpt, she adds her reasoning about the changes to the package:

It was decided then to leave out the QuickTime videos altogether. It was unfortunate because so much time was spent obtaining these resources, particularly organising the copyright and royalty issues.

It appears that although Joanne went some way towards developing an overview of the process, she saw this as a descriptive task.

#### **4.5.8.2 Own experience**

In relating her own experience to the experiences of the designers, Joanne's focus was on how the designers implemented their ideas for the product rather than how those ideas were developed:

The team of designers came up with a lot of ideas but only some of them worked. They had to test some of them to see if they would be suited to the type of project they were designing. Some ideas were abandoned as they were not feasible to create.

She then related this to having to discard design ideas in the production stage of a student project because of her own lack of skills:

I went through the same situation where I came up with some ideas that I thought [would] be great to include in my design but when I tried to create them in iShell, I either had trouble with the package due to my inexperience with it or I just ran out of time so I had to find another [way] to re-create a similar idea.

Despite the very different circumstances of her experience and those presented in the cases, Joanne saw this similarity as relevant. A similar concern with how design ideas are implemented on screen is also evident in other students' case analyses. This suggests that understanding the difficulties faced in turning ideas into a product may be of more relevance to them than developing those ideas in the first place.

#### **4.5.8.3 Design of the product**

In her discussion of a particular feature from each case Joanne provided a descriptive answer, summarising information which appears in case materials or impressions from her use of the CD-ROM, for example:

It was always the intention from the beginning to have the concept of the tool palette for the learner to use to create their own work. The idea was adopted from the PDA-style tool in the Nardoo project. Its visual design has undergone some changes during the development of the prototypes. It is a very powerful tool for the learner. The tool palette, which can be accessed from any of the rooms, has several different functions. It has a lot of functions such as the score which is located across the bottom of the screen.

However her descriptions were not always clear and did not explain the feature within the overall concept of the package. Her judgments of each feature's effectiveness were based on personal opinion and assertions such as:

This feature is very effective in teaching kids to learn how to interpret data that is collected and analysing the results. It allows kids to build on their problem-solving and investigative skills.

Some consideration was given to usability of the feature from the learner's perspective, but this is descriptive and is not used to support the argument.

There is little discussion of design issues in the remainder of the assignment beyond this. In discussing the case designers experiences, Joanne noted that some ideas are discarded but she did not explain why these ideas didn't work and how the designers adapted their ideas or developed alternative solutions, despite a number of examples being provided in the cases. The only other significant point made is that the designers of both products focused on learner interactivity and adopted a constructivist approach. These are issues that could have been explored further, and explained in relation to the products as outcomes of the design process.

#### **4.5.8.4 Management issues**

In identifying the management issues presented in the case, Joanne described a number of example situations from the *StageStruck* case in which project management seemed to be of importance:

Initially there was an issue with the lack of understanding on the part of the NIDA team of what it took to put a large CD ROM project together as they had never created this package before. The NIDA team and UOW team were working remotely with one team in Sydney and the other in Wollongong. They had to be consistently updated on with the progress made on each side ensuring that both teams were still meeting the goals of the project. They did [this] by emailing, sending things back and forth and also talked on the phone on a daily basis.

This section tended to be descriptive rather than interpretive with no attempt to relate the events to a theme or draw a general conclusion about whether strategies were successful or not.

No project management issues were identified for the *Exploring the Nardoo* case.

#### **4.5.8.5 Comparison of cases**

The assignment was structured to answer each question for one case and then the other in turn, and the only comparison between the cases appeared in a final section, which identified some of the similarities and differences. The similarities identified consist of five dot points, only one of which is more than a sentence, for example:

In terms of multimedia design, the focused was on learner interactivity. That is, to actively engage the learners and encourage them to construct the knowledge themselves. .e.g. designing their own stage sets or collecting river samples. Both looked at the constructivist approach where the learner learns by exploring. He/she is not restricted to follow a certain path, they can choose where to go and what to do and they are in control of their own learning. The consortium partners were more focussed on the content and had very little understanding of the complexities involved in developing a multimedia CD ROM.

Her account of the differences was even more concise:

Exploring the Nardoo contains simulations. [The] Nardoo team conducted a needs assessment.

Joanne offered no explanation of the significance of the similarities and differences she has identified.

#### **4.5.8.6 General principles**

Joanne drew several general conclusions about the features of a successful project from the *StageStruck* case - good communication, acquiring the necessary intellectual property permissions and having a dedicated team. The importance of these are explained in terms of what went wrong in the project, and therefore should be avoided:

It is important to effectively communicate with other team members and to keep them up-to-date. Failure to do this could result delay completing your project. Precious time would be wasted and deadlines not met when members don't have a full concept of project. It would be a costly experience and a waste of resources.

However Joanne did not go on to describe how these goals might be achieved in practice. This would have extended her ideas beyond this case and made them relevant to other projects.

#### **4.5.8.7 Use of other resources**

Joanne made no reference to sources from the literature in her assignment.

#### **4.5.8.8 Summary**

Joanne's response to the case analysis questions is descriptive rather than analytical. The absence of some responses suggests that Joanne had some difficulty in completing the task. She drew on examples from the cases and her own experience to highlight some of her points, although the logic of her argument was not always evident. There was more emphasis on project management than design with only a limited range of issues raised. Because of the superficial treatment given to most of the questions there is little linking of issues and therefore the complexity of the development process is not conveyed. Joanne made some general observations about the cases but did not relate these to wider practice.

#### **4.5.8.9 From the interview**

When asked about her approach to the case analysis task, Joanne replied that she began with the CDs, exploring them herself to learn about them. She then began reading about the details of the projects, "picking bits and pieces" she found interesting while reading through the interviews for a fuller picture. As she went she jotted down notes under categories for each case that related to the assignment questions:

I'd think to myself 'does that apply to the question that was being asked' and if it didn't I'd just keep going. Any parallels and differences to the questions you know, I worked from there.

Occasionally Joanne went back to the CDs, but only to check a detail rather than to continue exploring. She looked through some of the other documents, focusing on parts that were interesting or seemed useful for her assignment.

Joanne felt that the interviews were the most useful component of the case materials:

...because the interviews give each individual's perspective. So we got different people, the project manager and the designers. And you have the different points of view on what they thought went wrong or what they thought was good and how they approached the project.

Although each of the interviews contained slightly different information, Joanne found this helpful in determining points of similarity and difference in opinions and feelings about the project.

Joanne cited two main difficulties she had experienced with the task. Firstly she felt somewhat overwhelmed by the amount of material contained in the cases. A sense of frustration came from feeling that she didn't 'want' to read everything, and that there was too much detail. Plus she found reading from the screen for any length of time annoying. This led to her strategy of only looking for the relevant parts rather than trying to tackle everything, although she found that this was still very time-consuming.

Her other challenge lay in interpreting the requirements and deciding where to start with an unfamiliar type of task:

I didn't know if what I had was what was expected you know. I had trouble with the format and interpreting the questions and so I ended up taking a bit longer than I was supposed to.

Despite this Joanne didn't seek help either from the instructor or other students ("because everyone was off having their own little problems"). Ultimately Joanne just kept going with the task, but felt she ran out of time and had to hand it in before it was complete.

Joanne also said that she found that the material was quite repetitive because it was trying to describe the project as it was going through different stages. Understanding this progression involved:

...going in and trying to find out the difference between prototype 1 and prototype 2 and what were the changes. And there was a lot of reference to things they had originally but that they didn't end up doing. So in StageStruck there was this magic cat. And you think well there's no black cat now!

#### **4.5.9 Simon**

##### **4.5.9.1 Model of process**

Simon used the same four stages to describe the development process used in the two case projects. The framework - "The Proposal", "The Design Statement", "Prototypes" and

“Final Product” - is chronological and based on deliverables from each stage rather than the activities undertaken. His use of ‘design statement’ suggests that Simon has developed his own model of the process from the case materials, as this term is particular to the cases and not used in the wider literature.

When first discussing the Proposal and Design Statement stages Simon gave a general description of the relevant activities:

The proposal is the launch pad of all interactive multimedia packages. A proposal outlines the rationale and initial concepts of the package – *“taking the basic information derived from a needs assessment and converts it into a description of the Project; the information which is to be included in the materials, how it is structured, what the target audience understands about the information and how it may be structured for the audience”*. (Hedberg, Harper, Brown & Corderoy, [1994], p.4).

The design statement provides the entire design structures of the project development. A project description, goals, metaphors, content, target audience, activities, educational and technological strategies are all fashioned during the design statement production. The final design statement is a product of preliminary design briefs and a series of elementary design statements.

Both of these descriptions are derived from the case materials. The first passage includes a direct quote from a paper written by members of the *Exploring the Nardoo* design team, which was provided as part of the case. The second comes from Simon’s own observations about the process described in the interviews and the design statement documents themselves, which were also provided.

Within each section Simon has described the projects in a general way, summarising events at a high level rather than using specific detail or references to ‘characters’ from the case. His analysis tends to be descriptive rather than seeking either the reasons behind events or explaining their consequences in the way other students have:

Teams for both cases developed throughout the project however the main project team incorporated the roles of management, design and production.

In discussing the cases side-by-side he took the opportunity to compare and contrast:

Studying the overview of the two cases in question there appears a contrast in the way each case was developed. Exploring the Nardoo prepared a detailed design statement prior to the development of a prototype, whereas Stage-Struck produced early prototypes before completing the final design statement.

Although presenting a four-stage overview of the process and making broad comparisons between the two cases provides a framework for analysis, Simon's discussion contains little detail to indicate the complexity of the activities and the influence of other factors and decisions. The subtle differences between the two projects are lost. Furthermore, there is no indication that Simon has developed an understanding of the design process as one in which redesign and adaptation is necessary.

In discussing the Prototype stage of development Simon concluded that each of the projects followed a different production model:

The two contrasting production techniques can be identified as a Waterfall Development Model and an IMM Development Model (*Chapter 3, A Model for IMM Production – Rob Phillips and Nick Jenkins*). In the case of *Exploring the Nardoo*, a waterfall model is followed where the whole production method is completed with any changes requiring a complete review of the entire project. *Stage –Struck* has incorporated the IMM development model where concepts are designed, developed and evaluated continually before the final implementation.

This is interesting firstly because the *Exploring the Nardoo* project went through much iteration in its development, although perhaps not as clearly as the *StageStruck* project did. This suggests Simon may have relied more on the overview and timeline of the cases than on the information presented in the interviews, and so has missed some of the detail. It is also interesting because the project team's own model can be found in the literature provided as part of the case materials (Harper & Hedberg, 1997), but he has not used it as a reference.

In one passage Simon made his own comments on the case, describing the Final Product stage:

I found this particular stage of development interesting in the fact that while the management team of both cases had developed a constructivist learning tool, the publishers in both cases wished to provide detailed explanations of how to navigate through the program, destroying the exploration concept behind the projects. A conflict between marketing and educational concepts.

This stands out as the only remark made in this section that suggests Simon has tried to interpret events rather than just describe them.

#### 4.5.9.2 Own experience

Simon related his own experiences both as a teacher and as a designer. He began by using a quote from the literature (Roblyer, Edwards & Havriluk, 1997) to describe the issues that “the designers confronted when trying to distribute the *StageStruck* CD-ROM throughout Australian schools”. In Simon’s view the problem lies with teachers who are unwilling to stay in touch with new techniques and theories:

Many teachers continue to believe they are the fountains of knowledge, which students must tap into not the facilitators. These teachers are quickly becoming disillusioned with teaching practices as they are left behind with modern technology and methodologies.

While the point clearly comes from his own observations, its relationship to the experiences of the designers in the cases is not clear nor is it an issue discussed in the materials. He then listed a number of similarities between the case designers’ experiences and his own:

The similarities I have noted have been: working to a deadline with checks points to sign off at: the concepts developed were for educational purposes and involved the development of democratic and prescriptive environments: technological skills were developed throughout the product design.

He noted that the case designers “are a team with a budget and past experiences to build on” which contrasted to his previous design experience. No further explanation of the significance of these factors, either in the case projects or his own experience was provided, nor did Simon raise any specific examples from the cases.

#### 4.5.9.3 Design of the product

In discussing a design feature from each of the products - the PDA from *Nardoo* and the 3D environment in *StageStruck* - Simon traced the origins and the development of the ideas, also highlighting relevant design issues.

In his description of the events which led to the development of the PDA Simon confused the sequence, and so gives an impression of events that differs from that presented by the designers interviewed. Similarly in discussing the development of the 3D environment in *StageStruck* Simon identified the extra time required to develop new programming routines as a major issue, but did not mention the intellectual property dispute which was the other major determining factor. Neglect of this second issue is surprising because all of the interviewees in the *StageStruck* case talked about it at length.



This misinterpretation and glossing over of important detail further suggests that Simon has not closely read and absorbed the materials. He has developed an overview of the projects, but not taken account of the detail, and this had led to oversimplification.

Simon did not offer his own judgement about the effectiveness of either of these features. Instead he made a broad statement about its success, for example with regard to

*StageStruck*:

While the concepts involved in producing the 3D environment were not totally realized it could be seen as a success with students provided the capabilities to create something of their own and share through a web community. This is possible through the programs ability to adapt video and audio files to relatively small file sizes.

Overall, Simon raised a broad range of issues with his responses correlating to all of the categories coded except one. However, none of these were dealt with in any depth.

#### **4.5.9.4 Management issues**

Simon's discussion of project management issues in the development of the *Nardoo* package focused on Rob Wright (the project manager) and his role in managing the large amount of project resources. This issue was also linked to the *StageStruck* case and Simon expanded on this to highlight the friction evident between the stakeholders groups and the development team.

Simon provided his own interpretation of some of the case events here. For example, he stated that according to the project manager the "graphic designers cluttered the interface in an attempt to place everything at the users disposal", though this does not concur with the case materials. It is also interesting that many students referred the difficulties in selecting and working with external graphic designers as a main problem, but Simon did not raise it as a significant issue.

Simon also wrote in reference to the *Stagestruck* project that:

Finally there were legal concerns when developing the project. Contractual agreements were challenged, with NIDA believing they had ownership over the software developed by the University of Wollongong. This was proven to be incorrect as the original contracts made no mention of such an agreement.

However, there was no explicit mention of contracts in the case materials suggesting that Simon is drawing on knowledge of events typical in these types of projects.

Discussion of management issues was well balanced with design and process issues.

#### **4.5.9.5 Comparison of cases**

Simon structured his assignment such that he discussed both cases within a single response to each question. This offered him an opportunity to compare the cases throughout which he made some use of in discussing the development process, for example:

Studying the overview of the two cases in question there appears a contrast in the way each case was developed. Exploring the Nardoo prepared a detailed design statement prior to the development of a prototype, whereas Stage-Struck produced early prototypes before completing the final design statement.

Like his writing throughout this assignment, these comments tend to be descriptive and the significance of similarities and differences between the projects were not discussed.

In the remainder of his assignment Simon discussed each case sequentially, occasionally referring to a high-level similarity to link his points together, for example:

Similar concerns arose with the management and production of the Stage-Struck CD-ROM.

#### **4.5.9.6 General principles**

Simon drew out only a small number of general principles in his analysis. For the most part his discussion stayed within the bounds of the case information, or referred to relevant literature or personal experience. One exception is Simon's explanation of the nature of the proposal and the design statement, in which he makes a generalisation about the function of these documents (see quote above in Model of process section).

Only in the last section in which he reflected on what he learned from studying the cases, did Simon again extend beyond the specific scope of the cases:

Finally, a concern which I believe from [reading] both cases, especially Stage-Struck, had little priority was the promotion and distribution of the final product. As is always the case, you can have the best product on the market however if you fail to give it exposure and attempt to make it universal than it will fail.

#### **4.5.9.7 Use of other resources**

Simon cited one reference included as part of the subject materials and two other sources, indicating that he has done some further research on the topic.

#### **4.5.9.8 Summary**

Simon's writing in this assignment combines summarising description with some of his own interpretations of the case events. He raised a range of issues with a balance between management, design and process factors and related these to the cases in broad terms, rarely referring to details or to the views of individuals. This has the effect of glossing over some of the complexity in the cases. Treating the cases together may also have contributed to this as Simon showed a tendency to focus on similarity rather than difference.

In some places Simon's interpretations of the material differed from what appears in the materials and often failed to mention prominent issues. This may indicate that he did not read the materials closely, or simply that other issues were more relevant to him. His own experiences as a creative arts teacher and designer were incorporated, although the relevance to those of the case designers was not clearly explained. Simon made some general remarks about the products, but does not make clear links between the issues raised by the cases and their potential significance in other contexts.

#### **4.5.10 Ian**

##### **4.5.10.1 Model of process**

In his account of the development of each of the cases Ian divided the process into a series of stages that reflect the different periods in the projects. Rather than using traditional developmental terms, these stages characterise the activities taking place, for example "Falling Behind" in the *StageStruck* project and "Team Work and Building in Blocks" in *Nardoo*.

This suggests that Ian was trying to tell the story rather than just recount events presented in the case materials. He focused on describing what people did, the decisions made, and the reasons for and consequences of these:

**Graphics Problems:** In mid 1997 some hard decisions had to be made regarding the graphic design of the project. The graphics editor, who seemed suitable earlier on, was not working out. He seemed unable to provide what [was] graphically needed. He took too long, producing ineffective results and was costing the project too much money. He was let go. A new graphics team of three took his place.

Although perhaps not as explanation-seeking as other students, Ian tried to put events in context and add life to the story:

By mid 1996 the early prototype mockups of the project and an initial design statement had been developed. Then the work stalled as the issue of ownership of the coding platform becomes a problem. Lawyers were involved, things got sticky and work on the project stopped for several weeks.

The series of stages developed for each case is different and does not indicate that Ian extracted a generic model of multimedia development from his analysis.

Although Ian did not express views on the nature of the development process in this discussion or elsewhere in his assignment, his comments suggest he is aware that ideas need to be revised and adapted during the development of a multimedia product.

#### **4.5.10.2 Own experience**

Ian did not relate any of his own experiences either from his work as a teacher or as a novice designer. This may be because he did not see his previous experiences as relevant to the discussion of these projects.

Like some of the other students, Ian used his own investigation of the CD packages as the basis for his discussion of a particular design feature from each product:

Here the user can choose from a series of soundscapes - music, sound effects, atmosphere sounds and human sounds. These soundscapes can be blended, looped, layered and shortened to develop background score to the script. Once I got the hang of moving, layering and adjusting the sounds onto the audio template at the bottom of the screen – the experience it was great!

These impressions became the basis for his judgment of the effectiveness of these features:

I thought this method allows for a tremendous amount of user interaction and creativity. I don't see how this part of the project could have been made any better.

This personal assessment in which Ian put himself in the position of the learner is consistent with the reflective, thoughtful tone adopted throughout the assignment.

#### 4.5.10.3 Design of the product

Rather than discussing the experience of the designers (in response to Question Two), Ian identified some multimedia design and development experiences specific to each of the cases. In these sections, Ian highlighted a range of factors that affected the design of the product and the process the designers went through, for example:

**Reduce, Reduce, Reduce:** The *Nardoo* project started out with very large and comprehensive parameters. The team was constantly struggling with reducing the amount of content in the project in order to make it manageable. Design ideas, such as video editing also had to be dropped because of time and size concerns.

In places he drew general conclusions, and then related these to events, causes and consequences in the cases:

**Finishing the Project:** Few projects are ever complete. Time and money simply run out. The project seldom ends up where it was originally seen as going. These principles apply to *Stage Struck*. The final product was not what was originally envisioned. Given more time and money, there were aspects that would have been developed further and additional features and information would have been added.

While not going into as much detail about the designers' experiences as some other students, Ian pointed to situations and perspectives from the case materials to illustrate his argument, mentioning key players by name where appropriate:

This project had John Hedberg who had a working knowledge of both of the performing arts and of the multimedia design side of things. This expertise helped tie the project together.

In discussing a feature from each package Ian combined a description of the feature and its functionality with an account of its origin and development. Although the designer's specific aims for the features are noted, Ian did not place these within the broader context of what the package was trying to achieve.

As noted above Ian used his own impressions of the products to assess the effectiveness of the features he chose. He also considered the original intentions of the designers and to some extent learners' use of the product:

The designers originally wanted to have the user record their own dialogue sound files. This was not possible, primarily because there was no control over the sound input features on the user's computer. When it was decided to use prerecorded lines, it was projected to use eight intonations for each dialogue line. They ended up settling for four intonations/intentions. Perhaps some of the creativity of writing your own script has been lost using the prerecorded dialogue. This would reduce the creativity of the project as a whole, but considering the limitations of the user's platform, I think they have reached a satisfactory compromise that the learner can interact with and learn from.

This passage also shows that Ian developed an appreciation for some of the factors that affect the design of a product, and how designers work towards a compromise. In this section Ian focused on some of the detail of the process, which contrast to most students who discussed design issues more generally, if at all.

Overall, Ian's assignment included a broad range of design issues with comments coded in all categories except one. Emphasis was placed on the functionality of the product, and on factors that influenced the design of the product.

#### **4.5.10.4 Management issues**

In his discussion of project management issues Ian highlighted a number of major themes, expanding on each with general observations and specific examples from the cases:

**Management Concerns:** Primarily for political reasons, there seemed to be a number of committees directing *Stage Struck*. This management style proved an ineffective management means. Decisions were not forthcoming from these committees. There was a definite indecisiveness - especially re: project content. A team approach is imperative in a multimedia project – but an effective project must have a decisive, empowered project manager.

Ian's discussion ranged across all of the project management categories coded with his focus being on management of the client and the team and how they work together, and to a lesser extent, scheduling and time management. Although more emphasis was placed on management than design, in terms of the number of comments made, management issues were generally explained in less detail.

#### 4.5.10.5 Comparison of cases

Ian confined his comparisons of the two cases to the concluding section of his assignment. Here he focused mainly on similarities in the underlying constructivist philosophy, use of a notebook feature, compromises made on the design, enhanced expertise of client and team, and the need for a shared physical working space. He concluded that the development of *Nardoo* was achieved by a smoother process than *StageStruck* due to better cooperation, despite money being more of an issue.

This section is descriptive, with simple comparisons made between the projects. Ian did not draw any conclusions about the significance of the commonalities or differences, nor does he discuss them in depth. This leaves his comparison fairly superficial.

#### 4.5.10.6 General principles

In his analysis Ian readily made general observations and drew conclusions about the cases, predominantly in describing what he learned from the cases but also in discussing the designers' experiences and the main project management issues.

Some of these statements are observations, which are then followed by examples from the case, a pattern seen in the passage below:

**Finishing the Project:** Few projects are ever complete. Time and money simply run out. The project seldom ends up where it was originally seen as going. These principles apply to *Stage Struck*. The final product was not what was originally envisioned. Given more time and money, there were aspects that would have been developed further and additional features and information would have been added.

Others offer guidelines and advice:

**Flexibility:** certain aspects of a design may be unachievable. New ideas and needs may arise. Be prepared to re-evaluate and revise. This project went through several major revisions.

Ian did not always use information from the case to support his generalisations but explained his approach in this paragraph:

I have made a list of ideas that one might keep in mind when designing and producing a multimedia project. The issues examined in the two case studies sparked these ideas. Here are those ideas, listed in no particular order.

- Set priorities in your product development. Know what you must have and what aspects of the project are not vital.

- At some point, you must become precise in what features and content you want in your design. Working in generalities does not allow you to proceed effectively in the final stages of the project.
- Start small and build your project from there. By doing this you will not have to be cutting material all the time...

This clearly shows that Ian was thinking beyond the context of the cases provided and about multimedia project development in more general terms.

#### **4.5.10.7 Use of other resources**

Ian did not refer to any sources from the literature in his assignment.

#### **4.5.10.8 Summary**

Ian's writing style throughout this assignment is personal and reflective. In describing the development process he added his own commentary on the events rather than simply summarising them. He wrote about the CD package from his own perspective rather than that of a neutral third-person, and included his own impressions in his evaluation of the product. Information from the cases is used to support his points and his explanations were often quite detailed as he unfolded the relevant events.

The wide range of issues he tried to include in his discussion suggests that Ian was aware of the complexity of the cases. Although commenting on a greater number of management issues, design was discussed in more detail. Interrelations between issues were also described.

Ian did not refer to the literature or volunteer any of his previous experience, so his response is largely framed within the context of the cases. His general observations and other comments indicate however that he moved beyond the scope of these particular cases and considered multimedia development projects in general. These observations have begun to consolidate into general ideas of how projects could and, perhaps, should be managed.



## 4.5.11 Kath

### 4.5.11.1 Model of process

Kath described the process used to develop each of the cases under a series of four stages, which are similar, but not identical, for each project. This indicates that she had not developed a generic model, but saw each project going through similar process of initiation/planning, design, prototyping and production.

In places she provided a general explanation of these stages, such as:

Prototyping involves creating and testing a part of the project, usually for the purpose of refining the design. Because the aim of prototyping is to refine the ideas and design of the project, things are usually changed after tests with users, so it is wise to avoid spending too much time on content for a prototype.

Although Kath did not cite a source for these statements, it seems likely that these ideas come from her knowledge of the literature rather than interpretation of the case materials. This is suggested by the poor referencing and lack of interpretation of the case information evident throughout her assignment.

While Kath's account of the processes gives a sense of each products' development over time, she did not always express her ideas in complete sentences or fully explain them in relation to the case or more generally. Though the bulk of her statements are descriptive, there is some evidence that she was trying to interpret as well as present the events:

In Nardoo, a great deal of time (too much?) was spent on video, audio, simulations and graphics, while parallel development of the authoring tool continued through this stage. The most difficult issue would be determining how detailed a prototype must be to properly test it, given the refinements will mean a lot of backtracking for the designers.

There is no evidence in the rest of her assignment that Kath developed a more general understanding of the nature of the development process.

### 4.5.11.2 Own experience

In relating her own experiences as a student designer Kath observed that "the team constantly needs to objectively regard the needs of the target group". She then listed some "central themes" derived from "comments expressed by the designers in the case of *Nardoo* and *StageStruck*". These are a mixture of design, management and process issues which

appear as dot points without direct links to designers' experiences from the case or her own specific experiences. For example:

- Impose some constraints on the nature and scope of the project.
- Keep the prototype as simple as possible - too much too soon means any changes become unwieldy.
- The demands on time and resources are enormous.
- Most importantly, extensive planning is vital.

Without any further explanation of the points and given their generality, it is difficult to draw any conclusions about their origin. Furthermore the listing glosses over detail in the cases that might serve to illustrate the implications of these issues for practice.

#### **4.5.11.3 Design of the product**

Kath chose to examine the PDA as a particular feature from the *Exploring the Nardoo* package. She gave a description of the PDA's functionality and noted that:

- Barry Harper revealed that the design team needed a tool, stating "... we decided that instead of having different tools popping up and filling up the screen, we would have one tool that was more compact and different functions would be just an extension of the tool itself."

She did not place the PDA within the overall aims of the package, or explain the purpose it was intended to serve. Nor did she discuss the issues raised by the design of the tool itself and how the team members resolved these.

In judging the PDA's effectiveness Kath concluded that:

- The beauty of the PDA is that its use will actively involve the learner in the learning process, which fits well with the pedagogy and the constructivist philosophy of the team.

And later she added that:

- Features such as the PDA have the role of being the tool that enables individualised, self-paced instruction in engaging multiple formats.

She did not however go on to describe how this is achieved through the design of the PDA. Neither did she compare it against the goals of the design team or assess its usability herself – both techniques used by other students in their analyses. She did mention that the tools were found to be usable (in formative evaluation) and it received critical acclaim from other developers, information to be found in the case notes.

Kath's discussion touches on the full range of design issues coded, though only two receive significant attention - designing the product for target learners, and the functionality of the product. As with her writing in other sections, Kath tended to describe these issues rather than interpret and explain them.

#### **4.5.11.4 Management issues**

Kath's discussion of management issues began with:

[The] project manager role [involves] taking responsibility for a complex series of inter-related tasks [that] will need to be performed, some of which can occur concurrently and others that must be performed in a certain sequence.

She then listed aspects of the project that she believed the project manager ultimately responsible for:

Pedagogical soundness, Costing, Timing, Sign off design statement, Team Management – Communication, Expertise of team members, Intellectual property issues, Decisions about software, Marketing, Client management and feedback, Content management, Testing on the user and, Release of prototype to target audience.

This set of 'big issues' was given no further elaboration and Kath made no specific links to the case, although the issues are quite consistent with those raised by other students.

Without further explanation however, it is difficult to know the significance that Kath placed on these and their importance in the success of a project. For example, decisions about software are undoubtedly important, but there is no indication of what needs to be considered and what impact those decisions might have on the project. Furthermore the simple listing did little to support her assertion that project management is complex.

Overall, Kath referred to a wide range of management issues covering all of the categories coded, except two. Her main concern was with the management of teamwork and of the project's resources - these two issues received significantly greater emphasis than other issues. There is a fairly even balance between the space devoted to discussion of management and of design issues.

#### 4.5.11.5 Comparison of cases

Although Kath's responses to Questions Two to Five combined her analysis of both cases, she made little attempt to compare the two projects apart from sweeping statements such as:

The Design lessons learned from observing Nardoo and Stagestruck, include the need for keeping the interface simple and navigable, using colour meaningfully and consistently, taking extra time for selection of software tools and for content analysis, and working effectively with a team of experts.

She did, however, include a section on "the similarities and differences between *StageStruck* and *Nardoo*". These are listed together, and without prior knowledge of the cases, it would be difficult to distinguish between a similarity and a difference, as Kath has not explained her statements fully. Some of these observations focused on superficial features of the cases, such as use of "similar kinds of software" and "use of the PDA as a navigational tool". Other comments suggest a greater level of interpretation from the cases, but were still not clearly explained:

The stated aim of Australia on CD was to bring cultural institutions and multimedia developers together - bringing artistic and theatrical types together with programmers. This has more 'people' issues, and team work issues than can be predicted.

#### 4.5.11.6 General principles

In addition to the general comments she makes describing stages in the development process, Kath also derived some general principles from the cases. She did this both in relation to the experiences of the case designers and the lessons she learnt from studying the cases. Some of these are observations, such as "The demands on time and resources are enormous". Others are presented in the form of heuristics - two examples of which are:

\*Resources are limited - more than you think! Careful planning, costing and 'scoping' of the whole project will mean resources can be managed well.

\*Each team member has particular skills and responsibilities - while it is important to collaborate, it is equally important to stay focussed on one's special responsibility and not become lost in the big picture.

In each of these points Kath gave a suggestion and then explained, albeit briefly, the consequences. These are the issues that Kath saw as generally important and here she moved beyond the specific context of the cases.

#### **4.5.11.7 Use of other resources**

Kath drew on one of the subject readings and three other sources from the literature for her assignment. These three other papers are cited in a general discussion of multimedia design that formed the introduction and conclusion to the assignment. These sections are not linked to the responses to the analysis questions and their inclusion suggests that Kath may have originally seen this as a more traditional essay-style task, and later re-arranged it into the format in which it was submitted. In preparing this later version the links between some of her points and their supporting explanations may have been lost.

#### **4.5.11.8 Summary**

Despite some efforts to interpret the events in response to Question One, Kath's writing tends to be descriptive rather than analytical and there is little evidence that she was able to 'put herself into the situation' in the way some of the other students have tried to do. She wrote about the cases in general terms, rarely going into detail or using specific instances from the case to support and justify her arguments. Key 'characters' are rarely referred to and their experiences not discussed.

This lack of detailed description and explanation is apparent throughout the assignment, in the use of dot points and lists to highlight major issues. The structure of her assignment suggests that it was initially prepared in a more standard academic format, and perhaps in re-structuring her assignment, Kath did not link her ideas together and glossed over some of the detail.

#### **4.5.11.9 From the interview**

Kath began the case analysis task by exploring the packages, both of which she had seen demonstrated previously. Having refreshed her memory, she then familiarised herself with the assignment requirements. With the analysis questions in mind she then read through all of the interviews looking for relevant information. Kath commented that she didn't even know if she could have gone any further into the material given the limited time she had available.

When asked what materials she found most useful in completing the task, Kath said the interviews because “having it in that dialogue style you visualised the conversation and it made it easier to read between the lines”. She also felt that being able to read about real situations with real people improved her understanding of the process.

Asked if she looked at any of the other resources, Kath replied that Blum’s (1995) book gave her tips about collaborative work in a team project, but she didn’t go into “the more heavy-duty academic stuff”. Problems she had installing Adobe Acrobat Reader also meant that reading original project documents that were saved as .pdf files was a problem. This was resolved with some help from the instructor and Kath was able to read and print some of the documents, but didn’t really find them useful for completing the analysis task.

Apart from the initial technical problems, Kath felt she had no difficulty in using materials except for some confusion between the people interviewed:

I guess the problem with that was after a while you couldn’t remember which person was which. The photograph helped so you could work out that. But you actually had to sit with it in front of you and I remember going backwards and forwards between the two people to try and work out which person was having which problem with which area.

#### **4.5.12 Steve**

##### **4.5.12.1 Model of process**

Steve did not present either a chronology or narrative of the development processes used in the two cases. Instead he chose several key ‘themes’ for each case and discussed their impact on the process. These were client involvement and the development of the authoring software for *Exploring the Nardoo*, and the intellectual property, technical issues and staff changes for *StageStruck*. Steve explained the importance of each of these with reference to the events in the case and their consequences:

Due to the fact that the developers wanted to develop a 3D world and the technology used to create this was relatively new, time frames were difficult to define. This, combined with the Rights issues led the developers to change track halfway along and the 3D engine was scrapped. This meant that the project had to be redesigned. It was this time and budget aspect that forced the scaling down of some of the components. This scaling down was further brought about with changes in software utilized in the authoring tool media Plant. The change from QuickTime version 2.5 to 3.0 and the licensing arrangements brought

about by Apple midway through the work meant that significant video resources could not be utilized in the final product.

Although this approach allowed Steve to describe a number of issues in depth, these were not set within the broader context of 'what happened' in the development of the product. In extracting several major issues, the chronology of the process has been lost and the detail simplified. It may be that Steve interpreted the question quite literally and decided to focus only on the key events as he saw them.

Steve combined description of events with his own interpretation of how they were significant to the project:

New ground was being broken in the creation of the authoring tool used in the development of the package and there would have been considerable advantages and disadvantages in developing the product and the authoring tool concurrently. The advantages revolve around the close connection that would have existed between the programmer and the rest of the team. This would obviously assist each other's work in terms of exploring the capabilities of the software and the project.

There is no evidence to suggest that Steve used a model of the process to 'make sense' of the case events, nor did he make any generalisations about the process elsewhere in his assignment. Later in his assignment he noted that the *Nardoo* project was developed according to the Hedberg (1993) model. This paper was not included with the case materials indicating that Steve did some additional research to find it. This model was not explained or related to events of the case however.

Later in his assignment Steve noted that:

In this work [StageStruck], as was the case with Exploring the Nardoo, the team appears to have combined aspects of the various development paradigms proposed in Visscher-Voerman et al., (1999), selecting useful features from the four paradigms, recognising the good and bad components of each.

With respect to *Nardoo* this would seem to contradict his earlier statement. There is no link made in the case materials between the processes used and any of the models found in Visscher-Voerman et al. (1999), so this was Steve's own interpretation. Again, he made no link to information from the cases to substantiate these views, suggesting that Steve had not considered how these models relate to the case processes.

Later comments indicate that Steve saw the development process as one in which the team must adapt to change, whether internal to the project or brought about by outside agencies. These, he concluded, “will have an effect on the product’.

#### **4.5.12.2 Own experience**

It seems that Steve was reluctant to relate the events of the case to his own experience. That he saw little in common with his own work is evident in his discussion of the *Nardoo* project:

In terms of the design process, I feel that I am unable to comment since I have not been part of a team. In individual works I recognize the value of consistency and methodology.

While other students also commented that working in a project team was not part of their own experience, they were able to identify more general similarities in ways of thinking about or working on design problems. It seems that Steve was not as able to move beyond surface differences to identify points of similarity. He made no personal comments in relation to the *StageStruck* case.

On a more general note he observed that:

It seems abundantly clear throughout my readings, that the constructivist theories role in the area of multimedia production was an inevitability, as flourishing interactive multimedia software was progressively being developed, along with the steady influx of multimedia computers into the school environment. Students look for a rich learning environment that such software offers, and from my experience, instinctively turn towards software that gives them the freedom to explore and construct their own learning.

And further on in assessing the effectiveness of the PDA:

At the time that the finished package came out into schools I spent some time using the program with small groups of students. Like others I felt that there was a significant cognitive load placed on students in using the device, particularly with navigating the time zones and carrying out measurements. Whilst recognising this fact there were other students who had little difficulty in working with the PDA. The teacher must play an important role here, in the form of guiding students, making certain that they have studied the help movie, that they can use the tool, and in making certain that appropriate activities are chosen for the students cognitive abilities.

In both of these passages Steve linked to his own experience as a classroom teacher, which he may have felt were more relevant to the issues presented by the cases.



#### 4.5.12.3 Design of the product

In relating the experiences of the *Nardoo* case designers to what he had read in the literature Steve cited Sims (1995) in which the package is praised as an example of innovative, constructivist design. Steve then noted that once this approach had been decided upon the team followed the Hedberg (1993) design model. No further explanation or elaboration is given that might give insights into how this influenced the design of the product or the decisions that designers faced.

In discussing *StageStruck* Steve mentioned its similarity to another project but did not fully explain the link or give a full reference:

The production of Stage Struck required the team to cope with external changes that impinged on their work. Changes to software and difficulties with hardware devices are commonplace in multimedia development – a view shared in the creation of other works such as the *Tertiary Study Options for Aboriginals and Torres Strait Islanders*.

Steve's discussion of a particular feature from *Exploring the Nardoo* provided a summary of the designer's intentions and the issues they faced. His assessment of the PDA's effectiveness came from his contention that this "can only really be determined from the users perspective" after which he related his experiences of using the product with his own students (see quote above). With respect to the stage area feature in *StageStruck* he limited his comments to:

My impressions are that this part of the project could be further developed given more time and resources.

He appears to have been reluctant to give a more personal appraisal of the product and did not offer his impressions of the functionality of the product itself.

Overall Steve's discussion of design issues is limited, with comments relating to just over half of the categories coded. Most issues received one or two mentions, apart from the features and functionality of the product and the factors affecting the product's design which were dealt with more thoroughly.

#### 4.5.12.4 Management issues

Steve's discussion of the main management issues in *Exploring the Nardoo* drew out two 'big' issues – the role of the project manager and the people management skills required for the task. His comments are mainly general observations with some reference to the cases:

Learning how to manage a project for the first time is an extremely difficult process and requires the manager to have a good understanding of what was involved. Rob Wright was aided by the support obtained from an experienced manager in the form of Barry Harper. Some of the issues for the manager involve keeping the team focused and making certain that the communication mechanisms were effective.

With respect to management issues in the *StageStruck* project Steve provided a much more detailed account highlighting the key issues of copyright permissions, client and team relationships and scheduling. Here he used information from the cases to illustrate his points. For example on the difficulties of working with more than one client he wrote:

Communicating with these two organizations rather than one, as was the case with *Exploring the Nardoo*, would have made things difficult. As Rob Wright points out in his interview though, both projects were fairly open ended, and apart from the management issues that this creates, "they've shown the worth of that approach".

He rounded off this discussion with the conclusion that "the team needs to be able to cope with such changes and adapt to them".

These are two quite different responses – the first draws out some generalisations about the role and responsibilities of the project manager, the second stays very much within the case context and interprets the events.

Overall, Steve's discussion of project management is more comprehensive than his treatment of design issues, with more than double the number of comments that cover a greater proportion of categories coded. The main areas of interest to Steve were management of the client and the team, and project scheduling.

#### 4.5.12.5 Comparison of cases

Steve completed his analysis assignment with a section comparing the main similarities and differences between the two case projects. Elsewhere the cases are discussed separately and comparative comments were not made.

The beginning of Steve's comparison is mostly descriptive, focusing on general issues rather than the detail of the projects:

Perhaps the most significant difference between Exploring the Nardoo and Stage Struck lies with the differences in what the project is trying to achieve. There is a distinct difference between the Sciences and the Arts. For this reason there are a number of differences in the feel of these two products. The "virtual world" created in Stage Struck is different to the time zone concept presented in Exploring the Nardoo.

He then noted that although both products were designed with an underlying constructivist approach there is a greater emphasis in *StageStruck* on immersing learners in the environment. This, he concluded, results in them having "more opportunity to construct their own understanding". With this final comment Steve offered his own evaluation of the products that goes beyond mere description of them.

#### **4.5.12.6 General principles**

Steve drew out a number of general principles in his analysis of the cases. Some of these are observations, like "the role of teamwork is important to the development of any multimedia product", which are used a device to introduce further discussion on the topic. Others are more obviously drawn from the cases themselves – most notably in his discussion of project management issues and then in reflecting on what he learned from studying the cases.

These latter statements suggest that Steve was noting both the successes and failures in the cases and drawing his own conclusions about how these could be avoided:

From the viewpoint of a developer of multimedia it is important to find a solid team to work with. Due to the fact that there wasn't any real change in the basic team [working on the Nardoo project] and that their communication was good, the result was achieved without major problems. ... It is also important to mention here the problems brought about by developing the authoring software at the same time as a project is being developed – additional time needs to be allocated to adapt to the new software.

Similar conclusions drawn about management and process issues with regard to the *StageStruck* project further indicate that Steve was considering how a project might 'ideally' be developed:

All parties must be in agreement with each other in terms of the time frame for the stages to be completed and in the intended content/ feel of the project. One must also be able to adapt to changes that take place during the progression of the product.

#### **4.5.12.7 Use of other resources**

Steve referred to one of the subject readings and two other papers he has located through his own research. One of these was authored by a designer who appeared in the *StageStruck* case and the other includes a discussion of *Exploring the Nardoo*.

#### **4.5.12.8 Summary**

Steve's case analysis is briefer than those of most of the other students, due to his focus on major process, design and management themes rather than a broader range of issues and events. His comments show that he developed a good overview of the cases and could generally use more detailed information where needed to support his arguments. Overall his writing is more interpretive than descriptive and shows that he was able to draw general conclusions about the events that might be useful to him in his own project development activities.

Steve seemed unwilling to offer his own judgments and relate his own experiences unless he saw an obvious link, such as having used *Exploring the Nardoo* in his own classroom. In contrast to some of the other students he did not seem to make a connection with the people in the cases – judging by his lack of reference to their perspectives. As a result he omitted some of the complexity of the cases.

#### **4.5.13 Discussion of individual case analyses**

Examination of the case analysis assignment from each of the students provides insights into the ideas they developed about the two cases. Table 4.3 summarises each student's response in relation to the relevant research sub-questions.

| Table 4.3 Summary of student responses for each sub-question |   |   |
|--|---|---|
| Student  | Anna  | Rod   |
| <b>Model of process</b>                                      | <ul style="list-style-type: none"> <li>▪ Identified broad stages</li> <li>▪ No generic model</li> <li>▪ Nature of process as iterative</li> <li>▪ Factors that affect process</li> </ul>  | <ul style="list-style-type: none"> <li>▪ General framework for first case</li> <li>▪ Identified main differences for second</li> <li>▪ Nature of process as iterative</li> <li>▪ Compared to Phillips and Jenkins model</li> <li>▪ Factors affecting process</li> </ul>                   |
| <b>Own experience</b>  | <ul style="list-style-type: none"> <li>▪ Made general observations as team member on other projects (not multimedia)</li> <li>▪ General similarities</li> <li>▪ Production issues as student designer</li> <li>▪ Own impressions of CD packages</li> </ul>                            | <ul style="list-style-type: none"> <li>▪ Related to his experience in a small team</li> <li>▪ Saw high-level similarities</li> <li>▪ Difficulties implementing design ideas as a student designer</li> </ul>  |
| <b>Design of product</b>                                     | <ul style="list-style-type: none"> <li>▪ Traced origin of particular feature</li> <li>▪ Judgement considered constraints and learners</li> <li>▪ Factors affecting the design</li> <li>▪ Broad range of issues discussed throughout</li> <li>▪ Her own perspective as user</li> </ul> | <ul style="list-style-type: none"> <li>▪ Summarised origin of particular feature</li> <li>▪ Judgement in terms of general usability and designers' goals</li> <li>▪ Focus on product design</li> <li>▪ Small range of issues</li> <li>▪ Saw in terms of process and management</li> </ul> |
| <b>Management issues</b>                                     | <ul style="list-style-type: none"> <li>▪ General issues in relation to case events</li> <li>▪ Broad range of issues discussed throughout</li> <li>▪ Less emphasis than on design issues</li> </ul>  | <ul style="list-style-type: none"> <li>▪ General issues in relation to case events</li> <li>▪ Several keys issues</li> <li>▪ Role of project manager</li> <li>▪ Impacts on design and process</li> <li>▪ Overall a greater emphasis on management issues</li> </ul>                       |
| <b>Comparison of cases</b>                                   | <ul style="list-style-type: none"> <li>▪ Separate comparison section at end</li> <li>▪ Identified similarities and differences</li> <li>▪ Supported by detail from the cases</li> <li>▪ Some comparison elsewhere</li> </ul>  | <ul style="list-style-type: none"> <li>▪ No separate section</li> <li>▪ Compared key stages in process from cases</li> <li>▪ Little comparison elsewhere</li> </ul>   |
| <b>General statements</b>                                    | <ul style="list-style-type: none"> <li>▪ General observations about the cases</li> <li>▪ Did not explicitly relate to broader context</li> </ul>  | <ul style="list-style-type: none"> <li>▪ General observations about the cases</li> <li>▪ Suggested practical implementations and strategies</li> <li>▪ Focus on design process and project management</li> </ul>  |

| Table 4.3 Summary of student responses for each sub-question |   |   |
|--|---|---|
| Student  | Margaret  | Lynn  |
| <b>Model of process</b>                                      | <ul style="list-style-type: none"> <li>▪ Stages derived from the case events</li> <li>▪ Different for each case</li> <li>▪ Ideas about the nature of the process not stated</li> </ul>  | <ul style="list-style-type: none"> <li>▪ Broad framework</li> <li>▪ Similar for each case</li> <li>▪ Compared to Phillips and Jenkins model</li> <li>▪ Suggested that she sees process as iterative</li> <li>▪ Related stages and events to the literature</li> </ul>   |
| <b>Own experience</b>  | <ul style="list-style-type: none"> <li>▪ Experiences as a student designer</li> <li>▪ Design and production challenges</li> <li>▪ Related specifically to experiences of characters</li> <li>▪ Identified general similarities</li> <li>▪ Own impressions of CD packages</li> </ul>                                 | <ul style="list-style-type: none"> <li>▪ Challenge of developing prototype as student designer</li> <li>▪ Reflected on these and draws conclusions about alternate strategies</li> <li>▪ Other general issues</li> <li>▪ Own impressions of CD packages</li> </ul>  |
| <b>Design of product</b>                                     | <ul style="list-style-type: none"> <li>▪ Traced origin of particular feature for each case</li> <li>▪ Judgement compared product to goals (general &amp; specific)</li> <li>▪ Broad range of issues</li> <li>▪ Factors that affect design of product</li> <li>▪ Discussed the challenge of design itself</li> </ul> | <ul style="list-style-type: none"> <li>▪ Traced origin of particular feature for each case</li> <li>▪ No discussion of design issues</li> <li>▪ Judgement based on own impressions</li> <li>▪ Did not consider target learners</li> <li>▪ Focus on product design</li> <li>▪ Little consideration of other design issues</li> </ul> |
| <b>Management issues</b>                                     | <ul style="list-style-type: none"> <li>▪ Organised issues under major themes</li> <li>▪ Some common to both cases</li> <li>▪ Broad range of issues</li> <li>▪ Even balance with design issues</li> </ul>  | <ul style="list-style-type: none"> <li>▪ Highlighted a range of issues</li> <li>▪ Ensuring a successful project</li> <li>▪ Overall a greater emphasis on management issues</li> <li>▪ Mention of impact on product</li> </ul>   |
| <b>Comparison of cases</b>                                   | <ul style="list-style-type: none"> <li>▪ Separate comparison section</li> <li>▪ General observation of similarities</li> <li>▪ Differences supported by case detail</li> <li>▪ No comparison elsewhere</li> </ul>   | <ul style="list-style-type: none"> <li>▪ No separate section</li> <li>▪ Compared and contrasted cases throughout</li> <li>▪ Basis for some generalisations</li> </ul>   |
| <b>General statements</b>                                    | <ul style="list-style-type: none"> <li>▪ General observations of project management</li> <li>▪ Suggested practical implications and strategies</li> <li>▪ Focus on process and project management</li> </ul>  | <ul style="list-style-type: none"> <li>▪ General observations about the cases</li> <li>▪ Focus on project management</li> <li>▪ 'Lessons' for a successful project</li> <li>▪ Few strategies suggested</li> </ul>   |

| Table 4.3 Summary of student responses for each sub-question |  |  |
|--|--|--|
| Student  | Sheryl   | Barbara  |
| <b>Model of process</b>                                      | <ul style="list-style-type: none"> <li>▪ Stages derived from the case events</li> <li>▪ Listed events within each stage</li> <li>▪ Saw case processes as iterative</li> <li>▪ Ideas about the general nature of the process not stated</li> </ul>  | <ul style="list-style-type: none"> <li>▪ Identifies broad stages using standard terms</li> <li>▪ Not a generic model</li> <li>▪ Described the stages in <i>Nardoo</i>, but more superficial for <i>StageStruck</i></li> <li>▪ Compared to models from the literature</li> <li>▪ Saw process as iterative</li> <li>▪</li> </ul> |
| <b>Own experience</b>  | <ul style="list-style-type: none"> <li>▪ Linked her experiences as training professional and student designer to issues from the cases</li> <li>▪ Expressed her beliefs</li> <li>▪ Cases as a starting point</li> <li>▪ Professional experience is her main reference point</li> </ul>   | <ul style="list-style-type: none"> <li>▪ Related her activities and reactions as student designer</li> <li>▪ Compared her experiences with issues evident in a 'real' project</li> </ul>   |
| <b>Design of product</b>                                     | <ul style="list-style-type: none"> <li>▪ Traced origin of particular feature for each case</li> <li>▪ Focus on design issues encountered</li> <li>▪ Detailed discussion drawing on cases</li> <li>▪ Judgement based on goals and learner use</li> <li>▪ Broad range of issues</li> <li>▪ Factors that affect design</li> </ul> | <ul style="list-style-type: none"> <li>▪ Traced origin of particular feature for each case</li> <li>▪ Judgement based on learner use plus evidence from the cases</li> <li>▪ No personal comments</li> <li>▪ Range of issues discussed</li> <li>▪ Factors affecting the design</li> </ul>                                      |
| <b>Management issues</b>                                     | <ul style="list-style-type: none"> <li>▪ From the perspective of the project manager</li> <li>▪ More general observations and conclusions than design</li> <li>▪ Little use of case details</li> <li>▪ Broad range of issues</li> <li>▪ Balance with design</li> <li>▪ Limited discussion of impact on other issues</li> </ul> | <ul style="list-style-type: none"> <li>▪ General observations supported by examples from the cases</li> <li>▪ Ensuring a successful project</li> <li>▪ Range of issues discussed</li> </ul>  |
| <b>Comparison of cases</b>                                   | <ul style="list-style-type: none"> <li>▪ Separate comparison section</li> <li>▪ No comparison elsewhere</li> <li>▪ Similarities tend to be descriptive</li> <li>▪ More analytical about differences</li> </ul>   | <ul style="list-style-type: none"> <li>▪ Separate comparison section</li> <li>▪ No comparison elsewhere</li> <li>▪ Focused on differences</li> <li>▪ Drew some general conclusions</li> </ul>  |
| <b>General statements</b>                                    | <ul style="list-style-type: none"> <li>▪ General observations about project management</li> <li>▪ Drew conclusions about the 'best' approach</li> </ul>  | <ul style="list-style-type: none"> <li>▪ General observations made about the cases</li> <li>▪ Practical implications identified</li> </ul>   |

**Table 4.3 Summary of student responses for each sub-question**

| <b>Student</b>             | <b>Liz</b>  | <b>Joanne</b>   |
|----------------------------|---|---|
| <b>Model of process</b>    | <ul style="list-style-type: none"><li>▪ Used Phillips &amp; Jenkins' model as framework</li><li>▪ Related stages and events to the literature</li><li>▪ Chronology of events not obvious</li><li>▪ Tended to gloss over details</li></ul>     | <ul style="list-style-type: none"><li>▪ Developed a four-stage framework</li><li>▪ Consistent with literature but not cited</li><li>▪ Mainly descriptive</li><li>▪ Second case superficial</li><li>▪ Process of revision</li></ul>  |
| <b>Own experience</b>      | <ul style="list-style-type: none"><li>▪ Discussed her role as project manager and experience as a teacher</li><li>▪ Related to case and literature</li><li>▪ Focused on management rather than design issues</li></ul>                        | <ul style="list-style-type: none"><li>▪ Related to production issues encountered as student designer</li><li>▪ Focus on implementation of design ideas</li><li>▪ Factors that affect the product</li></ul>  |
| <b>Design of product</b>   | <ul style="list-style-type: none"><li>▪ Related particular feature with aims, but doesn't trace its development</li><li>▪ Judgement is superficial</li><li>▪ Little discussion of design issues overall</li></ul>                             | <ul style="list-style-type: none"><li>▪ Traced origin of particular feature for each case</li><li>▪ Used cases and her use of the products</li><li>▪ Not in context of the whole product</li><li>▪ Judgement based on assertions about use</li><li>▪ Little discussion of design issues overall</li></ul> |
| <b>Management issues</b>   | <ul style="list-style-type: none"><li>▪ Focused on team and client management issues</li><li>▪ Impact on product and process</li><li>▪ Other issues included as list only</li><li>▪ Overall a greater emphasis on management issues</li></ul> | <ul style="list-style-type: none"><li>▪ Described situations from <i>StageStruck</i> in which project management was important</li><li>▪ Did not identify key issues or draw conclusions</li><li>▪ No discussion for Nardoo</li></ul>   |
| <b>Comparison of cases</b> | <ul style="list-style-type: none"><li>▪ No separate section</li><li>▪ Focus on high-level commonalities</li><li>▪ Lack of contrast</li><li>▪ Glossed over differences</li></ul>   | <ul style="list-style-type: none"><li>▪ Separate comparison section</li><li>▪ No comparison elsewhere</li><li>▪ Identified some similarities and differences with no explanation provided</li></ul>   |
| <b>General statements</b>  | <ul style="list-style-type: none"><li>▪ Few general observations</li><li>▪ Did not move beyond case contexts</li></ul>  | <ul style="list-style-type: none"><li>▪ General observations about <i>StageStruck</i></li><li>▪ Features of a successful project and what should be avoided</li><li>▪ Did not move beyond case contexts</li></ul>   |



| Table 4.3 Summary of student responses for each sub-question |  |  |
|--|--|--|
| Student  | Simon  | Ian  |
| <b>Model of process</b>                                      | <ul style="list-style-type: none"> <li>▪ Developed a four-stage framework</li> <li>▪ Based on deliverables from the cases</li> <li>▪ Discussed cases together</li> <li>▪ General description of stages</li> <li>▪ Descriptive</li> <li>▪ Loss of detail</li> <li>▪ Related to models from the literature</li> </ul>  | <ul style="list-style-type: none"> <li>▪ Process divided into periods of activity</li> <li>▪ Derived from the cases rather than a model</li> <li>▪ 'Tells the story'</li> <li>▪ Process as one of revision and redevelopment</li> </ul>  |
| <b>Own experience</b>  | <ul style="list-style-type: none"> <li>▪ Observations based on experience as a teacher</li> <li>▪ Not clearly explained</li> <li>▪ Previous design experience</li> <li>▪ Listed similarities between own experiences and the case designers</li> <li>▪ Did not explain</li> </ul>  | <ul style="list-style-type: none"> <li>▪ Did not relate professional or student design experiences</li> <li>▪ Own impressions of CD packages</li> </ul>  |
| <b>Design of product</b>                                     | <ul style="list-style-type: none"> <li>▪ Traced origin of particular feature for each case</li> <li>▪ Highlighted design issues encountered</li> <li>▪ Misinterpreted and ignored major issues</li> <li>▪ Judgement based on goals</li> <li>▪ Made broad statements</li> <li>▪ No personal assessment</li> <li>▪ Broad range of issues</li> <li>▪ Lacking depth</li> </ul> | <ul style="list-style-type: none"> <li>▪ Traced origin of particular feature for each case</li> <li>▪ Judgement based on goals and learner use</li> <li>▪ His perspective as user</li> <li>▪ Detailed discussion</li> <li>▪ Identified some of the general design and implementation issues</li> <li>▪ Factors that affect the product</li> <li>▪ Broad range of issues</li> </ul> |
| <b>Management issues</b>                                     | <ul style="list-style-type: none"> <li>▪ Focus on project manager's responsibilities</li> <li>▪ Relationship between issues</li> <li>▪ Misinterpreted and ignored major issues</li> <li>▪ Balance with design issues</li> </ul>  | <ul style="list-style-type: none"> <li>▪ Identified major themes</li> <li>▪ Made general observations and supported with examples from the cases</li> <li>▪ Broad range of issues</li> <li>▪ Overall a greater emphasis on management issues</li> <li>▪ Discussed in less detail</li> </ul>  |
| <b>Comparison of cases</b>                                   | <ul style="list-style-type: none"> <li>▪ No separate section</li> <li>▪ Discussed cases together</li> <li>▪ Identified similarities and differences</li> <li>▪ Did not comment on significance</li> <li>▪ Observed general commonalities</li> </ul>  | <ul style="list-style-type: none"> <li>▪ Separate comparison section</li> <li>▪ No comparison elsewhere</li> <li>▪ Simple, descriptive comparisons</li> <li>▪ Did not comment on significance</li> </ul>   |
| <b>General statements</b>                                    | <ul style="list-style-type: none"> <li>▪ Few general observations</li> <li>▪ One general conclusion relevant to wider context</li> </ul>   | <ul style="list-style-type: none"> <li>▪ General observations about the cases</li> <li>▪ Some supported by detail from the cases</li> <li>▪ Derived some general principles</li> <li>▪ Suggested practical implications and strategies</li> </ul>  |

| Table 4.3 Summary of student responses for each sub-question |   |   |
|--|---|---|
| Student  | Kath  | Steve   |
| <b>Model of process</b>                                      | <ul style="list-style-type: none"> <li>▪ Similar series of stages used to describe each case</li> <li>▪ General description of stages</li> <li>▪ Description and some interpretation of events</li> <li>▪ Not always fully explained</li> </ul>   | <ul style="list-style-type: none"> <li>▪ Did not present a chronology</li> <li>▪ Selected two-three key themes</li> <li>▪ Discussed relevance to process</li> <li>▪ Doesn't place in broader context</li> <li>▪ Mentions Hedberg (1993) model</li> <li>▪ Did not relate to case processes</li> <li>▪ Compared to models from the literature</li> <li>▪ Process as requiring adaptation to change</li> </ul> |
| <b>Own experience</b>  | <ul style="list-style-type: none"> <li>▪ Listed design, process and management issues she felt were relevant to her experience</li> <li>▪ Did not clearly link either to case events or specific experiences</li> </ul>   | <ul style="list-style-type: none"> <li>▪ Did not see much relevance in cases to his experience</li> <li>▪ Did not go beyond surface differences</li> <li>▪ General observation about use of software in classroom and his own use of Nardoo with students</li> </ul>  |
| <b>Design of product</b>                                     | <ul style="list-style-type: none"> <li>▪ Described specific feature from Nardoo, but not StageStruck</li> <li>▪ Did not explain with context of product</li> <li>▪ Did not discuss design issues encountered</li> <li>▪ Judgement based on assertions and case details</li> <li>▪ Touched on broad range of issues</li> <li>▪ Detail about two only</li> <li>▪ Descriptive</li> </ul> | <ul style="list-style-type: none"> <li>▪ Made some links with design issues in the literature</li> <li>▪ Did not explain clearly</li> <li>▪ Traced origin of particular feature for each case</li> <li>▪ Judgement based on his use with students (<i>Nardoo</i>) and his impressions</li> <li>▪ Range of issues</li> <li>▪ Focus on product design and factors affecting design</li> </ul>                 |
| <b>Management issues</b>                                     | <ul style="list-style-type: none"> <li>▪ Listed aspects of the project for which the project manager is responsible</li> <li>▪ No explanation or links to the cases</li> <li>▪ Broad range of issues</li> <li>▪ Two issues emphasised</li> <li>▪ Lack of detail</li> <li>▪ Balance between management and design</li> </ul>   | <ul style="list-style-type: none"> <li>▪ Two big issues for Nardoo and several for <i>StageStruck</i></li> <li>▪ General observations with reference to case events for Nardoo</li> <li>▪ Much more detailed discussion for <i>StageStruck</i></li> <li>▪ Overall emphasis on project management and broader range of issues</li> </ul>   |
| <b>Comparison of cases</b>                                   | <ul style="list-style-type: none"> <li>▪ Separate comparison section</li> <li>▪ Little comparison elsewhere</li> <li>▪ Similarities and differences not separated</li> <li>▪ Simple comparisons</li> <li>▪ Lack of detail</li> </ul>  | <ul style="list-style-type: none"> <li>▪ Separate comparison section</li> <li>▪ No comparison elsewhere</li> <li>▪ General description of similarities and differences More detailed discussion of design approach</li> </ul>   |
| <b>General statements</b>                                    | <ul style="list-style-type: none"> <li>▪ General observations about the cases</li> <li>▪ Some general principles expressed as heuristics indicating wider significance</li> <li>▪ No guidelines offered</li> </ul>  | <ul style="list-style-type: none"> <li>▪ Some general management principles included</li> <li>▪ General observations made about the cases</li> <li>▪ Drew conclusions about how a project might ideally be developed</li> </ul>   |

#### **4.5.13.1 Model of the process**

The first case analysis question required learners to describe the major stages and decision points in the development of each of the case projects. Three approaches were evident from the structure of the responses. Some students extracted stages directly from the materials, and so derived a description specific to the case. Other students developed their own frameworks that fitted both cases, using more generic terms. These appear to combine knowledge of the general multimedia literature and information from the cases. One student used a model from the literature to structure her response. A range of approaches was also apparent in the style used. Some students provided a mainly descriptive response that summarised events. Others sought to explain the events, either based on their own interpretations or in relation to the literature.

Most of the students also included their ideas about the nature of the design process, viewing it as iterative, complex and messy.

#### **4.5.13.2 Own experience**

Many of the students readily related their own experiences to the experiences of the designers interviewed in the case materials. For some this was in relation to their professional lives as teachers, trainers or designers. This ranged from general observations, for example about the use of software packages in the classroom from Steve, to specific comments, such as Sheryl's on design issues and strategies. Most of the students also shared some of their experiences as student designers, most often discussing the difficulty of putting design ideas into practice. It seems that some students felt that the differences between their own experiences and those of the designers meant that they could only make very limited comparisons. Most, however, looked beyond these and found more general commonalities.

Some students also included their impressions of the CD packages from the perspective of a user. In doing so they were able to consider the learner's interaction with the product.

#### **4.5.13.3 Design of the product**

Analysis Questions Two and Three asked learners to consider the experiences of the designers and the development of a particular feature of the product.

When considering the experiences of the designers students were invited to make links to their own experiences or concepts from the relevant literature. Most of the discussion tended to focus more on process issues, for example how the design process related to a particular model, or related management issues, such as working with the client. There was little attention to how the designers developed and refined their plans for the product, and the instructional design influences on their decisions. This suggests that perhaps students tended to see the designers in the overall context of the project, rather than as adopting particular strategies, thus making it difficult to identify and isolate 'design' issues.

In discussing a particular feature of each product most students were able to describe the intentions of the designers and relate these to the outcome in the final product. Many of the students however did not refer to the main 'design' issues, though some identified relevant management or production issues instead. Those students who did discuss design issues often did so in some detail, explaining events and activities in the case accounts. Few generalisations were made.

Most students commented on the effectiveness of the feature by considering how it met the designer's original goals and what it offered learners. Often their comments arose from their own experiences with the product, for example reflecting on whether they had trouble navigating through the package or found the tools easy to use. Some, however, simply asserted that a feature would, for example, support problem-solving or engage the target audience, without explaining how this would be achieved.

While for some students discussion of design issues was confined to the responses discussed above, other students referred to design issues in other parts of the assignment. This allowed them to consider a broader range of issues than was apparent from the Question Two and Three responses.

#### **4.5.13.4 Management issues**

Question Four asked students to identify the main project management issues evident in the cases. Some students chose to discuss a few key issues from each case, others covered a broader range, sometimes organised under themes. Some students considered the issues from the perspective of the project manager's responsibilities. Others commented on the aspects they thought were most important for successful project development. The project management issues were discussed in more general terms than design issues, with example situations from the cases used to illustrate the main points.

Students also discussed management issues in other parts of the assignment in relation to the development process and design activities. This suggests that students recognised the impact of management concerns throughout the projects.

Some of the assignments showed a marked emphasis on management issues and less on design and process issues. It may be that issues relating to people and organisational skills are more generally relevant and so learners found them easier to identify with. For at least one student, Liz, these issues were of greater interest because she had taken on the role of project manager in her group.

#### **4.5.13.5 Comparison of cases**

Students were also asked to include a comparison of the cases in their assignments. Some students added a separate section at the end of the document, while others included comparative remarks within the responses to the five analysis questions. Few of the students performed this aspect of the task well, many producing a list of simple comparisons without any explanation of their significance to the projects. There was also a tendency by some students to compare the cases in very general terms, neglecting the differences between them that reveal some of the complexity of multimedia development.

4.5.13.6 General statements

The analysis of the assignments also sought to investigate the generalisations made by students. These appeared in three types – general observations made about the case(s), general principles that apply more broadly, and comments on the practical implications that offer guidelines for future work. These types of statements indicated that students were taking a broader view of the case, and consolidating their ideas about multimedia design and development more generally. Many of the students included one or more of these general statements in their analyses, often when discussing what they had learned from the cases. One student however, made no general statements within her analysis, and another offered only a few. These results show that some students were able to take a more general view of the issues to consider their wider relevance, while some did not move beyond the specific case contexts.

4.5.13.7 Overall response

The investigation of students’ individual case analyses also revealed differences in the way students wrote about the cases – the type of responses and the use of the case materials. Also noted was the way resources other than the case materials were used. A summary of these attributes appears in Table 4.4.

| Table 4.4 Summary of general aspects of student responses |  |  |   |
|---|--|--|---|
| Student   | Approach to writing  | Use of cases   | Use of other resources  |
| Anna  | <ul style="list-style-type: none"><li>▪ Interpretive</li><li>▪ Judgemental</li></ul>                           | <ul style="list-style-type: none"><li>▪ Described events and their consequences</li><li>▪ Linked pieces of information</li><li>▪ Support for her interpretations and conclusions</li></ul>   | <ul style="list-style-type: none"><li>▪ No other resources cited</li></ul>                      |
| Rod   | <ul style="list-style-type: none"><li>▪ Mostly summarising description</li><li>▪ Some interpretation</li></ul> | <ul style="list-style-type: none"><li>▪ Summarised case events</li><li>▪ Presented detail to support arguments and observations</li></ul>  | <ul style="list-style-type: none"><li>▪ Two subject readings included in bibliography</li></ul> |
| Margaret  | <ul style="list-style-type: none"><li>▪ Interpretative</li></ul>   | <ul style="list-style-type: none"><li>▪ Described events</li><li>▪ Used details to support interpretations</li><li>▪ Drew information together from different sources</li><li>▪ Related to individuals</li><li>▪ Drew multiple perspectives together</li></ul> | <ul style="list-style-type: none"><li>▪ No other resources cited</li></ul>                      |

| <b>Table 4.4 Summary of general aspects of student responses</b> |   |   |  |
|--|---|---|--|
| <b>Student</b>   | <b>Approach to writing</b>  | <b>Use of cases</b>   | <b>Use of other resources</b>  |
| <b>Lynn</b>  | <ul style="list-style-type: none"> <li>▪ Interpretative</li> <li>▪ Reflective</li> </ul>  | <ul style="list-style-type: none"> <li>▪ Described events and their consequences</li> <li>▪ Used details to support interpretations</li> <li>▪ 'Read between the lines'</li> <li>▪ Drew on multiple perspectives</li> </ul>   | <ul style="list-style-type: none"> <li>▪ Two subject readings are cited</li> </ul>   |
| <b>Sheryl</b>  | <ul style="list-style-type: none"> <li>▪ Partly descriptive</li> <li>▪ Elsewhere more interpretive</li> <li>▪ Expressed firm beliefs</li> </ul> | <ul style="list-style-type: none"> <li>▪ Summarised in process section as lists</li> <li>▪ Detailed discussion to support arguments and observations</li> <li>▪ Starting point for further discussion</li> <li>▪ Point of comparison with own experience</li> </ul>   | <ul style="list-style-type: none"> <li>▪ No other resources cited</li> </ul>   |
| <b>Barbara</b>   | <ul style="list-style-type: none"> <li>▪ Mainly summarising description with some interpretation</li> </ul>                                     | <ul style="list-style-type: none"> <li>▪ Described events and their consequences</li> <li>▪ Linked pieces of information</li> <li>▪ Used to support arguments, although detail often not provided</li> </ul>  | <ul style="list-style-type: none"> <li>▪ Four subject readings in reference list</li> </ul>  |
| <b>Liz</b>   | <ul style="list-style-type: none"> <li>▪ Mainly summarising description with some interpretation</li> </ul>                                     | <ul style="list-style-type: none"> <li>▪ Used to support arguments, although detail often not provided</li> <li>▪ Showed tendency to summarise events</li> <li>▪ Glossed over detail</li> <li>▪ Related to individuals</li> <li>▪ Drew multiple perspectives together</li> <li>▪ Isolates events</li> </ul> | <ul style="list-style-type: none"> <li>▪ Three subject readings in reference list</li> </ul>   |
| <b>Joanne</b>  | <ul style="list-style-type: none"> <li>▪ Descriptive with little interpretation</li> <li>▪ Incomplete</li> </ul>                                | <ul style="list-style-type: none"> <li>▪ Used to support arguments, although detail often not provided</li> <li>▪ Did not link case evidence to points clearly</li> </ul>   | <ul style="list-style-type: none"> <li>▪ No other resources cited</li> </ul>   |
| <b>Simon</b>   | <ul style="list-style-type: none"> <li>▪ Mainly summarising description with some interpretation</li> </ul>                                     | <ul style="list-style-type: none"> <li>▪ Used to support arguments, although detail often not provided</li> <li>▪ High-level comparison</li> <li>▪ Glossed over complexity</li> <li>▪ Some misinterpretations</li> </ul>  | <ul style="list-style-type: none"> <li>▪ One subject reading and two other references</li> </ul>   |
| <b>Ian</b>   | <ul style="list-style-type: none"> <li>▪ Interpretative</li> <li>▪ Reflective</li> </ul>  | <ul style="list-style-type: none"> <li>▪ Perspectives of the characters</li> <li>▪ Presented detail to support arguments and observations</li> </ul>  | <ul style="list-style-type: none"> <li>▪ No other resources cited</li> </ul>   |
| <b>Kath</b>  | <ul style="list-style-type: none"> <li>▪ Mainly summarising description with some interpretation</li> </ul>                                     | <ul style="list-style-type: none"> <li>▪ Used lists to summarise</li> <li>▪ Described in general terms</li> <li>▪ Little use of detail</li> <li>▪ Not linked to arguments</li> </ul>  | <ul style="list-style-type: none"> <li>▪ One subject reading and three other references cited in a general discussion section</li> </ul> |
| <b>Steve</b>   | <ul style="list-style-type: none"> <li>▪ Mainly summarising description with some interpretation</li> </ul>                                     | <ul style="list-style-type: none"> <li>▪ Presented detail to support arguments and observations</li> <li>▪ Sometimes links not clearly made</li> </ul>  | <ul style="list-style-type: none"> <li>▪ One subject reading and two other references</li> </ul>   |

Some students adopted a predominantly analytical approach throughout, piecing together information and interpreting it to form their own conclusions about the events described in the case materials. Others, however, described the case events – at times re-wording accounts from the materials or summarising the details into a more general statement or a list of bullet points. Some learners were quite reflective, either in linking to their own experiences or offering their perspectives on using the products. A few included value judgments about events or issues.

All students needed to refer to case events, although some did so in more detail than others. The most basic form was a simple description of the details of the case, usually in summary form. Sometimes additional information was provided, for example when the consequences of an event were discussed or the perspectives of different designers were described. This required linking of information from different documents and sources to put the event into a broader context. Learners also offered their own commentaries on the case events, for example in noting when a process seemed to run smoothly or caused a dispute. For some students these observations were also a starting point for discussion of situations they had experienced. Specific examples from the cases were also used to illustrate arguments or support generalisations, although these were accompanied by explanations of varying depth.

Seven of the students made reference to resources other than the case materials. Generally these were suggested readings provided as part of the subject resources, although three students researched further and found one or more additional references.

#### **4.5.13.8 From the interviews**

Further insights gained from interviews with seven of the students revealed their approaches to the task, the case components they found most useful and the difficulties they encountered. These are summarised in the table below.



| <b>Student</b> | <b>Approach to task</b>   | <b>Most useful components</b>   | <b>Difficulties</b>   |
|----------------|---|---|---|
| <b>Anna</b>    | <ul style="list-style-type: none"> <li>▪ Browsed materials and explored CD-ROMs first</li> <li>▪ Read case materials</li> <li>▪ Re-visited CDs</li> </ul>   | <ul style="list-style-type: none"> <li>▪ Interviews, timeline and CD-ROMs</li> <li>▪ Interviews for revealing the 'behind-the-scenes' process</li> <li>▪ CD-ROM products as opportunity to compare outcome to intentions</li> </ul> | <ul style="list-style-type: none"> <li>▪ Navigating through <i>StageStruck</i></li> </ul>   |
| <b>Lynn</b>    | <ul style="list-style-type: none"> <li>▪ Detailed review of Nardoo case first and then <i>StageStruck</i></li> <li>▪ Later brought together the two documents</li> <li>▪ Additional research on the Internet</li> </ul>                                   | <ul style="list-style-type: none"> <li>▪ Interviews as honest accounts</li> <li>▪ Overview and timeline</li> <li>▪ Original design statement as a model</li> </ul>  | <ul style="list-style-type: none"> <li>▪ Navigating through <i>StageStruck</i></li> <li>▪ <i>StageStruck</i> more difficult to relate to</li> <li>▪ Comparing cases based on materials that were different</li> </ul>   |
| <b>Sheryl</b>  | <ul style="list-style-type: none"> <li>▪ Began with case materials but realised she needed to explore the products first</li> <li>▪ Browsed material available</li> <li>▪ Re-read with questions in mind</li> <li>▪ Checked details on the CDs</li> </ul> | <ul style="list-style-type: none"> <li>▪ Interviews as accessible, personal accounts of events</li> <li>▪ Revealed team and management issues effectively</li> </ul>  | <ul style="list-style-type: none"> <li>▪ Found amount of material overwhelming</li> <li>▪ Not sure of the 'right' approach</li> <li>▪ Not as easy to 'get a feel for' the design issues without original mock-ups</li> </ul>  |
| <b>Barbara</b> | <ul style="list-style-type: none"> <li>▪ Read suggested readings before beginning case analysis</li> </ul>  | <ul style="list-style-type: none"> <li>▪ Design statements as models for her own project</li> <li>▪ Subject readings communicate the authors' 'pearls of wisdom'</li> </ul>   | <ul style="list-style-type: none"> <li>▪ Task was time consuming</li> <li>▪ Interviews too cordial</li> <li>▪ Relating questions to the information provided</li> <li>▪ Couldn't find information she needed</li> <li>▪ Too much material</li> <li>▪ Task too structured</li> </ul> |
| <b>Liz</b>     | <ul style="list-style-type: none"> <li>▪ Printed out key documents and highlighted sections</li> <li>▪ Made notes under headings</li> <li>▪ Used table to make comparisons</li> </ul>   | <ul style="list-style-type: none"> <li>▪ Interviews because she could identify with the people involved</li> </ul>  | <ul style="list-style-type: none"> <li>▪ Collating and interpreting information from multiple perspectives</li> <li>▪ Unfamiliar kind of task</li> <li>▪ Relating to the technical information</li> </ul>   |
| <b>Joanne</b>  | <ul style="list-style-type: none"> <li>▪ Explored CDs</li> <li>▪ Read materials writing notes for each analysis question</li> <li>▪ Went back to the CDs to check details</li> </ul>  | <ul style="list-style-type: none"> <li>▪ Interviews because they contained multiple perspectives that she could then compare</li> </ul>   | <ul style="list-style-type: none"> <li>▪ Frustrated by amount of material and level of detail</li> <li>▪ Unfamiliar kind of task</li> <li>▪ Information in different sources was repetitive</li> </ul>  |
| <b>Kath</b>    | <ul style="list-style-type: none"> <li>▪ Reviewed CDs and then went through interviews looking for relevant information</li> </ul>  | <ul style="list-style-type: none"> <li>▪ Interviews as dialogue with the designers</li> <li>▪ Was able to 'read between the lines'</li> <li>▪ Preferred non-academic readings</li> </ul>  | <ul style="list-style-type: none"> <li>▪ Technical difficulties with .pdf files</li> <li>▪ Confusion between designers ("who was who")</li> </ul>   |

Students adopted a range of strategies when approaching the task. Some students began by browsing the materials to give them an overview of the resources available before they then returned with the case analysis questions in mind. Other students began by a close examination of one case and then turned to the other, highlighting sections or making notes

to identify relevant information. One student in particular, Kath, used the analysis questions as her starting point and focused her efforts on finding relevant material. Most relied solely on the case materials with only one student consulting the subject readings before working on the analysis task and one other student conducting further research on the Internet.

All commented on the importance of exploring the CD-ROMs at the beginning of the analysis process so that they could become familiar with the product or refresh their memories of it. Sheryl's realisations that she needed to know the product to understand the case materials indicates the importance of being able to view these in tandem. Most of the students found that they also needed to re-visit the CDs to clarify information in the cases.

All but one of the students nominated the interviews with key designers as being among the most useful components of the case materials for generating responses to the analysis questions. A variety of reasons were given for this – for example that the interviews gave 'behind-the-scenes' accounts, that they were honest portrayals, that they were easy to read or the student could identify with the real people. Access to the original design statements was also considered useful because they provided a model to guide the students in the development of their own documentation.

Some common issues emerged when students discussed the difficulties they had with the task, namely: navigating within the *StageStruck* package; managing the amount of material provided; making comparisons based on diverse information; and knowing how to approach an unfamiliar kind of task. Other comments reflected personal preferences. For example, Lynn's feeling that she could relate better to *Nardoo* than *StageStruck* because she wasn't an 'arts' person, and Barbara's preference for a less-structured task.

Overall this analysis shows that, although learners often described and identified similar issues in their case analysis papers, there were differences in their interpretations and emphases, styles of presentation, use of case details, approaches to the task and assessments of the resources available.

#### **4.6 Small group discussion of case issues**

The second component of the case analysis task was for students to discuss the cases within their project teams, focusing on the issues that they thought would be particularly relevant to the development of their own multimedia packages. The aim of this activity was to bring learners into contact with each other's views about the cases, and to move them beyond the specific cases provided to think about how the issues might impact on their own situations.

The discussion was held during the second class meeting, which was held in Week Five. All of the students were present and in the first part of the session the class divided into the three project groups, which moved to different rooms. Thirty minutes was allocated for this discussion but the students requested extra time.

Informal observation was undertaken during this time to allow the students to talk freely. Some of the conversation suggested that students were discussing both the cases and their own projects, and were quite critical in evaluating the events of the cases. Some issues relating directly to the current state of their projects entered into the discussion, but they returned to the task at hand.

The next part of the session required groups to enter a summary of the discussion on the class *WebCT* site. This would provide a record for students to refer back to later in the reflective stage should they wish. Groups returned to the computer lab after concluding the discussion, and one or more of the team members posted a message to the discussion space. A summary of the teams' activities in the first weeks of their projects and their small group discussions from this session are described below.

## **4.6.1 Group A**

(Lynn, Steve, Margaret & Kath)

### **4.6.1.1 Early team activities**

By week five of the session Group A had met twice. Postings to the discussion list in the first two weeks of the subject indicate some confusion about who was part of the team and difficulties in making contact. Steve wasn't present at the first class meeting and his first message expressed his keenness to get started and asked members of the group to contact him. Margaret and Lynn's messages indicated however that they were having trouble making contact with Steve and weren't sure if his email was working. In the confusion he didn't attend the first team meeting.

Lynn summarised this first meeting on the discussion list. At this stage they were trying to decide on a client and negotiate their team roles and contributions. A lack of technical skills was a key concern. Lynn wrote, "let's hope we don't encounter problems like the *StageStruck* did. At least there is not much risk of intellectual property issues".

Another meeting was held a week later and Margaret wrote that the group was making progress. Although unable to meet with their client, they had obtained some materials to start work on. They had already made some decisions about a metaphor and a possible means of navigation at this stage.

### **4.6.1.2 Discussion summary posted by Group A**

Group A team members provided a long list of issues they saw as relevant to their project. Some of these were issues of general importance, which they needed to be aware of:

Metaphor/Interface and Navigation issues - as with any project, it is important to establish these early in the project.

Also included were issues they needed to think about and make a decision on:

Pedagogy and instructional design - here we feel we need to look at constructivist or teacher-directed learning.

Others referred to features they intended to develop, having already decided these were essentials for the project:

Need to ensure user gets feedback (eg. quizzes)

Design and management issues were listed separately, with two technical and one process consideration listed in the former category (see Table 4.6 for a summary). Each point was brief with little further explanation given. There was no reference made to any information from the cases and the group members were clearly focused on their own project issues.

| Table 4.6 Issues reported on by Group A  |   |
|--|---|
| Design issues  | Management issues   |
| <ul style="list-style-type: none"><li>▪ Metaphor/navigation</li><li>▪ Instructional approach</li><li>▪ Relevance of content</li><li>▪ Selection of programming tool</li><li>▪ Target audience</li><li>▪ Cycle of evaluation</li><li>▪ Support materials</li><li>▪ Needs analysis</li><li>▪ Learner feedback</li><li>▪ Product features</li></ul> | <ul style="list-style-type: none"><li>▪ Funding</li><li>▪ Scheduling</li><li>▪ Contract</li><li>▪ Team issues</li><li>▪ Resource management</li><li>▪ Client management</li><li>▪ Matching product to the design intentions</li><li>▪ Formative evaluation of prototype</li></ul> |

### 4.6.2 Group B

(Sheryl, Ian, Anna & Barbara)

#### 4.6.2.1 Early team activities

Although Ian had not been able to attend the initial class meeting in Week One, he had already put forward the idea of doing a project for the large industrial company. Four other students opted to join Ian’s project, one of whom later withdrew from the subject. Early postings on the discussion list from Barbara indicate that the group was experimenting with the communication technology, trying to use a chat facility but not being successful.

The first progress report came from Sheryl who related some of what had happened at the team’s first meeting with their client. Sheryl believed the meeting was successful in introducing the team to the scope of the package, establishing roles and discussing of the overall metaphor. Plans for the immediate future included collection of content and concept mapping in preparation for work towards a storyboard. Sheryl also wrote: “I think we are

off to a good start, but having reviewed the cases I'm sure we're in for some 'challenges' along the way".

Ian's expansion on Sheryl's account revealed more about the team's progress. The team's main communication methods to this point had been one face-to-face meeting, several on-line chat sessions and many emails. They planned to set aside the Sunday following the second class meeting to work on the storyboard and the design. According to Ian, the client was interested and involved, and perceived the need for a multimedia approach. Ian likened this close working relationship, in which both the developers and client develop their understanding of multimedia, to the *Nardoo* case.

Barbara added her perspective shortly after writing that she was "quite excited about doing something different" and had "enjoyed the readings about MM development because there is a real purpose and application behind it now". She remarked that her own role as graphic designer would be a challenge for her and she needed to learn more about user interface design, but had already started on some screen mock-ups. Barbara established a listserve but mentioned a lack of communication from at least one other group member as a cause for concern. Barbara also mentioned her worries about whether the team's end product would meet the client's needs and expectations. Sheryl also commented that the team needed to clarify the requirements of the project assignment.

#### **4.6.2.2 Discussion summary posted by Group B**

In their group discussion posting, the Group B team members related issues from the cases without making any explicit links to their own project. Their discussion posting discussed how issues arose in the cases, plus the reasons and the consequences. For example:

[G]raphic design was an issue in both cases, especially in SS, where the graphic designer was expected to put some very nebulous ideas into concrete form -graphic designers and other creative types tend to think the[y] own the creative process which does not work well in multimedia because it requires different disciplines to work together -difficult to have all parties share the same vision -both packages developed too much content and had to cull - both packages had leave out ideas and functionality to keep to time and budget - when it came to actually marketing Nardoo, the basic philosophy of constructivist learning was set aside in favour of commercial considerations e.g. teacher's manual.

In comparing the two projects the team concluded that *Nardoo* was more focussed than *StageStruck* because the developers used their previous experiences as a guide and the project had a clear client and aim. This assisted the development process. *StageStruck* was breaking new ground and was slower to start with the consequence that “some parts of SS were underdeveloped; they were too text-based for a performing arts resource and a bit lame”.

While the summary suggests that the group discussed the issues they saw as most important and in so doing reached some joint conclusions about these, the contribution to the discussion list doesn’t indicate that the group gave consideration to how these issues would be relevant to their own projects (see Table 4.7). It did however help them identify aspects of a successful project and areas of potential difficulty.

| Table 4.7 Issues reported on by Group B  |   |
|--|---|
| Design issues  | Management issues   |
| <ul style="list-style-type: none"><li>▪ Role of the graphic designer</li><li>▪ Working with the graphic designer</li><li>▪ Reaching common understanding</li><li>▪ Developing too much content</li><li>▪ Time and budget as factors affecting the design of the product</li><li>▪ Conflict between educational and commercial aims</li></ul> | <ul style="list-style-type: none"><li>▪ Client relationship</li><li>▪ Intellectual property</li><li>▪ Multiple stakeholders</li><li>▪ Management by committee</li></ul> |

### 4.6.3 Group C

(Rod, Joanne, Simon & Liz)

#### 4.6.3.1 Early team activities

By the fourth week of the session Group C, had established a relationship with the client and held several group meetings. Liz, the project manager, wrote the team had spent time on “concept mapping, designing metaphors and our information landscape”. The team had also allocated roles. This was a difficult task as some team members wanted to learn new skills but had to be realistic about what they could achieve in the limited amount of time available. The client had left the instructional design up to them, something which Liz said ‘can be good and bad’. The team had early ideas for a game or simulation rather than an instructional tutorial.

Discussion postings from other members of the group (Rod and Joanne) give further insights into the early stages of the team process. Rod's comments suggest that although the team had assigned roles they still needed to see how the arrangements would work in practice. He recognised that part of this would be learning how to negotiate and in working together "how the graphics whizz interprets the design and can the programmer actually make it work". Joanne's contribution gives an insight into the team's early attempts to define the scope of the project so that the needs of the client, school audience and wider community would be met. It is clear from her comments also that Liz had been responsible for developing the client relationship and that the other members of the team were yet to meet him or visit the gallery. Joanne also noted that the group had decided on regular face-to-face meetings.

#### **4.6.3.2 Discussion summary posted by Group C**

The group's discussion summary shows that the team members had made clear links between the cases and their own project. Their comments indicate some of the issues that were relevant at this stage:

1. Importance of a clear concept feeding into the whole design process. Strategies to assist with this problem would be to brainstorm ideas, discuss limitations and expertise. This is an issue in our group because we are still struggling with envisaging the final product. We haven't properly researched our needs assessment and identified the overall purpose of our product to satisfy our client and student/teacher needs. We still wish to maintain the constructivist learning environment and yet provide relevant learning experiences for Years 7-10.

They also considered concepts from the cases they would like to use:

2. Involving target audience in design phase as in the Nardoo and PDA development. We would also like to adopt a similar metaphor with a VAPD (Visual Arts Process Diary) and we want this to be functional and applicable.



And ‘improvements’ they would make:

- 3. Inclusion of instructions for use of package, particularly in Stagestruck. Feelings with Stagestruck were that some instructional material should have been included in the package so that the software could be used practically in the classroom.

They referred to strategies (prioritising the list of the content resources) and to issues they needed to be aware of (communication challenges due to physical separation and the need to juggle multiple roles). At this stage they had identified strategies for the design, but management concerns remained issues to be aware of rather than to address (see Table 4.8).

| Table 4.8 Issues reported on by Group C  |   |
|--|---|
| Design issues  | Management issues   |
| <ul style="list-style-type: none"><li>▪ Initial development of clear concept</li><li>▪ Involvement of target learners</li><li>▪ Including instructions for use</li><li>▪ Prioritise content development</li><li>▪ </li></ul> | <ul style="list-style-type: none"><li>▪ Awareness of communication problems</li><li>▪ Client management</li><li>▪ Team roles</li><li>▪ Team decision making</li><li>▪ Coordination and planning</li></ul> |

4.6.4 Discussion of small group responses

Examination of the discussion list postings added during the period between the first two classes revealed some of the teams’ early activities. At this stage it seems that the project teams had similar concerns. The main activities reported were:

- deciding who would join the team
- developing an understanding of the learning/training problem
- establishing the client’s needs and expectations of the project
- negotiating and allocating roles amongst the members
- developing communication strategies
- determining the design approach and some possible features of the product.

The summaries of the small group discussion indicate, however, some differences in the focus of each team’s concerns. Group A team members focused on their product and their discussion summary included specific plans for its design and production. They make little reference to the cases in their posting.

Group B's discussion revolved around issues derived from the cases and seems to focus on potential problems that might be avoided. Unlike Group A, the summary does not suggest that the team members had related these issues specifically to their project. Instead they had identified issues of more general importance.

The summary of Group C's discussion focused on the plans the team members had for the project's development, based on what they saw as positive and negative features of the cases. These included specific plans for their product, for example it would include instructions for teachers, and general issues, such as the need for good communication.

Overall, the small group discussions seem to have focused attention on a sub-set of the issues identified in the individual analyses. While there were no new issues raised, the discussion questions prompted learners to consider issues from a different perspective – in relation to their own projects. Thus these were the issues seen as most relevant to the teams, and discussion about them seems to have made their general applicability more apparent.

#### ***4.7 Whole class discussion of case issues***

The final component of the case analysis activities was participation in a whole class discussion. This was included to allow the project teams to share the issues of relevance to them with the rest of the class and promote further discussion. Participation was not part of the assessment.

After all of the project teams had posted small group discussion summaries to the *WebCT* site the instructor brought the class back together so that students could report on and discuss the issues raised. Each group was asked to contribute some issues identified and these were recorded on the whiteboard under the headings 'design' and 'management', with some falling in between.

### 4.7.1 Design issues

The discussion began with students from each of the teams volunteering some of the design issues they had identified in their groups.

Members of Group C spoke about three main issues. Firstly, they talked about the need to develop a clear concept of the product from the outset. They felt that the *StageStruck* and *Nardoo* teams had achieved this, but they were finding it difficult. They believed that this was because their project was driven by a number of different goals such as promoting art appreciation and making people aware of the gallery's collection, as well as targeting Year 7-10 Visual Arts students. Finding a way to put these 'big' ideas into practice was proving to be a challenge.

They also talked about their intention to include an electronic visual arts diary in their product - which would be based on a real-life counterpart. From reading the cases they realised how much work would need to go into the development of the visual design and that they would need to do some prototyping with their target audience.

Finally, members of the team said that they had discussed whether they should include instructions with their product. This issue was sparked by comments from the *StageStruck* case that indicated that teachers generally found it difficult to get started with because it didn't have a clear use for them. One member of the group also commented that she had used *StageStruck* with her class and had not considered it useful at primary school level. A decision was made to produce a teacher's guide to put the use of the product.

One of the team-members expressed some concern at being able to program the diary tool. This gave the instructor an opportunity to respond that even if a feature would not be working in the team's final version they should still write about its planned functionality and appearance in the design statements. Discussion about this issue was important in clarifying that the instructor's expectations of the team's final package was that it would be an advanced prototype rather than a complete product.

Group A team members spoke next. Their concerns were based around developing an appropriate metaphor and navigation style for their product. They had decided they didn't want to rely solely on metaphor because some people might find it too difficult to follow. One group member commented on the difficulty she had in working out where to go in *StageStruck*. They also needed to find out more about the target audience and their skills, and well as the technology they would have access to. The group felt that they were having trouble communicating with their client and there was a sense a frustration as they described the difficulties in determining the client's goals and negotiating how this would match what they could achieve within the scope of the project. They also saw the importance of having a revision cycle that allowed plenty of opportunity for the client to review the progress of the product. They thought that this would be an important strategy to keep their project on-track.

One of the Group C team members commented on how her team's project differed in that the group had a great deal of freedom to develop the concept. This meant that they would need to scope and develop content as the project progressed and at this stage were uncertain about what their product would include. They also had a broader target audience because, although they were focusing on the Year 7-10 Visual Arts syllabus, they wanted their product to have wider appeal to students at other levels and members of the general public.

The members of Group B were the last to offer their perspectives on the issues of importance. They focussed on the group process, first talking about the problems with graphic designers evident in both of the cases. These they attributed to poor communication and lack of a common vision. One team-member suggested that each person needed to develop a sense of ownership over the concept (deemed to be another problem with *StageStruck*) and other members joined the discussion agreeing that it was important to meet face-to-face and develop protocols for decision-making and negotiation. This led to a general discussion about the need for team members to understand how their role impacts on others working on the project. Group B went on to state that this awareness is needed to develop a sense of what the team is working toward.

Members said that it was their impression that the *Nardoo* team benefited greatly from the use of *Lake Iluka* as a starting point, but with *StageStruck* the concepts did not mature until the end of the project. This, they said, might be acceptable for a government-funded initiative intended to promote innovation, but they felt that they should be much more pragmatic. Theirs was a training project and they saw a need to stay within the organisational culture. They therefore judged that a constructivist approach would not be appropriate and agreed to research products similar to the one they intended to develop.

#### **4.7.2 Project management issues**

The discussion turned to project management, although many such issues had already been raised in the context of design.

Group B noted the importance of managing the relationship with the client. In *StageStruck* there were multiple parties with a stake in the project and no strong leadership from the management group. They felt that the *StageStruck* team paid lip service to project management principles and that the changes that occurred during the process due to disagreements were detrimental.

These comments led to a wider discussion about whether or not project management ideas can be applied across different kinds of projects. There was debate over whether the *Nardoo* project ran more smoothly because it involved scientists who ‘think logically’, but one student responded that she knew arts people who managed large projects quite successfully. Another student commented that it was necessary to read between the lines to work out what went wrong with *StageStruck*.

Group B team members then commented that they were having problems with their client and wanted to be able to ‘put him back in his box’. They felt he had too many ideas about the project and over-estimated what could be done. This led to discussion about how some clients wanted to be very involved - like Group B’s - while others weren’t willing to allocate much time – such as Group C’s client. The instructor suggested that the design

statement would be a useful tool for capturing the results of negotiations with clients and a way to contain expectations of the product, as had been done in the case projects.

The discussion came back to the issue of teamwork again. Group B had decided on a strategy whereby the person with the main responsibility for an area would make a final decision on an issue after consultation with other team members. This would help balance the need for ownership and the necessity to stand back from the product and make decisions about it. Team members also felt that unlike the members of the case teams who each had the own area of expertise, they would be able to see links between their roles more readily because their skills were more evenly spread. The difficulties with graphic designers in the cases, made it clear to this group that training was needed and recognition that transforming nebulous design ideas into reality was a difficult process.

#### **4.7.3 Other issues**

The discussion became more wide-ranging at this stage with the instructor asking other teams about how they were handling the distribution of roles. Group C had needed to reshuffle roles after one of the team members had withdrawn from the subject. The team members were happy that they had handled this successfully.

Other issues raised were in the form of questions for the instructor and these were concerned with how to finish the product (this seemed to concern all of the teams), who had rights of the project in terms of intellectual property, and how to ensure a product had a long lifespan. The instructor offered her perspective on these for the teams to consider.

The discussion closed with the instructor asking teams about which communication strategies they had developed. Most teams felt there was a need for face-to-face meetings, which could be supplemented by email communication. Meeting in person was necessary because it was often the most efficient way to 'thrash issues out', as Group C found when developing the design statement. Group B had experimented with the chat tool, but found it was more useful for setting up meeting times than dealing with issues in depth.

The instructor reminded groups of the need to develop archiving, documentation and version control strategies - usually the task of the project manager. She also reminded them that various support facilities such as physical meeting and workspaces, server and ftp access, and file storage were available. Groups were encouraged to consider what their needs were.

4.7.4 Discussion of whole class activity

The design and management issues contributed to the whole class discussion are summarised in Table 4.9, and indicates something of the current concerns of the project teams.

| Table 4.9 Issues raised by the team members in whole class discussion  |  |
|--|--|
| Design issues  | Management issues  |
| <ul style="list-style-type: none"><li>▪ A clear concept is needed from the outset (Group C)</li><li>▪ Want to develop a PDA style tool. Will need time to develop and prototype (Group C)</li><li>▪ Will include instructions to help teachers see relevance to classroom use (Group C)</li><li>▪ Need to develop an appropriate metaphor and navigational style (Group A)</li><li>▪ Need to collect information about the target audience and the implementation environment (Group A)</li><li>▪ Communication and negotiation with the client needed to develop the concept (Group A)</li><li>▪ Will build in a revision cycle to allow client review of progress (Group A)</li><li>▪ Decided to take a fairly 'traditional' approach to the design (Group B)</li><li>▪ Helpful to have developed a similar product (Group B)</li><li>▪ Need to research similar products (Group B)</li><li>▪ Turning ideas into reality (Group B)</li></ul> | <ul style="list-style-type: none"><li>▪ Communication and common vision needed (Group B)</li><li>▪ Need to develop a sense of ownership (Group B)</li><li>▪ Need for face-to-face meetings and to develop protocols for decision-making (Group B)</li><li>▪ Need to develop an understanding of own role (Group B)</li><li>▪ Keep in mind the goal you are working towards (Group B)</li><li>▪ Important to manage the client relationship well (Group B)</li><li>▪ Need to develop an understanding of all roles (Group B)</li><li>▪ Training may be needed (Group B)</li></ul> |

The issues shared by Group C team members were explained in terms of the development of their own product, and related to the cases. They focused on three particular issues and were quite expansive when explaining them to the other groups. At this stage team members seemed to be working at a conceptual level, thinking about the 'big picture' ideas for their product and what they were trying to achieve.

The issues of concern to Group A were more specific than those for Group C. Even in the early stages of the project many of the design decisions had already been made. The team

had access to the materials from an existing training program and the project brief was to ‘convert’ these into multimedia format. The goals of the project and the target audience for the product had been clearly defined. This allowed the team members to move quickly to discussion about the specifics of their product and develop strategies they would use to guide the development process, such as the revision cycle.

Group B dominated much of the discussion, and were particularly interested in team management issues. The issues raised suggest that at this stage some aspects of the project had been decided (for example an overall prescriptive approach), but the team was less concerned about the design and more focused on developing strategies to support the development process.

Having to explain the issues of concern to an audience beyond their own team members required the students to explain some of the background to the project and explain how the issues were important. This illustrated how each team’s different circumstances raised different issues. It also allowed teams to share their different strategies, for example Group B’s ideas for managing decision-making.

Also highlighted were the teams’ ideas about the cases and their relation to the team projects. Similarities and differences in the case projects were evident to the team members, prompting them to think about their own situations and strategies. Comments by members of Group C on the need to develop a clear concept brief are a good example. They considered this an important step in the early stages in both of the case projects and shared their concerns about the difficulties they were experiencing.

Events from the cases were also used as examples of what not to do. These come particularly from Group B team member’s contributions to the discussion. Fostering a good team environment was one of their key concerns and they identified potential problems from the cases. For example, they had decided that poor communication and the lack of a shared vision created difficulties for the *StageStruck* team.



In addition to offering their own perspectives, the issues raised also functioned as a starting point for further discussion. For example when members of Group C shared concerns about being able to develop their planned PDA-type tool provided an opportunity for the class and the instructor to discuss and clarify her expectations of the final product.

The discussion also allowed the students to compare their team's different situations, and in particular their clients. This is highlighted by comments about the freedom given to Group C to develop the project concept, compared to Group A's project brief which was more pre-determined.

Discussion also moved on to more general issues, not so immediately related to the team projects. For example, the class discussed whether project management ideas could be broadly applied or should be modified depending on the project.

When discussion of issues raised by the teams had concluded, the role of the instructor as facilitator changed slightly as she posed some questions to the group. This allowed her to follow up on issues already touched on but not discussed fully, and issues that not yet been raised.

Overall, analysis of the class discussion shows that team members were now more focused on their own projects. Sharing ideas in this forum gave the students a chance to:

- explain their different circumstances, raising awareness of the issues relevant to other projects
- explain aspects of the case projects they considered relevant and why
- expand on issues, encouraging wider discussion and drawing out generalisations
- share and discuss strategies
- raise issues related to the task and clarify the instructor's expectation
- discuss issues raised by the instructor.

## **4.8 Summary**

The findings from this stage of the investigation provide the following insights into learners' interpretations of the case materials:

- The case analyses included multiple interpretations and demonstrated learners' understanding of the nature and complexity of real-life multimedia development projects.
- Project management issues featured more prominently than design issues in the individual case analyses.
- Most learners found the cases relevant to their previous experience as professionals and students designers.
- Learners used details from the cases in a variety of ways to support their interpretations of the cases.
- The individual case analyses included responses that range from straight-forward description to sophisticated interpretation and generalisations.
- The analysis task was challenging and learners drew on a variety of strategies to prepare their responses.
- The discussion components allowed learners to share their different perspectives and consider the issues more broadly.

The next chapter presents the results of the second stage of the study, which investigated the group project phase of the learning experience.

## **Chapter Five**

### **Group Project Experiences**

#### ***5.1 Introduction***

This chapter presents the analysis of the group project experiences. The chapter opens with a description of the group assignment task, followed by an explanation of how it relates to the study. Next the approach to analysing the data is described and this is followed by a presentation of the results. The chapter closes with a discussion of these results.

#### ***5.2 The group project task***

The group project was the major component of the student's assessment work in the subject and was comprised of two parts.

The first part required each of the teams to develop a design statement that detailed ideas for the project. To do this team members would need to meet with their client to develop an understanding of the learning or training problem to be addressed. From this understanding the team would then develop an appropriate solution, which would then be expressed in the design document.

The assessment instructions provided some directions on how to proceed (see Appendix 3.5), but groups were able to decide how their members would work together to develop the design statement, including the division of labour, the frequency of meetings, and the nature of communication and collaboration. All students had previous experience in developing design statements for a pre-requisite subject, though not for a real project. As in the previous subject, a template was provided to guide students through the preparation of the design statement (see Appendix 5.1).

The design statement was due in Week Seven of the session, its preparation overlapping with the case analysis task. Teams then had a further ten weeks to develop the prototype.

This second part of the group task required each of the teams to produce an educational multimedia package based on the design statement they had prepared. Brief instructions provided in the subject outline (Appendix 3.1) indicated that each team member should make an identifiable contribution and that the product should be produced through a full development cycle. Further clarification of the task occurred in class discussions, and between the instructor and project managers from the groups. The instructor and class agreed that the final product should be in the form of an advanced prototype in which a significant section of the package would be completed and polished, while other parts could remain undeveloped.

The final version of the package was due for submission at the end of session with the exact date negotiated separately by each team.

### ***5.3 Relevance to the study***

The first phase of this study, described in Chapter Four, was concerned with how learners developed their ideas about multimedia design and development from their analyses of two real-life cases. The next part of the learning process saw students form teams to work on projects of their own. Analysis of their group project experiences, described in this chapter, provides insights into how the students developed and implemented their design solutions in response to the educational or training problem presented by their clients. By following the learners through this stage it is possible to develop a full description of the learning context. This is essential for understanding how the cases influenced the student projects. This influence is considered in this chapter in terms of the design of the product and the process of development. The descriptions the project experiences also form the basis for understanding the learners' reflections, discussed in Chapter Six.

Three aspects of the group project experiences were examined – the development of the project design statements, the implementation of design ideas in the teams' advanced prototypes, and the group process. This prompted the following key questions:

- How do the teams define the design problems?
- What design solutions do the project teams propose?

- How do the teams implement the design ideas in the prototypes?
- What issues do the groups face when working together?

The main data sources examined to address the questions were the group design statements and final prototypes. The design statements represent each group's ideas about the project – the features of the situation identified as important, the issues focused on, and the plans developed for the product. The design statement was the focus of each team's early work on the project, and was developed in consultation with the client before production work commenced. The prototype product required groups to work together taking on different, and perhaps multiple, roles so that high quality results could be achieved. The prototype was likely to have been developed over a number of iterations, and may have changed considerably from the original ideas expressed in the design statement.

In addition to investigating the two products from the group task it was also desirable to understand the context in which they were developed. Further insights about the overall group experience and process were gained from interviews with some of the students (at least two members of each team), transcripts of messages posted to the discussion list, and the researcher's observations at class meetings.

The focus of this stage of the investigation was on characterising the group project experiences as a part of the case study description. The intention was not to investigate issues of teamwork and collaboration more generally. As such, the descriptions that follow are limited in that they provide contextual data for understanding this particular learning situation.

## ***5.4 Approach to analysis***

The main technique used to examine the data was to construct frameworks based on the questions above, the literature where appropriate, and the structure of the task.

Analysis of the group design statements began with reading and memoing, followed by summarisation and reduction of the data into a tabular format. The rows in the table

corresponded to the sections in the design statement. The first two columns categorised text as either the team’s description of the project or the ideas for the solution. Each group’s description reflects what the team members saw as the inherent parameters and their interpretation of the design problem. The key issues raised were summarised in a third column, and a fourth column provided space for the researcher’s notes. An example of the analysis table for Group B’s design statement is included in Appendix 5.2. This process reduced the data to a more manageable form and from this a summary of the team’s definition of the problem, and the proposed solution. These results are presented in Section 5.5.

The group projects were analysed by exploring the software packages thoroughly and then making notes about the key features on a pre-prepared template. This descriptive framework consists of seven features, reflecting the content, functionality and instructional approach evident in the package (Table 5.1). These categories were developed from key sources in the multimedia design and development literature (Jonassen & Reeves, 1996; Oliver & Herrington, 1995; Phillips & Jenkins, 1998; Reeves & Harmon, 1993, 1994; Schwier & Misanchuk, 1993).

| Table 5.1 Analysis framework for advanced prototypes |   |
|--|---|
| Feature  | Considerations  |
| Structure and presentation                           | <ul style="list-style-type: none"><li>▪ Sequencing of material</li><li>▪ Logical structure (eg. linear, branching, Web-like)</li><li>▪ Information (re)presentation</li><li>▪ Use of organising metaphor or context</li></ul> |
| Navigation options                                   | <ul style="list-style-type: none"><li>▪ Pathways through the package</li><li>▪ Learner control and options</li><li>▪ Orientation devices (eg. maps)</li></ul>   |
| Visual design  | <ul style="list-style-type: none"><li>▪ Screen design and layout</li><li>▪ Aesthetics</li><li>▪ Visual cues</li></ul>   |
| Media use  | <ul style="list-style-type: none"><li>▪ Use of media types</li><li>▪ Combination of media</li><li>▪ Integration</li><li>▪ Appropriateness</li></ul>   |
| Tasks and activities                                 | <ul style="list-style-type: none"><li>▪ Learner activities</li><li>▪ Instructional strategies</li><li>▪ Interactivity</li></ul>   |
| Support features and tools                           | <ul style="list-style-type: none"><li>▪ Cognitive tools</li><li>▪ Help features</li><li>▪ Feedback</li></ul>  |
| Technical aspects                                    | <ul style="list-style-type: none"><li>▪ Functionality works as intended</li></ul>   |

An example of the analysis table for Group B’s advanced prototype can be found in Appendix 5.3. Section 5.6 describes the task requirements and then the main features of the packages produced by each group, followed by general comments and a comparison with the design statement ideas.

Lastly, an understanding of the group experience was sought through analysis of the discussion list postings, the researcher’s observations of class meetings and interviews with seven of the students. Data from each of these sources were summarised and are presented in Section 5.7.

This is followed by a more general discussion of the project work overall and its relation to the case analysis task.

**5.5 Group design statements**

Examination of the group design statements offers insights into both how the teams defined the problems with which they were presented, and how they then developed their design solutions. The following sections summarise these two aspects of the design statements prepared by the three project teams.

**5.5.1 Group A**

This group consisted of Steve, Lynn, Kath and Margaret. A section of the design statement described the mix of skills and experience in the team, with each team member having previously some experience of multimedia design (in a pre-requisite subject) and with developing Web-based materials. The roles are listed in Table 5.2.

| Table 5.2 Group A team members and their project roles |   |
|--|---|
| Team member  | Expertise and roles   |
| Steve  | <ul style="list-style-type: none"><li>▪ Currently employed as a high school teacher</li><li>▪ Will do the programming, and contribute pedagogy and instructional design</li></ul>   |
| Lynn   | <ul style="list-style-type: none"><li>▪ A librarian with qualifications in Adult Education and Training</li><li>▪ Will be the project coordinator responsible for calling meetings, ensuring deadlines are met and the budget is maintained</li><li>▪ Will be the initial contact between the team and the client</li></ul> |
| Kath   | <ul style="list-style-type: none"><li>▪ Teacher-trained, now working with information technology</li><li>▪ Will undertake the graphic work, adapting material supplied by the client and creating new material as required</li><li>▪ Will also assist with programming</li></ul>  |

|          |   |
|----------|---|
| Margaret | <ul style="list-style-type: none"> <li>▪ A primary school teacher-librarian</li> <li>▪ Will provide direction on pedagogy and instructional design</li> <li>▪ Will also work on video editing in collaboration with the rest of the team</li> </ul> |
|----------|---|

### 5.5.1.1 Definition of the problem

The group’s client was a well-known national dairy manufacturing company and the situation they were presented with required them to re-develop a training program for vendors of the client’s products. The purpose of this program was to train vendors (usually owners of small mixed businesses) in the company’s strategies for marketing and managing their products in retail outlets. The program had been provided in a face-to-face seminar format, which the client wanted to adapt into self-paced modules on CD-ROM.

This strategy was proposed to overcome some difficulties in the existing program. Vendors participating in the training program are dispersed geographically, and attendance at face-to-face sessions meant that they were away from their businesses. If they were unable to attend they then had to wait until the next scheduled opportunity. In addition, the company’s development officers spent a significant amount of time facilitating these sessions. The company viewed self-paced training modules delivered on CD-ROM as the best way to make training more convenient and efficient for both the vendors and the trainers. The existing presentation and support materials, comprising text, graphics and video, were made available to the team. The client wanted these to be “translated” into a self-paced multimedia package.

In describing the design problem the team focused on learning about the client and the rationale for the project, the purpose of the training, the target audience, the current approach and the problems with it, the solution proposed by the client, and the resources available to the team. Some broader industry factors that give some background to the client’s motivations were briefly discussed. The scope of the current project was also defined, stating the client’s responsibilities for the final product and the extent of the work the team would do in reworking one module only.



Overall, Group A's design statement gives a good overview of the background factors that form the basis of the group's proposed solution, but does not provide much detail. For example, little information is provided about the trainees beyond identifying them as product vendors who all have computers equipped with CD-ROM drives.

#### **5.5.1.2 The proposed solution**

A key feature of the product proposed by the team was the metaphor of the shop-front that aimed to convey a realistic, familiar context. Within this context learners would engage in problem-solving scenarios that sought to encourage them to "think more about the issues". The multimedia CD-ROM would provide a "multi-dimensional" experience in "an interesting format". Overall, the team described the instructional approach as prescriptive, with the material to be presented in a tutorial style with a linear structure that learners could work through at their own pace.

The stated goal of the package was to educate franchise owners in developing and managing the client's products. From this the team identified three objectives that are expressed in terms of developing the vendor's understanding of the relevant business strategies. These are general statements and were not linked to specific outcomes.

Each module in the product would include an introduction, presentation of the content, and interaction through quiz questions followed by instant feedback on responses. Learners would choose a topic by clicking on an object or person appearing in the graphical representation of the shop-front. A text-based alternative would also be available. Media would include excerpts from a motivational video, in addition to the other resources available as part of the current training materials. Screen mock-ups attached to the design statement indicated the team's plans for the introduction, main menu, content and feedback screens, and showed a rough layout of elements and the navigation options.

Also proposed for the package was a simulation tool called the 'Mould-o-meter', which would allow learners to investigate the relationship between temperature and time in terms of the effect on product quality. This was proposed as a navigational tool, although no further details were provided.

In explaining the planned implementation of the product the team noted that the product would be developed as a cross-platform CD suitable for a multimedia computer with *QuickTime* installed. They stated that the client bore responsibility for learner support and access to the required technology.

In describing the proposed product, the team focused on the following product design issues: the overall instructional approach, the structure and presentation of the content (including media use), navigation options, the tasks and activities which will engage the learner, and tools and features to support the learners. The team also discussed factors related to the implementation of the product, namely the technical requirements and the role of the instructor.

The team's design statement also touched on management and process issues. Specifically, several statements relate to intellectual property and copyright. The team proposed that they would retain the intellectual property rights over the simulation tool they developed and would ensure the copyright clearance of any additional resources used. In turn, the client would ensure that they owned the rights to any material they supplied for the project. Also noted was the team's choice of an off-the-shelf authoring package that would have "no implications on intellectual property".

The team noted that there were a number of constraints on the project that should be recognised, and which, by implication, might impact on the product. These were the limited time available for development, the limited access to target users for testing and a small budget.

Process issues were apparent only in the final section of the design statement, which described the planned evaluation procedures. Here the team stated that formative evaluation would "be instrumental in the development of this pilot". A prototype without content would be developed to test the navigation and appropriateness of the metaphor. Both the team and the client would review this stage of the product. No further review stages were included. Summative evaluation would consist of a survey of the target audience after the

product had “been in use for some time”. A pre- and post-test assessment of student learning was also suggested as a measure of the effectiveness of the package.

Overall, the team’s design statement provided an overview of the training situation, the concept for the proposed solution, and some of the features of the product. However a more detailed explanation might be expected in some parts. For example, the team did not include a list of the topics and sub-topics that would comprise the package. Nor was there any discussion of developing further resources beyond those provided by the client.

In general, design ideas were stated with little justification offered. For example, a general interest in moving to more problem-based approaches to learning was referred to in the needs assessment, but then was not related to the reason for adopting such an approach in this case. Unfamiliar terms and jargon were also used without further explanation. For example, it is not clear what the team meant by wanting to give learners a “multi-dimensional” experience, and they do not explain why this would be an effective strategy.

The design statement referred to many of the team’s ideas for the package, and how learners might be engaged in activities within it. However this mix of ideas is not well integrated, and some are not consistent the overall approach proposed. This suggests that team members had not consolidated their ideas into a coherent vision of the project.

### **5.5.2 Group B**

This group consisted of Ian, Sheryl, Barbara and Anna. They described their previous experiences in developing individual multimedia projects (in a pre-requisite subject), and the team’s wide range of expertise in teaching, corporate training and Human Resources Management (Table 5.3). Notes from an early meeting indicate that each of the team members took on primary responsibility for one or more areas plus a secondary, support role for another aspect of the project.

| Table 5.3 Group B team members and their project roles |  |
|--|--|
| Team Member  | Roles  |
| Ian  | <ul style="list-style-type: none"> <li>▪ Primary roles: project manager, media development</li> </ul>                            |
| Sheryl   | <ul style="list-style-type: none"> <li>▪ Primary role: instructional design</li> <li>▪ Secondary role: graphic design</li> </ul> |
| Barbara  | <ul style="list-style-type: none"> <li>▪ Primary role: graphic design</li> <li>▪ Secondary role: programming</li> </ul>          |
| Anna   | <ul style="list-style-type: none"> <li>▪ Primary role: programming</li> <li>▪ Secondary role: instructional design</li> </ul>    |

### 5.5.2.1 Definition of the problem

The client for this project was a large industrial company which needed to train contract drivers from a number of transport companies in the safe handling of a hazardous chemical. While the drivers undertook standard industry training in the transport of dangerous goods, the client supplemented this with a more site-specific program. Existing training was delivered in face-to-face sessions on the transport companies’ premises. The client viewed a move to CD-based training as a means of standardising the delivery of content so that the transport companies could assume responsibility for the program. Adequate performance in the new training program would be the basis for accreditation. The high level of learner engagement offered by interactive multimedia was also important to the client.

The overall goal of the package would be to educate drivers about the hazards of the chemical they transported, and the correct procedures for responding to an emergency situation. The package would be based on existing video and print materials, with heavy use of video excerpts. A detailed list of topics was included in the Information Review section of the design statement, and the related behavioural objectives were specified later in the document. The client would also provide access to a subject-matter expert who would be a source of further information as required. The client would also arrange access to company’s site so that additional visual material could be collected.

The program would initially be used with all contract drivers, and thereafter with new and relief drivers only. It would be the first part of a sequence of training programs and would build on a site-induction that was compulsory for all workers. The package would be self-paced, but progress would need to be monitored by a training supervisor to ensure all parts of the materials had been completed. The client would oversee initial implementation

within the driver's workplace to facilitate a smooth transfer. The CD-based package would be used at individual workstations, thereby allowing very fast data access and a high level of interactivity.

In defining the training problem, the team focused on introducing the client and explaining the reasons for initiating the project, and describing the target audience and the existing training program. The team outlined the overall goal and scope of the package, the topics and objectives to be covered, access to resources, and the client's ideas for the implementation of the new package. The explanation of the background to the project and client's conceptualisation is clear and detailed. The team appear to have been well informed about the client's needs and the training situation. Little mention was made of the characteristics of the target learners however.

#### **5.5.2.2 The proposed solution**

The team's stated intention was to design a highly interactive, learner-centred package, which would incorporate audio, video and graphics with minimal use of text. Quizzes and exercises would be included at the end of each module and a situation-based exercise would assess the learner's overall understanding.

The package would consist of three modules through which learners would be guided along a linear path. A journey metaphor would be used, with the narrator taking on the role of co-driver, and the modules incorporated as stops along the way. At the end of the journey drivers would be tested on their ability to "drive on their own". The team argued that the metaphor was appropriate because of its relevance to the target audience. The team justified a prescriptive approach on the basis that all of the content must be learned and assessed.

Although the narrator would guide learners from one module to the next, within a module they would be able to decide the order in which they completed the topics. Each topic would consist of an introduction, presentation of information, an optional summary followed by activities and feedback. The screen layout would be simple and consistent. The package would feature a map reflecting progress along the journey and allow the learner to go back to the module's topic page, view the help section or quit the package at any time.

Heavy use would be made of excerpts from the existing training video. The team would need to produce new voice-overs because the current narration was of poor quality, and may not be appropriate when the video was edited into segments. Additional media elements would be developed as required, although further production would be kept to a minimum for this prototype.

Information would be presented predominantly through the narration with video and still images used for support. Photos and video would be used in preference to illustrations and animation because this would give credibility to the information. Visual design would be relevant to the target audience and convey a masculine, industrial feel through use of artworks previously commissioned by the client. Background music would be included to add interest. Textual information would appear as dot points only, for example in an optional summary section.

The activities would encourage learners to become involved with the package and give them instant feedback. Learners would be required to answer all questions correctly before being allowed to proceed to the next module. When all modules had been completed learners would then be presented with problem situations in which they would have to successfully negotiate a number of obstacles. The system would record the learner's progress so that a training supervisor could later check it. Learners would be able to complete the package over multiple sessions.

Attachments to the design statement document included screen mock-ups for the introduction, map, information screen and quiz screen. Also included was a detailed storyboard for Module Two and some sample graphics.

The team's description of the planned project explained the overall instructional approach, the structure and presentation of the content (including media use), navigation options, the use and production of media resources, tasks and activities to test the learners' understanding, and features to support the learner. The team also discussed factors that relate to the implementation of the product, namely the technical requirements and the role

of the client and training supervisor. Detailed descriptions within the design statement and the attached storyboards indicate that the team had given considerable thought to the design of the product and begun to develop specifications upon which to base production tasks.

The design statement also dealt with some management issues, by clearly defining the scope of the project and what would be included in the prototype. The team also included ideas for further development and maintenance of the package, noting that these would be the client's responsibility. Also outlined were some of the responsibilities for particular team members, for example, preparation of voice-over scripts by the instructional designer. A brief note was also made about copyright issues, which would be addressed by using only the client's own materials. The need for specifications and documentation was noted in a number of places, particularly for ensuring consistency within the product and as a guide for the production of the package.

The plans for formatively evaluating the package gave some insights into how the product would be developed. The team stated that the client representative would review all of the scripts to ensure accuracy and sign them off before production. Initial evaluation of a simple PowerPoint prototype was planned, with key stakeholders providing feedback. These included some of the client's trainers and members of the target audience. No further evaluation or production stages were mentioned. Summative evaluation to assess the usability of the package and its ability to meet the learning objectives would be conducted by the client. A comparison between the existing face-to-face program and the new CD-based approach was suggested.

Overall, the team's design statement gave a clear and coherent description of both the background factors and the ideas for the new training package. Decisions made about the approach and design of the product were linked to the client and learner needs, the resources available and the implementation environment. This provided justification for many of the planned features of the product. The detail included indicates that the team was in an advanced stage of planning and had worked closely with the client to obtain materials

and advice. The team also clearly defined the parameter of this project and outlined key aspects of the intended development process.

5.5.3 Group C

This group consisted of Liz, Joanne, Rod and Simon. Although they did not discuss the development process in their design statement, the allocation of roles and responsibilities among the group members was recorded in other projects documents (Table 5.4).

| Table 5.4 Group C team members and their project roles |  |
|--|--|
| Team member  | Roles  |
| Liz  | <ul style="list-style-type: none"><li>▪ Project manager</li><li>▪ Research and resource collection</li><li>▪ Media editing</li></ul> |
| Joanne   | <ul style="list-style-type: none"><li>▪ Instructional design</li><li>▪ Audio production and media editing</li></ul>                  |
| Rod  | <ul style="list-style-type: none"><li>▪ Authoring in iShell</li><li>▪ Media editing</li></ul>  |
| Simon  | <ul style="list-style-type: none"><li>▪ Creation of specialised graphics</li><li>▪ Research and resource collection</li></ul>        |

5.5.3.1 Definition of the problem

The challenge for this group was to develop an educational package for a regional art gallery, aimed at secondary school Visual Arts students and their teachers. A CD-ROM package would provide access to the gallery’s collection and be closely linked to the relevant syllabus (which is discussed in detail). The only similar product on the market presents artworks from an annual exhibition, but does not relate closely to the curriculum. Though aimed at a specific target audience, the package would also be of general interest and be accessible to other gallery visitors. This would fulfil another of the gallery’s aims – to raise awareness about its collection and its role in the community.

The main target audience would Year 7-10 Visual Arts students. The team argued that being technologically aware and skilled with using computers these learners would be quite comfortable with a CD-based package. A lack of networking infrastructure and limited finances meant that in the first instance the package would be accessed from stand-alone computers within the gallery. This was the main reason for the client wishing to produce a CD package rather than making materials available on the Internet.



The gallery had agreed to allow the team access to its collection, staff and existing educational materials. A subject matter expert (SME) had been assigned to assist the team locate resources and assess any copyright implications. The SME had also worked as the gallery's education officer and so would be able to offer advice on instructional strategies.

For this group, defining the problem focused on understanding the client's goals for the project, identifying the target learners and their characteristics, researching the relevant syllabus materials, reviewing similar products and finding out about the resources that were available to them. The detail provided, particularly about the client and syllabus, indicates that the team was well informed about the background to the project.

#### **5.5.3.2 The proposed solution**

The team's stated aim was to develop "a rich resource of support material, and meaningful and contextual learning experiences". They proposed a constructivist approach, based on similar principles to those that guided the design of *Exploring the Nardoo* and *StageStruck*. The package would encourage learners to explore the information sources while engaged in problem-solving tasks.

Rather than try to cover the gallery's extensive collection the team selected Aboriginal art as the focus of the package and explained how this related to the syllabus requirements. The overall approach would be a game, or simulation. Learners would be able to move freely through the gallery landscape, which would be presented in user-friendly three-dimensional panoramas.

The 'virtual' gallery would be divided into three floors, to reflect the layout of the actual building. Artworks would be interactive, allowing learners to obtain further information by clicking on them. Staff of the gallery would also appear, and guides located on each of the levels would offer help and advice. Text, graphics, audio and video would be used to present a rich collection of resources, which would assist learners to construct their own understanding.

Learners would navigate through the package by clicking parts of the landscape. An interactive map would provide alternative navigation options so that learners could move quickly from one part of the package to another. The landscape panoramas would be presented through a combination of real and artistic imagery, using QuickTime VR technology employed to allow interactivity. Digital photos of the artworks, audio for the guides and other narration, and video interviews with staff of the gallery would be produced. Suitable background music and sound effects would also be sourced.

The team outlined a series of major goals for the package, based on consideration of both the client and the learners' needs. These were then followed by a list of objectives, which range from the general (to engage students in problem-solving tasks) to the more specific (to assist learners develop their perceptions of the gallery's staff roles).

The Visual Arts Process Diary (VAPD) would be a key feature of the package. The concept was based on the portfolio of artworks and reflective journal that students are required to develop as part of their studies. This feature, available throughout the package, would allow learners to collect information from the package and store it in an electronic notebook. The VAPD would also present a variety of open-ended tasks from which learners could choose. An overall challenge would be the "Art Detective" – a treasure hunt for clues located throughout the gallery.

To assist with implementation, an opening sequence inviting users to explore the package would be designed to attract attention. Short videos featuring gallery staff would also be included to provide assistance if necessary. A teacher's guide should also be produced to help them make the most of this resource.

The team also suggested a second implementation phase that would see the CD distributed to local schools, although they had not discussed this in detail with the client. This would enable teachers to plan for excursions to the gallery and give learners increased opportunity to use the package. To cater for this eventuality the package would be produced as a cross-platform CD-ROM.

In describing the team's ideas for the product, the design statement addressed the following main issues: the overall instructional approach, the focus and scope of the package content, links with the syllabus, the structure and presentation of content (including the use of media), navigation options, the learning objectives and tasks, and features and tools to assist the learner. The team also included discussion of the resources available and media production requirements. Consideration had also been given to the implementation environment and the team offered suggestions for alternative uses of the product.

From a management perspective, the issues addressed in the team's design statement were those of copyright, and client and team responsibilities. Copyright was an issue requiring further consideration in terms of reproduction of artworks should the product be distributed beyond the gallery. The client's responsibility for allowing the team access to its collection and staff was noted, and in turn the team clearly stated which aspects of the program it would develop as part of this project.

Plans for formative evaluation of the product give some indication of the process the team envisaged. Although specific stages were not mentioned, an initial review by the client, art teachers and instructional designers was outlined. This would be followed by evaluation with individuals and small groups from the target audience. Information from each of these strategies would be fed back into the development process. The group suggested that summative evaluation should be carried out to investigate both patterns of use within the gallery and the effectiveness of the CD compared with traditional methods for achieving the learning objectives.

Overall, the team's design statement presented a clear understanding of the client's goals for the product, familiarity with the relevant syllabus documents and the classroom environment, and a coherent concept for an educational product to meet the requirements. It appears that the team members devoted most of their attention to determining the scope of the content, the resources available to them and the main features of the package.

## 5.6 Prototype package

The prototype products developed by each team are the practical application of the ideas presented in the teams’ design statements. The following sections describe how each of the teams implemented their planned approaches, the main features developed in the prototypes, and the outcomes in comparison to the original concepts for the packages.

### 5.6.1 Group A

The package developed by this team, *Shelve-It*, aims to educate vendors about the management and marketing of the client’s products. The overall approach is a tutorial-style presentation that guides learners through a linear structure giving them limited choice to determine their own paths. The main features of the package are summarised in Table 5.5.

| Table 5.5 Key features of Group A’s final product |  |
|---|--|
| Feature   | Description  |
| Structure and presentation                        | <p>The opening section consists of a title screen, followed by a promotional video that leads to a help/instructions screen. From here learners can click on the forward arrow that will take them through an introduction or go directly to the Shop (Home).</p> <p>The introductory section consists of a slide show that moves through a series of screens featuring graphics and text. No learner interaction is required. The final screen includes a brief narration that describes the purpose of the package. A forward arrow is now available and by clicking on it the learner can move to the Home screen.</p> <p>The Home screen functions as the main menu and includes a row of three photos depicting parts of a typical mixed business store. The title of the screen reads “Home Page – Course Components”. Clicking on these graphics will take learners to sections covering the topics (from left to right): Fridge Management, Point of Sale, and Promotion and Selling. These are also labelled with text underneath. The layout of the graphics gives learners a sense of the structure of the package and implies a hierarchical order of topics.</p> <p>Within each topic learners move through a sequence of information screens containing graphics, text and narration. On some screens all of the information appears immediately and on others it is built-up through simple animation. Some screens follow automatically from the previous one whereas on others learners need to click on the forward arrow to progress.</p> |
| Navigation options                                | <p>Learners are given limited navigation options within the package. They have the choice of viewing the topics in sequence with the program automatically taking them from the end of one topic to the beginning of the next, or they can click on the buttons at the bottom of the screen.</p> <p>These buttons are available throughout most of the package and give learners the option to: go back to the previous screen in the sequence; go to the Home screen; go to the help screen; quit the package; or go to the next screen in the sequence.</p>  |

| Table 5.5 Key features of Group A's final product |  |
|---|--|
| Feature   | Description  |
|   | Difficulties arise however, when the button bar is not consistently placed in the same location and when some buttons are missing or don't work. For example, on some screens only the forward arrow is available, and so learners cannot review the previous screens. There is no apparent reason for or pattern to these changes to the navigation options.  |
| Visual design                                     | <p>The design of the screens in the package is very simple with media elements set against a white background. Text and graphics appear as disparate elements with no graphic theme evident.</p> <p>Each of the sections adopts a slightly different approach to layout of visual elements and includes different styles of screen depending of the dominance of text or graphic components. Transitions between screens are also highly variable.</p>   |
| Media use   | <p>Text is used for screen titles, and to present some of the main concepts either as dot points or in short paragraphs. On some screens, dot points are sequentially revealed as commonly seen in a PowerPoint presentation.</p> <p>Photographic images are heavily used throughout, sometimes at nearly full-screen size. These depict real-life interior and exterior views to a mixed business shop. The company's logo also appears on many screens. Other graphics such as cows and cowhide patterns are used in the opening and closing screens of the package for decorative purposes. Graphic icons are used for the navigation and follow familiar conventions – forward and backward arrows for linear movement, a house for the Home screen, a question mark for the help screen and a capital Q for quit.</p> <p>Narration is used for prompts and instructions at places in the package where learners can make a choice. It also provided additional detail to complement visual information, for example, when text dot points are used. However, this does not explain the point, but instead comments upon the topic. The quality of the audio is poor and, even when at maximum volume, is difficult to hear. Sound effects are used on the help screen where a short clip of cattle mooing is played when rolling over the button bar with the cursor, and a brief music clip plays at the beginning of the activity.</p> <p>Animation effects are used to present elements one-by-one on the screen or to move text or graphics from one location to another. These effects would appear to be aimed at catching the attention of the learner.</p> <p>A short video clip (approximately 15 seconds) excerpted from a commercially produced promotional video made by the client is included in the opening sequence of the package and on the credit screen at the end.</p> |
| Tasks and activities                              | <p>Only one learning activity is included in the submitted package. This is a drag-and-drop quiz that prompts learners to place items correctly in a commercial refrigerator. Four items appear in succession with text instructions. When the item is placed correctly it is locked into place and the narrator says "well done". If the item is not placed correctly it remains draggable and the narrator asks the learner to "Keep trying". Other items in the fridge give visual clues as to the correct location for the product.</p> <p>The package does not present the learners with an overall challenge or assessment activity.</p>   |
| Support features and tools                        | A single help screen is included which the learners can access from other parts of the package where the associated button is made available. This screen presents each of the button icons with an accompanying text explanation.   |

| Table 5.5 Key features of Group A's final product |  |
|---|--|
| Feature   | Description  |
| Technical aspects                                 | The CD-ROM submitted by the group contains a PC-only executable file. There are problems with this file however, and it is necessary to run the files from within the authoring tool to view the view the whole package. |

The package is in keeping with the original concept of a linear, prescriptive tutorial and is based on the resources that were made available by the client. In some ways, however, it differs from the plans presented in the team’s design statement.

Although there is some evidence of the planned metaphor in referring to the Home screen as the Shop, this is not conveyed through the visual design or the structure of the package. Three photographic images on this screen depict scenes from real stores, and therefore will be familiar and credible to the target audience, but they do not present learners with a shop front scene. Clicking on an image takes the learner to one of the three main topics in the package. In this way the collection of images is used as structural and navigation device, however this falls short of the plans of an interactive scene detailed in the team’s design statement. Although the topics are presented sequentially if the learner uses the forward and back buttons, there is no instructional hierarchy or sequence. Furthermore, the use of media in the package suggests a piecemeal approach to instructional design. The different media types used do not complement each other. For example, some of the narration seems to be an afterthought, being not clearly related to the text on the screen, though elsewhere it serves as a prompt for learner action or thought.

It appears that visual media have been sourced almost exclusively from the client, although the team have recorded audio files and created button and background graphics. Production of resources was not discussed in the design statement, suggesting that the team had perhaps not addressed this issue.

The package has a simple structure, but it seems that the designers have given little consideration to learner’s path through it. For instance, there are no labels or instructions on the help screen to indicate that an introduction is available. It appears that the designers have assumed that when using the package for the first time, learners will choose the forward arrow rather than the other navigation options and so will find this section. Clearly,

this may not be the case, and the learners may never discover that there is an introduction. However, this structure does mean that the section can be avoided on subsequent uses of the CD. Even though there are only limited navigation options open to the learner, the inconsistent placement and appearance of buttons could be confusing for learners. Furthermore, in the executable version of the program, many buttons do not work, which suggests that the product has not been properly tested.

Key features of the planned package that were not implemented include the simulation/navigation tool and the problem-solving scenarios.

Overall, this is a low quality outcome for this group and does not seem like the effort of four people, considering the poorly produced audio and lack of graphic and instructional design. The credits screen lists Steve as the programmer, Lynn as the project manager and Margaret and Kath generically as designers. However, there are no details about the way the group had divided up the roles and responsibilities. A note from the programmer that accompanied the submitted package indicates that the other team members had not reviewed this final version prior to submission. This suggests a lack of team communication and cooperation, which may have compromised the end result.

### 5.6.2 Group B

The package developed by this team, *Working Safely with BTX*, aims to train contract drivers in the safe handling and correct emergencies procedures when dealing with a hazardous chemical. The product uses a tutorial-style approach, which guides learners through a series of modules giving them limited opportunity to choose their own paths. The tone of the package is serious and informative. The main features of the package are summarised in Table 5.6

| Table 5.6 Key features of Group B's final product |   |
|---|---|
| Feature   | Description   |
| Structure and presentation                        | After learners have logged in using a login name and password, the package opens with an animation featuring a series of still images, text titles and background music. This leads into an introduction featuring a video clip of a truck driver, which sets the scene as the narrator introduces the package, explains the structure and gives initial instructions. The narrator describes progress through the package in terms of a journey with four milestones along |

**Table 5.6 Key features of Group B's final product**

| Feature            | Description  |
|--------------------|--|
|                    | <p>the way. An interactive road map representing the journey appears at the bottom of the screen and serves as the main navigational device. Only Module Two is available in this prototype version.</p> <p>The opening screen of Module Two presents a graphical menu consisting of a collage of images representing each of five topics available. Each of the options also has a text label. The narrator introduces the module, explains each of the sections and invites the learner to select a topic.</p> <p>Each of the topics within the module is presented through video clips accompanied by full narration with minor use of still photos, diagrams and text. This section plays through automatically with no learner interaction required.</p> <p>At the end of the presentation two buttons appear allowing learners to choose between viewing a summary of the information just presented or go straight to the exercises.</p> <p>The optional summary is presented as text dot points with narration giving a fuller explanation.</p> <p>Each of the exercises feature full audio instructions and automatic feedback. When the learner has completed the exercises correctly they are taken back to the topic menu for the module. The graphic representing the successfully completed module is ghosted, although learners can still access the section if they wish. If the learner's answers are not correct they can then choose to review the summary or the full presentation before attempting the questions again. They may also decide to go to another module or quit the package and return to that section later.</p> |
| Navigation options | <p>Learners are guided through most of the package with only limited navigation options open to them through the interactive road map available on every screen. While information is being presented the map disappears but is accessible by clicking on the truck icon in the left-hand corner of the screen. This reduces clutter on the screen, but allows learners to activate the map at any time and choose to go back to the start of the package, another module, or to exit the package.</p> <p>Topics within the module are chosen from a graphical menu on the opening screen and learners can complete these in any order they wish.</p> <p>The help button appears on the opening screen of each module and at the end of the introduction. Buttons appear at the end of a topic presentation to allow learners to choose between an optional summary and the exercises for that topic. If the exercises are not completed correctly learners may also choose to review the summary, try the exercises again or leave to topic using the map.</p>  |
| Visual design      | <p>The visual design for the package is simple and consistent. All of the media elements are set on a background featuring a faded image of artwork previously commissioned by the company. The client's logo is incorporated into the background and is placed at the top left corner.</p> <p>Video, still graphics, and text are presented in a large central frame that floats above the background – this illusion is created by a drop-shadow effect. Only one element appears on screen at a time, eg. a video clip, a still photo, a diagram labelled with text, a list of text dot points.</p> <p>The truck icon representing the map appears in the lower left-hand corner, and other buttons made available as required, appear at the bottom of the screen.</p>   |



| Table 5.6 Key features of Group B's final product |   |
|---|---|
| Feature   | Description   |
| Media use   | <p>Text is used only minimally in the product. A list of main points is used to present a summary of the information in each topic. The list is built up point by point in sync with a narrated elaboration. Some of the exercises at the end are presented in text format, again with narration. Text also provides most of the information on the help screen and the instructions on the login screen. Elsewhere text is used for titles, in diagrams, and as button labels.</p> <p>Graphics are used throughout the package. Digitised photographs and diagrams provide visual support for the narration. Images are also used in one exercise in which learners select the required protective clothing. The truck icon and the labelled map are the only graphics used as navigation devices in the package. (All other buttons are text-based.) Photos and artworks also have aesthetic value as the basis for the title animation and background.</p> <p>Audio is very important in this package. The narrator is present in all sections presenting topic information and providing instructions. The narration is usually more detailed than text information presented on-screen and is synchronised with video and still images to give further explanation. The narrator also reads the on-screen text that appears in the exercise section. (These are the only places in which the audio is fully redundant.) Short music clips are used in the opening sequence and to accompany a short video at the beginning of each topic. Background music is also played in the help section.</p> <p>Simple animation effects are used in the title sequence for aesthetic effect. Animation is not used for instructional purposes within the package.</p> <p>Video clips are used heavily throughout the package. A short sequence of full-screen video plays at the beginning of each topic. In the case of Module Two this shows the practical outcome of a BTX hazard, eg. an injury, a fire. Other clips appear in the central frame and are accompanied by full narration.</p> |
| Tasks and activities                              | <p>Exercises are included at the end of each topic and learners must correctly answer these to complete the topic. When all topics have been completed the learner has passed the module.</p> <p>The narrator explains each task, and each topic features a different type of activity. These require learners to: choose the correct answer in a multiple choice format; choose the safest driver after watching three short video interviews; drag-and-drop the required protective clothing onto the image of a driver; identify the correct emergency procedures from a list of possible actions; and drag statements into true or false boxes.</p> <p>Each question offers instant feedback and the narrator provides further explanation of both correct and incorrect responses. Learners may attempt the task multiple times.</p>   |
| Support features and tools                        | <p>The road menu provides both navigational and structural support in keeping with the overall concept of the package as a journey.</p> <p>The help section provides learners with information about how to use the road menu to navigate the package, the choices they can make within each module, and the compulsory exercises. This is presented using a combination of text and graphics.</p>  |
| Technical aspects                                 | <p>The heavy use of video in the package is very memory intensive and so requires a high-end machine to run the software seamlessly.</p> <p>There is a problem with one of the exercises, but this was the only bug detected.</p>   |

The package meets the team's stated goal to produce a guided tutorial based on the client's existing training resources. The narrator's introduction and the road map navigation tool support the journey metaphor, which sets the training within a realistic context without being immersive.

Most of the information is presented using video with narration, reflecting the team's intention to make extensive use of resources available from the client, though producing a new audio track. The narration is a key component of the package because it provides most of the detailed information and guides the learner through the material with clear instructions at every stage. As such, the narrator's role is more a guide and information source than co-driver, as had been proposed in the team's design statement.

Overall, the final product is closely aligned to what the team envisaged in the design statement. The group produced a high quality package in keeping with the stated aims and the needs of the client. The narrator-guided approach is well executed, with a high level of integration between the media elements. Teamwork is evident both from the high standard of production and the listing of all team members, some in multiple capacities, on the credits screen.

### **5.6.3 Group C**

*Art Dimensions*, the package developed by Group C, is targeted primarily at secondary school Visual Arts students and their teachers, and is intended as a resource to support the syllabus. The product encourages learners to explore a three-dimensional representation of the regional gallery and learn about its collection. A secondary aim of the package is to increase awareness of the gallery amongst a more general audience. The main features of the package are summarised in Table 5.7.

| Table 5.7 Key features of Group C's final product |  |
|---|--|
| Feature   | Description  |
| Structure and presentation                        | <p>Learners enter the package from outside the gallery by clicking on the main doors. This takes them inside the gallery, which is presented in a three-dimensional view. Learners can pan left or right using arrows in the bottom corners of the screen, allowing them to see the full 180-degree panorama from four aspects.</p> <p>Learners begin in the foyer which features two characters – the gallery manager and the front-desk information assistant - and by clicking on still images the learner can view videos of the staff members talking about their roles in the gallery. Learners can also click on the guide who welcomes them, offers some advice about what they can do in the package and introduces the Visual Arts Process Diary tool. Text points appear in a pop-up window next to the guide. Learners can also view a map of the gallery (which is also a structural and navigation device) or move up the stairs to the Fine Gallery (the only area developed for this prototype). Ambient noise of people talking plays continuously and clicking on or rolling over other objects in the gallery activates other sound effects.</p> <p>When learners click on the stairs a three-dimensional animation transports them to the upper level and to the Fine Gallery. In this area, as in the foyer, the space is represented by three-dimensional images with buttons allowing learners to pan around the scene. The room is hung with Aboriginal artworks and when the cursor is moved over them an information box appears providing basic details about the piece. Further information can be accessed by clicking on the painting. This brings up an information screen and learners can page through the information then go back to the room. Relevant video and audio resources can be accessed through the VAPD.</p> <p>A guide is available to offer information about this gallery space and learners can also access the map. A music clip loops in the background.</p> |
| Navigation options                                | <p>Learners can move freely around the gallery space by clicking on objects such as stairs and doorways. They can pan around a scene using buttons at the bottom of the screen.</p> <p>Another option is to use the interactive map available in every room, and this allows learners to jump directly to any other part of the gallery or exit the package (although most are inactive in this prototype).</p> <p>Information screens linked to the artworks branch off from the main gallery space. Learners can page through multiple text screens using buttons in the bottom corners, but the only option provided returns them back to the gallery. This keeps the overall structure of the package very simple.</p> <p>The VAPD is accessible from all gallery areas and appears as a movable floating window. Learners can access some media directly from this device.</p>  |
| Visual design                                     | <p>The gallery is represented by high quality graphics that give a three-dimensional feel, which is consistent throughout the space. The style is illustrated rather than photographic, lending the package an adventure-game feel. Consistent with the genre, clickable objects and areas are indicated by a change in cursor.</p> <p>Pop-up windows consisting of a simple bordering around text points appear near the relevant artwork when rolled over by the cursor. More detailed information screens linked from the artworks are simply laid out, featuring a title and several text blocks per 'page'. Video clips appear in a pop-up window in the centre of the screen.</p>  |

| Table 5.7 Key features of Group C's final product |   |
|---|---|
| Feature   | Description   |
|   | The VAPD appears in a movable pop-up window and is visually styled to look like a small ring bound book. Tabs on the right-hand side allow learners to move to the sections within it.  |
| Media use   | <p>The main use of text is on information screens describing each painting and for summaries that appear as pop-up windows. Text is also used inside the VAPD for titles, instructions and labels. Text labels also appear on the map.</p> <p>Graphics are used to create the 'virtual' gallery space in the objects within it, including the characters and artworks. Most of these are illustrated with the exception of some digital photographs of original artworks. The graphical representation of the VAPD as a book is another key visual feature. In both cases visual treatment is used to convey the metaphors employed. Simple graphics are also used for icons and buttons on the information screens and VAPD, and frames around pop-up windows.</p> <p>The only animated sequence included is one that transports the learner from the foyer, up the staircase and into the Fine Gallery. Though using a slightly different graphic feel to the rest of the package it is still in keeping with the illustrated style. While not strictly instructional the animation does support the metaphor and helps make the structure of the space more apparent.</p> <p>The main use of audio is to give life to the guides in the foyer and the Fine Gallery, who give introductions and offer hints to learners. Ambient sound and music also play in the background as further elements in the representation of the landscape. Sound effects are also played when as the learners rolls over and clicks on objects.</p> <p>Video clips, featuring two staff members, can be accessed by clicking on their images in the foyer. These are pieces to camera, each of which run for 1-2 minutes.</p> |
| Tasks and activities                              | <p>Two main types of activity have been implemented in this prototype and are accessible through the VAPD. The guides give learners hints about where to find the activities.</p> <p>A quiz that tests learners on information presented in the Fine Gallery consists of a series of multiple-choice questions. When a question is answered correctly a section of a painting appears and learners are taken to the next question. If the response is incorrect the learner is asked to try again. As learners correctly complete each question another section appears until all questions have been answered and the full picture appears. Learners are also rewarded with a letter for the Art Detective activity.</p> <p>The Art Detective engages learners in a treasure hunt to collect all of the letters they need to spell the name of an artist. Clicking on a magnifying glass located in the gallery opens a multiple-choice question in a pop-up window. When answered correctly the learner earns a letter, which then appears in the relevant VAPD section. When all letters have been collected (one from each gallery space) learners have to put them in the correct order to spell the name of a prominent artist.</p>   |
| Support features and tools                        | The electronic VAPD is the main support feature for learners and is the focus of much of their interactions with the package content. It includes four main sections: Notes, Quizzes, Media and Art Detective. The Notes section allows learners to copy, save and print text information collected in the package. This is saved to a file for later reference. In this version however learners cannot type in their own notes or include other media. Text-based help is also available in this section. The Media section includes direct links to video and text resources - when consulted from an information screen this is specific to   |

| Table 5.7 Key features of Group C's final product |  |
|---|--|
| Feature   | Description  |
|   | <p>the artwork, when activated from the gallery space a list of all media is provided. The Quiz and Art Detective sections are described in the above section.</p> <p>The interactive map is a key navigational support offering learners an alternative way to move through the package and take short cuts. It also allows them to comprehend the structure of the package by giving them an overview of its contents.</p> <p>The guides also support learners by helping them understand the purpose of the package and the options for exploring it.</p> |
| Technical aspects                                 | There are some minor bugs in the way the VAPD functions, for example on some screens it is not movable.  |

The product meets the group’s aim to produce a navigable ‘virtual’ gallery space that makes a rich information source available to learners. The graphic representation conveys a realistic context through which learners are able to navigate freely, examining the artworks on display. The illustrated three-dimensional style draws on the adventure game genre and is similar to *StageStruck*. Although the structure is simple, successful navigation of the environment relies on the user’s willingness to explore and experiment. This is appropriate for the target audience of secondary school students, many of whom will be familiar with the conventions of the genre.

Visual and textual information are well integrated, particularly by the linking of artworks and information panels about them. Two different means are used to access relevant video and audio material, with differing success. The video and audio linked to the characters (staff members and guides) can be accessed directly by clicking on a still image. However, audio and video clips that relate to the artworks are accessed by opening the media section in the VAPD. This more circuitous route makes the relevance of the information less obvious and also means that learners could overlook these resources.

The only activities included in this prototype version require learners to identify the correct answer in a multiple-choice question. This focus on reproduction of information from the package does not adhere to the stated constructivist approach to the design of the activities. However, these activities are in line with what the team committed to in describing the scope of the prototype in the design statement. Problem-solving tasks, and other more

open-ended activities consistent with a constructivist approach, were discussed as part of the original project concept, although were not included in this version. It would seem that these types of activities would be more in keeping with the aims of the syllabus and would make use of the tools available in the VAPD.

Despite falling short of some of the team's goals, this product is successful in conveying the proposed metaphors through visual representation and demonstrating how multimedia can be used to give learners access to a rich information resource. Team made use of their collective expertise and developed their skills to produce a high-quality product.

### ***5.7 Project development process***

Three data sources provided information about the process of development for each of the groups – postings to the class discussion list, observations made by the researcher at class meetings and interviews with representatives from each of the teams. The purpose of examining these sources was not to develop a detailed account, but to provide insights into the project development process and some of the issues the teams addressed.

A class discussion forum was established in the WebCT environment at the beginning of the subject. Although students were encouraged to post any message of general interest to the whole class, its main purpose was to allow students to publish progress reports or 'diary checkpoints'. Students were asked to post a message in Weeks 4, 6, 8 and 11, about any project-related issues that were relevant to them. This was a non-assessable component of the subject.

Although these postings provide some details of the chronology of the development process and some of the issues the teams faced, there are some limitations to the information that can be gleaned from the data:

- not all team members contributed at checkpoints even though they were explicitly asked to, and reminded by the instructor
- most of the messages were posted by the project managers

- there are some contributions from other team members, but some students did not participate, thus making it difficult to gauge their perspectives
- all of the teams had other, private means of communication (face-to-face and/or electronic), so this does not provide a full picture of team communication
- this was an open forum that could be read by all class members and so there may have been issues that team members did not wish to discuss publicly.

Comments made by team members at the class meeting were also noted by the researcher and provided further information about the team process. Four class meetings were held, the second and the last being most relevant:

- Week 1 – Subject orientation and group formation (described in Section 3.3.2.1).
- Week 5 – Case discussion activities (summary below; fully described in Section 4.7).
- Week 10 – Skills development workshop (no team discussion).
- Week 13 – Final team reports and presentations (see Sections 5.7.1-5.7.3).

Data collected from these sessions is limited in that team members may have been unwilling to discuss sensitive issues with the whole class and not all team members participated.

A further source of information about the development of the team projects was the semi-structured interviews with some of the team members. At least two representatives from each team were interviewed in the final stages of project development (after Week 13). Although some guiding questions were used, interviewees were allowed to pursue topics they considered important and seemed happy to talk candidly about their experiences. Again, the main limitation of this source is that only a subset of students were interviewed, and therefore the data set does not reflect the full range of perspectives within the class.

### 5.7.1 Group A

Table 5.8 summarises the team’s postings to the discussion list, with the contributor and message number shown in square brackets. It shows that the team made limited use of the discussion list, with Lynn, the project manager, making most of the contributions.

Communication problems were mentioned throughout, although their causes was never fully explained. The final posting from Kath hinted at difficulties the team members encountered in implementing their design ideas, and from her perspective, in having her contributions included in the product. Again the reasons for this are not clear.

| Table 5.8 Summary of discussion postings from Group A |  |
|---|--|
| Week  | Events and comments  |
| 3-4   | Early messages indicate some communication problems for the group members as they try to organise their first meeting. [Steve:9, Margaret:10 and Lynn:11]  |
| 4   | Three members of the group met, but neither Steve nor the client were able to attend. The initial focus is on the choice of authoring tool (iShell or OMO). There is concern about the team's lack of technical skills. [Lynn:12]  |
| 5   | The report on the second meeting is more positive and, although client representative was still not available, he has provided the existing training materials. The team has made some initial decisions about the metaphor. [Margaret:34]   |
| 5   | Kath posts a summary the team's small group discussion of the cases. This reveals some of the team's early ideas, such as a desire to establish the metaphor and navigation, and to decide on the pedagogical approach. Kath provides a long list of ideas in point form, offered as the basis for what they plan to do. [Kath:42]   |
| 6   | Lynn tries to organise another face-to-face meeting at which Steve will present the navigation shell, and Kath will present a mock-up of the opening screen. Arrangements are made for working on the design statement and giving feedback. Comments indicate the team is communicating and exchanging documents by email. [Lynn:43]   |
| 6   | Margaret makes arrangements for work on the design statement document. She tries to distribute a video attachment, but this is unsuccessful. [Margaret:44]   |
| 6   | Lynn reports that the team has develop a good understanding of the package concept. Team members are working on components. They are now holding weekly team meetings because they have decided that they are more productive when working face to face, although they are yet to meet with the client as a team. Comments indicate that the team is having trouble communicating electronically (comments suggest that technical problems are the cause). The design statement is nearly complete. The team will now develop storyboards. Video production skills are needed. [Lynn:48] |
| 8   | The design statement is complete and so the first milestone has been reached. The team have already realised that they will not have time to develop everything they want to. At the current stage of the project the main workload is for the programmer. Steve has developed an early prototype that the client has reviewed and was impressed with. Lynn notes that communication among the team is difficult with some members not making the time to log in and respond to emails. [Lynn:64]  |



| Table 5.8 Summary of discussion postings from Group A |  |
|---|--|
| Week  | Events and comments  |
| 10  | Kath's message reveals that technical problems have prevented her from contributing more regularly. She gives an update and her overview of the project. Development has run smoothly to date. There is a good complement of skills in the group – this mix of expertise means they have all roles covered. The skills developed will also be relevant to them in future. The team has been working closely with the client's ideas and materials. At this stage they are on track with the design issues, although many innovations have been abandoned due to lack of time. Kath notes the importance of realising limitations within the team. She describes in detail what she has done to develop her own skills, first with the graphics and then the audio. Although her work has not been used in the product she believes that there is value in the process. [Kath:90] |

The final class meeting for the subject was held in Week 13 of session. At this meeting each group made an initial statement about the current status of the project, followed by a presentation of their prototype.

Three members of Group A were present at the meeting, with Lynn unable to attend. At this stage, Steve said he was in the process of fixing some minor problems with the navigation and completing the packaging. He felt there had been no major obstacles to the production of the prototype. Team members also commented that having all of the content at the beginning of the project had been very helpful. They felt that this “freed them up” because there was no writing to do, and no “pedagogical stuff” to worry about. Their client had wanted a particular theme and structure, which had guided the development of their package.

When presenting the product the group explained that the previous training program had been delivered in face-to-face sessions, with the content presented on an overhead projector. The client had wanted a flexible delivery version that the trainees could complete in their own time. The content and structure of the package closely matched that of the previous face-to-face program. The navigation was deliberately simple and linear because the trainees had only basic computer skills. This meant that buttons had to be obvious and the presentation of information consistent. This was particularly important in the quiz because it stepped through a series of questions about how items should be placed in a fridge. Only limited use had been made of video and sound in the product, mainly because of time constraints. In general they would liked to have developed the prototype further, but had put a lot of time into the project already. This meant that they had to limit the scope of the prototype, rather than complete the package as they had hoped. They also mentioned

that they had only produced a PC version for the prototype, although authoring in Director meant that they could produce a Mac version if needed.

When asked to think back and relate the product to their design ideas, team members felt that the final result did not wholly reflect the original design. They would have liked to have made the product more interactive, but felt limited by the client's stipulation for a linear design. Many of the ideas they had initially didn't fit with the content provided by the client. So, although having the existing materials to work from was advantageous in one sense, it had stifled the group's creativity. For example, they had wanted to change the style of the product to something more democratic, but felt that this wasn't in keeping with the client's wishes.

Two members of Group A, Kath and Lynn, were interviewed in the final weeks of session (after the last class meeting). Their comments give further insights into their group process and the development of the prototype.

Kath's impression of the initial stages of the project design was that it was driven largely by the content that was provided by the client. Furthermore, she felt that not much instructional design had been required because the existing materials had determined the content and scope of the package. Kath commented that having all of the content available was a drawback because the team was limited in what could be done with the product.

Initially, the team had wanted to take a much less prescriptive approach and had a lot of new ideas for the product. These included the Mould-o-Meter simulation/navigation tool and lots of interactive quizzes. Some of the initial ideas were not included in the design statement stage, after being debated and then abandoned by the team.

At this stage the team was optimistic about completing the project:

...because we had all the content we thought that by then the end of the project, compared to the other groups and given all the other constraints of time and all that sort of stuff, that we would not have just a prototype, we would have an absolutely fabulous finished product because we didn't have to do that much really.

Despite the original plans however the product developed was very different to what the team had originally intended. Teamwork issues became a major problem:

[Steve] took over the entire project, every tiny bit of it. And not only that, he withheld access to it by refusing to respond to email and phone calls, didn't turn up to meetings, all that sort of stuff. So the whole process sort of collapsed and died.

Kath was responsible for the graphic design initially and had worked hard to develop a milk-bar scene that could function as the main menu for the product. The other team members felt that this didn't convey the appropriate message, and Kath then began work on a more realistic contemporary scene, which would be based on photographs. However, the planned photo-shoot did not take place and Steve took over the graphic design role.

As a result Kath's responsibility shifted to audio production, and she used her local contacts to organise male and female professional voice talent to record in a local sound studio. However Steve was supposed to provide the script and did not. He later recorded the narration on his home system, which Kath believed produced a much lower quality result.

The overall outcome for Kath and the other two team members was that few of their contributions were included in the final product, although Kath felt she had developed valuable skills. She also felt that the situation would be different working on a real-world project in which "you have to be a team player or you can be sacked":

The thing that didn't work like the real world was that when I approached the project manager [Lynn] and said "you have to deal with this", she declined on the basis that we weren't being paid. She said, "look if we were in an employment situation, then that would be different but I can't". And I was a bit let down by that.

From her own communication with Steve, Kath believed that he had decided it would be better if he did most of the work himself:

I think he had decided even before the subject started that teamwork didn't work for him. He said as much in a later email that teamwork is a waste of time. He just wants to do his thing of getting his skills and getting out of there. He's not interested in having human contact.

Overall Kath felt that the group lost sight of the original plan for the product and as team shifted away from the original intentions nothing was discussed about this. Looking back, Kath said she would have been prepared to sign a contract at the beginning of the project, and that might have required Steve to negotiate with and consult the other team members.

Lynn raised many of the same issues as Kath when she was interviewed about the subject although from the slightly different perspective of project manager.

Early ideas for the product came from working within the confines of the existing materials, but also trying to make the design less prescriptive. Unlike Kath, Lynn said she thought that having the existing resources was very useful and that the constraints reflected those in a real-life project.

In the initial stages of the project the team met to share and debate design ideas. Lynn felt that her ideas for the design came from her preferred learning style, features of *Exploring the Nardoo*, and a desire to make the package engaging for adult learners:

We had great ideas, great plans. If we'd have had more time we would have had like in the Nardoo where you could test the water quality. We had great plans to have a Mould-o-meter so you could test things in the fridge and see "oh that's green and off, that's disgusting". And all of those things were written into the design statement should someone pick it up at a later date and move with it.

The role of project manager proved a challenge for Lynn because she had to "deal with one person who wanted to own the whole thing and run with it and not share". Communication was an issue from the outset with Lynn not knowing whether Steve was part of the team or not. Eventually she heard from him, but he continued to be uncommunicative.

When Kath asked her to step in, Lynn said her response was:

You've got two options, you can just ignore it and know he's an idiot or you can battle it but I don't think you're going to win. I mean as project manager I've got no more clout than you because he won't answer my emails either. And then I set up a discussion list and asked people to contribute so it wasn't relying on email. And still he didn't respond. So what could I do? There were huge issues with it.

The project continued, although the work of the other team members was not incorporated into the product, with much of it taken over by Steve. Towards the end of the project the team received an email from Steve saying that the project was near completion. This caused "a great deal of stress and anxiety" for the two other team members who had their work discarded and their roles overridden. For Lynn it meant she was unable to update the client for long periods of time during the product's development and had to excuse Steve's lack of attendance at planned meetings.

For herself, Lynn felt that her involvement in the group project had done little to improve either her hands-on skills or conceptual knowledge. She partly attributed this to the breakdown in the project team, but also to the limitations of the role of project manager:

because if you were the project manager, you didn't have much hope of developing other skills and I am in this program to develop my IT skills. I took the project manager role because it was left and someone had to do it.

When asked if there was some intervention that Lynn thought might have improved the situation for her group, she replied that she would have preferred a more structured subject with a greater number of class meetings. Asking the instructor for assistance had not occurred to her.

#### **5.7.1.1 Summary of Group A experience**

The key features of Group A's project experience can be summarised as follows:

- the content and structure for the package was pre-defined
- the team had plans to take a different approach to the existing training but felt restricted by the client's requirements
- communication problems were evident from the team formation stage
- the team had difficulties in organising meetings and getting everyone to participate
- the team members negotiated roles early in the project and then assigned tasks which were to be completed independently
- one team member dominated and took over the development of the project
- the contributions of the other team members were not included
- this situation affected communication with the client
- the poor team dynamic was not addressed by the project manager, despite requests from at least one team member
- the joint outcome in terms of the product was poor and product was not as complete as they had hoped
- there was some potential to develop other skills in the process, although this was not realised by all team members.

### 5.7.2 Group B

Of all the groups, Group B made most use of the discussion list. All team members, except for Anna, made regular postings to the list. Early postings indicate that the team was experimenting with some of the communication tools available to them. Later in the session, they used a listserv for project communication and made less frequent contributions to the class discussion. A summary of the group's contributions appears in Table 5.9, with most postings reporting on the team's progress with some individual reflections.

| Table 5.9 Summary of discussion postings from Group B |   |
|---|---|
| Week  | Events and comments   |
| 1   | Ian posts a welcome message after missing the first class. [Ian:6]  |
| 2   | The group try to use the WebCT chat facility without success. [Barbara:7]   |
| 2   | Barbara organises an alternative chat room. [Barbara:8]   |
| 4   | Sheryl reports on the team's first meeting with the client representative. Roles have been negotiated easily. The team's starting point for the design had been to decide on a metaphor. They plan to storyboard at the next meeting. In the meantime Ian will collect content and map it out so the team can determine the scope of the project. [Sheryl:13]   |
| 4   | Ian reports that the team have been communicating by face-to-face meetings, chat sessions and lots of email. The first meeting was an opportunity to allocate roles, develop a clearer understanding about the focus of the package and work out an appropriate metaphor. The team plan to have an all day meeting next time to develop a storyboard and work on design ideas. The client relationship is good and supportive – like the <i>Nardoo</i> project. The team has now received all content material from the client representative. [Ian:14]   |
| 5   | The team is making good progress so far and there is a good team dynamic. Barbara values the expertise of the others and looks forward to applying ideas. Her assigned role is graphic design. She has had little previous experience but is happy to learn. She feels she needs to know more about interface design. She also indicates that she is thinking about the visual resources she will need. A major concern is team communication, as she has not heard from all team members on the listserv. She is also worried about difference between requirements for subject and client expectations, and how the group would manage these. [Barbara:32]                                      |
| 5   | Sheryl responds that she is also concerned about the requirements and what the form the prototype will take. She suggests that they clarify this with the instructor at next class meeting. [Sheryl:36]   |
| 5   | The team reports on the small group discussion of case issues. [Ian:40]   |
| 6   | Ian reports on progress after the next team meeting. He gives the impression that the team is working well together and all are interested in structuring the process. Work concentrated on design issues and planning. At this stage they have developed a clear idea about the prototype and what will be in it. Tasks for the coming month have also been determined. The next step is to complete the design statement. Sheryl will put together a first draft and input points from the others sequentially. The client wanted to become too involved, but Ian had managed this. The team have also lost one member and so have had to re-structure the roles and responsibilities. [Ian:50] |

| Table 5.9 Summary of discussion postings from Group B |  |
|---|--|
| Week  | Events and comments  |
| 7   | Although they don't appear to be meeting as often as other groups, Sheryl feels there is good communication between the team members by email. In working with the client, they have agreed on the scope of the prototype. Now she is working on the design statement, which requires a lot of detail, and has forced the team to make design decisions early in the project. She is finding it difficult to use the template provided because she is used to devising her own structure. She feels the team has a clear understanding of the basics of the project - how it will look, the objectives, etc. Tasks for team members have been allocated. [Sheryl: 56]  |
| 7   | Barbara is enthusiastic about the current development of the project. Her main concern is about her ability to deliver what is required, and the development of her own skills. She recognises that most of the current workload falls on Sheryl at the moment, but that this will change during project though. [Barbara: 57]   |
| 8   | Sheryl reports that the design statement is complete. She has now begun work on screen specifications. These will be the blueprint for the programmer and the resource-gatherers, and guide the graphic designer to create the look of the package. She responds to Barbara's point about her workload, noting that a lot of project work involves waiting for someone else to complete his or her tasks. This needs to be considered in planning. She is conscious that the others are waiting for her. She also notes that it is difficult to design specifications without trying them out in programming. There will be holes to fill and changes to make. [Sheryl: 65]  |
| 8   | Ian writes that the project is progressing well. The current stage is busy for the instructional designer (Sheryl) as she is completing the design statement and project specifications. This will be important for programming and resource collection. The instructor has organised space on a local server for the team to ftp files. This will allow them to work in different locations. Ian's describes his own roles – in project management and media production. He is developing production skills but is less confident about his management abilities, although team members seem happy to take initiative. Communication methods are working well although one group member doesn't communicate consistently. He notes that he will need to address this. [Ian: 66] |
| 9   | Barbara discusses the team's strategies for managing the workload, which she feels are working well. Her focus is on developing her graphic design skills. She feels that the listserv is a good communication tool. She also responds that Anna has not been communicating with the rest of the team because she is away and hasn't been able to check in on-line. [Barbara: 76]  |
| Break   | Anna writes that she is back from her trip and has started to get work on the programming by revising the basics of the authoring tool. She is pleased that the team has developed specifications that include a lot of detail for her to work from. In this respect she is better off than most programmers, and she thinks this reflects Sheryl's understanding of programming issues. [Anna: 83]  |

All members of the group were present at the final class meeting and they had also invited their client representative, Ray, to attend. Anna reported that she was trying to get through the programming and finding the time needed was her major challenge. With nearly all of the resources in place, the project was going into “tidy-up mode” with only minor changes to be made. In the most recent meeting the team had tried to identify all of the small errors that needed to be fixed. The frustration was in thinking that the project was finished and then finding more to be done. There were a few more jobs for Ian to do in getting some final graphics into place. Also, this meeting would be an opportunity for Ray to see the near-final version of the product.

In demonstrating their prototype the team members explained that the package had been developed from existing safety training for chemical handling. They had been able to re-use many existing resources, which were in video format, and had added still graphics, text and a voice-over they recorded themselves. The existing video training was continuous so the team decided to divide it up into separate topics, each with learning activities. These activities ensure that learners interact with the information and do not just “nod off”. Learners have some freedom to follow a non-linear path by being able to complete the topics in each module in whatever order they choose. However, the overall navigation was not complete in this version because only the second module had been developed. The team members agreed that they were very happy with the outcome, although they felt they could have managed their time better.

Sheryl commented that the team had developed clear specifications for the product, although they found that these had not guided the process as well as they had anticipated. As the team’s programmer, Anna felt she had to push the others for content and all had to be prepared to move between roles as the work dictated. They had realised that resource management had become a major problem when Anna couldn’t find the files or the versions she needed, and the team members agreed they had not organised this well. There was a problem with exchanging large media files across the network with each of the team members working in a different location. This had been partly resolved by allocation of space on a university server, but the transfer times were still lengthy. Anna also raised the issue of quality control, which was something they had not considered.

Ray commented that he planned to establish a management team for the project because he would like to see it become part of an accredited training program. Two of the contract transport companies were waiting to review the product, although he acknowledged there might be some resistance to the new approach.

Three members of Group B were interviewed for this study – Barbara, Anna and Sheryl – and their comments below give further insights into the development process and how the team members worked together.



Barbara described the early stages of the design process as the team members familiarised themselves with the existing training package and the client's requirements for re-development. Their aim was to develop a package that was self-paced, portable and engaging:

[Ray] said the problem was that people would actually just go to sleep during the training videos and this was important stuff. And when you have training in big companies like that, training very often is covering the company against liability more than anything else. So what we wanted to do was engage people more in the learning process rather than have people sitting there watching videos and potentially going to sleep.

With knowledge of the client and the trainees, the team then worked through the materials with the aim of identifying an appropriate metaphor – one that “would help people understand the package, and to structure it so it was fairly predictable and repetitive so once they had learned the sequence it would apply to the rest of the topics”. Establishing the structure of the material and navigation options was an important first step in the design process. The main influences at this stage were the resources the team had to base the package on, the target audience, and an awareness of the time limitations.

Barbara felt the team was very successful, having the right mix of personalities and a lot of expertise in industry training and project work to draw on. Roles were negotiated early and everyone in the team was assigned to a primary responsibility for a particular area. Barbara volunteered to take on the role of graphic designer, mostly “because no-one else wanted the job” but also because she could learn new skills. There was an agreement that final decisions would be made by the person in the primary role. All team members were also allocated a secondary support role.

This was a tight knit team from the beginning. They started with five team members – one of whom Barbara felt didn't fit into the group and who later withdrew from the subject:

What actually happened was the fifth person was a problem. We didn't know her from the previous course. I don't feel as if we were as welcoming as we might have been. She had to muscle in and she was keen to make a claim, but she really should have waited to see where she would fit. And I don't think it was her fault. It was just an unfortunate situation. Now if that had been a commercial team we would have had to include the person and I think we should have made more of an effort to do that. In this particular situation we didn't have to deal with that.

The team was run on a fairly democratic basis, with each person having a say in decision-making. The role of project manager was mostly an organisational one and was first taken on by Ian, who had initiated the project. Partway through the project however there was a change:

What we found was that Ian didn't really have the personality to be the project manager. He wasn't bossy enough and he ended up getting bossed by all of us. So Sheryl sort of de facto took over the project manager at some sort of mid-point. Quite amicably. Someone had to organise things and she was good at it.

Managing the relationship with the client was something else the team had to handle, when Ray wanted to take a greater role in the team. Doing most of their communication through a listserv, of which he was also a member, made the team members realise that "there are things that you really don't want your client to know" (Anna). Again, the situation was resolved amicably and the client was very happy with the end result. Barbara also mentioned resource management and version control as particularly important to the running of the project.

Anna's description of the early design process is quite similar to Barbara's. She also felt that the linear, prescribed approach they decided upon was influenced by the nature of the content. This was quite unlike the impressions she had of the other groups' projects, which seemed more open-ended. The team did however try to make the package as democratic as they could – all agreeing that learner choice was important. Anna felt that the graphic and interface design was weak because the team had not discussed it as much as basics, such as navigation and metaphor.

In describing how Ian came to be "rolled as project manager", Anna reveals some of her concerns about his initial lack of strong management. Her own role was as programmer and she was happy to be less prominent in the initial stages as the design statement was being developed because she knew there would be plenty for her to do later. However, she was concerned that the design process should provide the detail she would need to put the team's ideas into practice and pushed for the ideas to be turned into specifications. From her own experience working on projects and in developing her own multimedia prototypes she felt that this was essential for success:

I was really conscious that with the programming that I needed some things decided so I could go away and start working. And they were some basic things about the navigation and structure. That was some of the detailed stuff that I was determined to push. So that was partly self-interest. I just wanted to get on.

Having made a conscious decision to act as facilitator at team meetings, she also tried to persuade Sheryl, privately, to take over management of the project. She felt this was the best option given Sheryl's experience and workload:

I actually said to Sheryl early on that I thought that she should be the project manager because I was worried about this. And as time went on I got more and more worried and in the end I can't remember how it came up. It wasn't as deliberate as it now sounds, but I said Sheryl should be taking care of this stuff, organising and managing, because she wasn't terribly busy.

With the project management concerns addressed, Anna felt the team was better able to address production difficulties as they arose and keep the development on track.

Sheryl described the team's approach to the design of the product as pragmatic rather than innovative, having realised that the target audience and topic was best suited to a fairly traditional approach. Design rather than management was the focus of team discussion as they worked on getting the details in place for the design statement. Although they were able to meet face-to-face on occasion, most of this discussion occurred through email or over the phone. Input for all team members was important in this process, as Sheryl describes in relation to the metaphor:

Initially we had a meeting and had it all in our heads and probably all went away thinking this is what it looks like. And then when we got together we said this is what I think it looks like and we went around the group. That was good to help us get some kind of common feel for it and start to plan it.

Roles were negotiated at an initial meeting. Sheryl revealed that the team members felt the time frame was too tight for them all to learn new skills, and so previous experience in a role was a primary consideration in this process.

Initially Sheryl's role was of instructional designer, and her focus was on organising the design statement, although she was also mindful of management issues. Her later transition to project manager was smooth from her perspective, although she did not elaborate on this.

Management issues were addressed as problems arose. As project manager, resource management proved the greatest challenge for her:

I thought we were only doing this tiny little thing so there was no way we would have those issues. And then when we had videos and graphics all over the place, all called different things and the programmer couldn't find the things that she wanted to. And we're all sitting on modems trying to download and upload videos that take 15 minutes. It was a nightmare.

Although each person also took on a secondary, backup role the system was never really applied. Sheryl thought this was probably because they hadn't really discussed how and when it would work. They also planned to teach each other about what they had learned which "was part of the decision to do what we knew because at the end we would learn how to do new things". Sheryl said that this happened to some extent, though not as much as they had hoped.

#### **5.7.2.1 Summary of Group B experience**

The key aspects of Group B's project experience can be summarised as follows:

- the project was based upon pre-existing training materials
- the client had strong ideas about the package and was keen to be involved
- the professional experience of team members and the characteristics of the target learners were important influences on the design
- initial design ideas focused on what the team considered to be the basics – such as navigation and use of metaphor
- detailed specifications were developed early in the project
- team members selected roles and agreed on a system for decision-making
- a concern that the project be well-managed came from all team members
- there was an amicable change of project manager part-way through the project
- the project manager's role was more organisational than leadership
- resource management was a major issue
- all team members were involved and worked well together to accommodate their different priorities
- at one stage the client became too involved and this was addressed by the project manager
- the team members shared some of the skills they had learned.

### 5.7.3 Group C

As evident in the summary of postings in Table 5.10, progress reports were largely left to Liz as the project manager, although there are initial comments from three team members. Furthermore, there are no messages from Simon, which suggests he perhaps was not as involved as the other team members.

**Table 5.10 Summary of discussion postings from Group C**

| Week | Events and comments  |
|------|--|
| 4    | Liz reports on the team's work on the early design ideas and the use of concept mapping to develop the metaphor for the prototype. Project planning has involved allocating roles and jobs, and developing a realistic timeline. The team have been given a lot of flexibility by the client, whose only preference is for game or simulation rather than a traditional tutorial. [Liz:15]   |
| 4    | Rod writes that the first meeting focused on group formation and assigning roles for each team member. He is confident that they will get along well and sees the main issue as deciding on how the team will work together. [Rod:31]  |
| 4    | Joanne describes the decisions made at the team's first meeting - the scope of project, its focus, and the goals and objectives derived from the syllabus. The team also need to consider the wider community as a secondary target audience. One of the next steps will be to meet with client as a group. The team have decided on face-to-face meetings. [Joanne:46]  |
| 5    | The team's discussion of case issues is reported. [Rod:41]   |
| 7    | Liz describes the group dynamic as good and believes that communication strategies (email and face-to-face meetings) are working well. The team's initial focus has been on developing the overall concepts and interactive approach. They are now at the implementation stage. The team members have varying experience and skills that are complementary. They are also finding that some of their roles overlap, allowing them to work together. The current priority is to finish the design statement, which will happen in the next few days. After that they will need to work out what they can achieve in the time available. [Liz:54]  |
| 9    | The group has spent a lot of time conceptualising the topic and working out roles. The team has eventually finalised the design statement by working in a group of three (Joanne, Rod and Liz). Team members were also able to include some screen mock-ups. Writing the design statement has helped the team come to terms with the prototype and make firm decisions. Simon will use these ideas as the basis for the visual design. Their own expectation is for the prototype to demonstrate the planned functionality, including the VAPD. Happily, there is no pressure from the client. The current main management issues are: working out meeting times and encouraging team members to read and respond to their email. As project manager Liz needs to develop a schedule now that they have collected many of the resources. The team has discussed some of the technical issues and discussed the cases as models for the development process. [Liz:67] |
| 11   | After the session break, Liz reports that the team is back at work. They now have the final versions of screens from Simon, which they have been waiting for. Inconsistencies in these have required Rod (the programmer) adapt some of the team's ideas. The client has been very helpful in providing access to materials and artworks. Joanne and Liz have been busy working on resources and audio scripts. The team feel they would have liked more help with skills development – they have had to learn most of these by themselves or with help from peers. The team is still working on production with testing to be carried out soon. At this stage there are different jobs for the project manager with most of the focus on programming. Liz hopes she is not placing too much pressure on Joanne and Rod. [Liz:93]  |

All members of the group were present at the final class meeting. Reporting on the current progress of the project, the team revealed they were running behind time. There were several reasons for this. One was that the team had been given an open brief and had spent a good deal of time developing what they felt was a good design and structure. The team had also had to produce all of the media, not having a pre-existing package to work from. Rod had been waiting for content to be collected before starting on the programming, but now realised that he should have been building the package up with placeholders until the final media were ready. Overall the team felt the main delay had come from being overly reliant on the graphic designer, Simon, to finish the visual components, but said it was too hard to imagine the package without being able to see it on-screen.

The team introduced the prototype as an educational package for year 7-10 Visual Arts students. They had no existing instructional material to work from, but were guided by the syllabus. The client had some ideas for the project in that he wanted a game rather than a tutorial, but the remainder came from the project team. They felt that coming up with the design had been the hardest part of the project, though they had enjoyed the process and had been particularly inspired by *StageStruck* and to a lesser extent *Exploring the Nardoo*. Simon pointed out also that the Visual Arts syllabus is very much open to interpretation, so it was not a straightforward task to come up with an approach. With a huge range of artworks to choose from the team decided to focus on Aboriginal art because of personal preference and appeal to the target audience. The design process involved a lot of brainstorming and trying to keep ideas broad until it was time to make some decisions.

There was still major work to be done on the project before it would be ready for submission. There were also some changes that needed to be made to the existing work. For example, the panoramas were “too close” and Simon said he would need to re-build these for the final version. Some things would have to stay as they were, such as the arrows at the bottom of the screen for navigation, even though with more work these could be changed to allow more seamless movement. At that stage the package also contained images for which they did not have copyright permission, and the team would need to work out what to do

about this. Although the team had not drawn up specifications, they worked out a system for file naming early in the project to avoid potential resource management problems.

Liz commented on the difficulty of running to a project plan. She realised now that as time went on it became more important to structure the work. Her planned weekly updates had been abandoned and instead she started to distribute 'to do' lists. The team members realised that it might have been more time-effective to restrict themselves more to their set roles, but some had decided to work across tasks where possible to learn more. Although they felt constrained by the technology and their own skills, all agreed they had learned a great deal. They had not met with the client since the early stages of the project, but the team did not feel this was a problem because he had taken a very 'hands-off' approach. They planned to present the final version to the gallery next week.

Liz and Joanne from Group C were interviewed for this study and their comments give further insights into their group process and the development of their prototype product.

As project manager, Liz was interested in fostering a good team dynamic and felt that the group worked "pretty well" together overall, with a good mix of skills and expertise. Initially she would have preferred that the team adopt a communicative development paradigm (Visser-Voerman et al., 1999), but some of the team members were more interested in taking a pragmatic approach. It seemed to her that the two female team members wanted to meet face-to-face and discuss issues, whereas "the boys just seemed to think we've got a deadline and let's just get something submitted".

Simon in particular wanted to separate his role from the other members of the team. He took on the graphic design role, which was appropriate given his already well-developed expertise in that area, however Liz felt that he would also have been able to make a significant contribution as a subject-matter expert. Liz also felt that although Simon was advancing his skills and learning to use a three-dimensional graphics tool. This meant that they were then "locked into" what he produced.

In the early stage of negotiations each team member revealed different expectations about the level of commitment required and the way they wanted to work, something that Liz found difficult:

I was a little bit confused, especially being appointed project manager, about where everyone stood and if that person was going to be committed from the beginning to the end, through design statements meetings, everything. So I felt quite taken aback when he [Simon] sent me an email and said he didn't realise that this course and his involvement with the group involved so much contact time. And I found that really alarming because I thought, "why not, why not, it's a fantastic idea".

Liz researched her own role – gaining a better understanding of it through the cases, readings and further material on the Internet. She found the role “a bit daunting at first” and did not want to be too dogmatic. Having brought the idea to the team she also felt a responsibility to encourage interest in the project and to develop a vision of it that could guide the development process.

Liz was very impressed by *StageStruck* and felt that the product gave the team inspiration. Although the client had an initial concept in mind he had little experience with multimedia development and was happy to be fairly uninvolved in the process. The team members took the client's stipulation for a simulation/game approach and added their own ideas. Liz felt this process took a long time because it was a new concept, not just a tutorial based on pre-prepared content.

In terms of the development process, Liz commented that the team “found it very hard to make the jump from the design statement to the production stage”. Furthermore they felt that they were being “held up” because they had to wait for Simon's screen designs and generally they lagged behind the other groups. She felt that developing better specifications to move them from storyboard to production would have alleviated this problem:

I feel that compared with other groups we're still a bit behind. I feel that's because we didn't have everything specified, you know, audio and video. And I think that came down to the fact that the concept was new and it wasn't a [training and development] package as well. In a way I think we all benefited from that because I think that made it more interesting for us because we were inventing this idea.

As the instructional designer for the project team, most of Joanne's comments focused on the design issues the team encountered. The team's early idea was to design an educational



product that was interactive and based on constructivist principles. She said that most of the ideas came from *StageStruck*, a product that all of the team members were impressed with.

Having little guidance from the client and very few constraints, the team had difficulty developing an overall concept. With no specific material to use as a starting point, the team needed to narrow the scope of the prototype to focus on Aboriginal art:

...we felt that there was no constraint and we could do anything we wanted. And we found that really hard. With direction and constraints you might find something to focus on but [the client] just said go and do it. So we had something different to the other groups. Whereas they had lots of material, we've got something totally new, totally out there. And it was really hard to develop our scope and our overall concept. And we actually took quite a long time to do that and kept coming back to it.

They also wanted the prototype activities to involve more than “just answering questions”, to be part of a bigger challenge:

The learners get a piece of the puzzle and then they have to complete the whole puzzle and find out what the answer is. It incorporates a bit fun and interactivity into the package.

Joanne also felt the team worked well together. In the early stages they met regularly – as often as they could. Phone contact was also important for keeping team members informed. Later in the project, email became an essential means of communication, although not all team members responded regularly.

For Joanne an important part of the project was learning how to work as a team. Simon defined his role as graphic designer early on in the project and separated his responsibilities from the rest of the group's. For the other three team-members, however, the division of responsibilities was less obvious:

A lot of the time the roles were overlapping. And we didn't know who should be doing what and we didn't want to step on anyone's toes, but if I had the time I felt like I should do that. I'm all for helping anyone out and I think I was the one that was the most free. So I said them “if there's anything you want me to do...”. I was trying to be helpful in that way. It's hard sometimes when you're in a group and everyone wants to do their own thing. And there are time constraints. [The instructor] was saying that in the end everyone's got to chip in because there's a different workload throughout the project. So someone might do lots early on or later. So there was a little bit of that.

This arrangement also meant that the team was waiting for Simon to complete his part of the project, and Joanne worried about the group's progress compared to other teams:

From the time we had the storyboard, which took some time to create by the graphic designer, to the time the screens were ready – that was quite a long time. I think that was four weeks. So we were sitting around waiting for that. And I think in hindsight we probably should have started looking at content. Trying to develop our content and looking at our resources to develop the media. It was just not knowing.

Overall, Joanne commented that although the concept was hard to develop and sometimes the process was frustrating, she was very pleased with what the team had been able to achieve.

#### **5.7.3.3 Summary of Group C experience**

The key aspects of Group C's project experience can be summarised as follows:

- the project began with a initial concept but with no existing content to work from
- the design was open-ended but the team had ideas about the kind of package they wanted to develop
- having no constraints made the design process time-consuming but rewarding
- the team was influenced by both *StageStruck* and *Exploring the Nardoo* and incorporated aspects from each package that suited the project
- roles were negotiated early in the project, but some of the team members worked across the roles where it was appropriate
- the initial communicative paradigm, preferred by the project manager, was abandoned for a more pragmatic approach
- members had different expectations and aims which were openly discussed
- one team member worked quite separately from the others and was often uncommunicative, although still made his contribution to the project
- there was only limited involvement from the client
- the package evolved gradually rather than being planned
- this process was different and slower than the other groups and the team members felt as though they were behind schedule
- the team members were satisfied with both the skills they had developed and the final product.

## **5.8 Discussion**

### **5.8.1 Problem definition**

Analysis of the design statements shows that teams focused attention on certain key aspects when defining the training or educational problem.

The teams relied on discussions with the client as the main source of background information for the project. Teams met with the client representative to develop an understanding of the client's needs, motivation and conceptualisation of the project outcome. This process involved both information-gathering and negotiation, as the parties worked to determine the scope of the project that could meet the client's expectations and was achievable. Group C's design statement includes information about the client, whereas Groups A and B provide little background.

Learning about the audience for the planned package was also important at this stage. The teams identified the target learners and the features of the implementation environment, based on information from the client. Groups A and B had very specific target audiences, but provided little information on their characteristics. This may be because the teams had limited opportunity to gain access to and research the target learners. Group C's product was aimed at a more general audience – high school Visual Arts students and visitors to the gallery. The team members were able to draw on their experiences as teachers, with one member an art teacher, in characterising the target learners. The design statements indicate, however, that all of the teams made some assumptions about their audiences, with no evidence of further research to support these ideas.

Consideration of current approaches and alternative products also played a part in coming to understand the problem. The brief provided to Groups A and B was to re-develop current training materials, so understanding the existing approach and its deficiencies was important. Group C team members investigated other multimedia products aimed at Visual Arts students to determine how their project might offer something different. This process also helped teams determine the possible content of their packages and the learning/training

objectives. These were derived from the existing programs or from relevant syllabus documents.

The teams were also concerned with identifying the available resources. This was both in terms of information sources or media available from the client, and the skills available within the team.

Despite these similarities, the problem definitions indicate that each of the groups faced a quite different challenge.

- Group B developed a detailed problem definition based on information made available by the client. The topics and objectives of this new package needed to be closely aligned to the existing training program.
- Group A was also working to re-develop an existing training package, but provided much less detail about the planned package. This suggests that the client may have been less specific about what the product should include.
- Group C have been given an even more open brief with little direction from the client.

### **5.8.2 Proposed solutions**

Similarities again emerged in the ideas the groups developed for their products, as expressed in their design statements. These point to key activities undertaken at this stage of the project.

#### **5.8.2.1 Setting out the ‘big picture’**

Part of developing their ‘solution’ to the problem required that the teams decide on a general approach. This included deciding on the underlying principles that would become the basis of the design, and particularly important was determining the metaphor, instruction approach and presentation style. This process appears to be an essential part of developing a shared vision of the project.

#### **5.8.2.2 Defining the goals and objectives**

Discussions with the client gave the teams insights into why the product was to be developed and what it would help learners to achieve. Teams had to develop their own expressions of the goals of the package and the learning objectives based on this

information. All of the groups had to interpret the needs of the client and the learner to develop these. In addition, Group C needed to take into account the needs of a wider audience and the requirements of the relevant curriculum. Although Group B was provided with a set of learning objectives, these still had to be set within the broader goals of the project, for example, to provide a more self-paced style of training.

#### **5.8.2.3 Documenting specific design decisions**

The design statement was a repository for the team's plans for the product and this included specific features, as well as the 'big picture'. These included ideas for structuring the content, options for navigating through the package, planned activities and tasks to engage the learners, support tools such as the Visual Arts Process Diary (Group C) and the Mould-o-meter (Group A), and media elements. Mock-ups of screens and specifications were included to illustrate the teams' ideas.

#### **5.8.2.4 Determining the scope of the project**

The design statement also served as a record of what would be developed as part of the project. Both Group B and C set out in detail the sections or features that would be developed and described how these comprised a part of the overall design. The teams also detailed, where relevant, the responsibilities of the client, for example, to provide resources, ensure access to certain people, and give timely feedback. Group A did not discuss the scope of the prototype. This, and comments from the team members, suggests that they planned to complete the whole package.

#### **5.8.2.5 Considering the 'full' package**

Although the assessment task only required that teams develop prototype versions of their planned packages, the design statement template also prompted consideration of issues relevant to the full package and its implementation. For example, Group C proposed a cross-platform version even though their brief was for PC-only. This was based on reasoning that, if the product were later used in classrooms, it would need to be Macintosh compatible. Both Groups A and B considered how the client might implement the product, discussing the role an instructor might take. All groups proposed plans for summative evaluation of the product to determine its success in the implementation environment.

Teams also showed they were aware of intellectual property and copyright issues even though they were not of concern to them in the development of the prototypes.

Given that all the teams used the same template to structure their design statements, a degree of similarity is to be expected. Differences are evident however. Group B provided a coherent, detailed plan of the proposed product, which reflects a clear definition of the problem. By contrast Group A's design solution was lacking in detailed explanation and the planned features were not consistent with the principles they espoused. For example, they planned to engage learners in problem solving, but then used simple quiz questions as the main learning activity. This suggests the team had not developed a consolidated vision of the project. Group C also wrote in general terms, rather than providing detailed explanations. They did, however, more successfully link the proposed approach to the rationale for the project. This suggests that the team may have been concentrating on developing a vision for the project rather than deciding on the specifics at the design statement stage.

### **5.8.3 Prototype packages**

Analysis of the prototype packages developed showed how the teams translated their design ideas into reality.

Group A's prototype product was linear and prescriptive and took less advantage of multiple media than it might have. Many of the team's design ideas were not implemented. In particular, the metaphor of the shop environment was not evident, although the package does include images of a real shop. The product also lacked coherent and consistent visual design, and there were problems with both the navigation design and implementation. The result is a low-quality product in which the component parts do not work well together.

Group B's product closely matches the plans outlined in the design statement. Like Group A, it appears that this team also had difficulty implementing the chosen metaphor, although the concept of a journey is reflected in the 'road map' menu. The visual and aural media

work well together to present the content clearly and consistently. Overall, this is a well-integrated and polished prototype that presents one section of a larger package.

Group C's prototype meets the stated aim of presenting learners with a navigable, three-dimensional space and demonstrates the integration of visual and textual information about the gallery's collection. The main cognitive tool, the Visual Arts Process Diary is implemented but the functionality is clumsy. The activities developed are not well integrated with the content, and perhaps were not the best choice to demonstrate the intended approach. They are, however, consistent with the scope of the project outlined in the design statement.

#### **5.8.4 Group experience**

Teamwork was an essential part of this process and the prototype products developed reflect team collaboration as well as the original design ideas.

The breakdown in teamwork evident in Group A affected all aspects of the project – the relationships between team members, the relationship with the client and the production of the prototype. The difficulties were hinted at only in the later postings to the discussion list, although communication problems were mentioned throughout the session. Interviews with two of the team members revealed the nature and consequences of the tensions within the group.

Group B worked very well together and all team members were actively involved in the project, not just within their own roles but also across a wide range of activities. All were concerned that the project be well managed, and as individuals and a team, they implemented strategies to ensure that this occurred, including transferring the role of project manager. The members of this team were all highly motivated and worked together to ensure that each was able to achieve what they wanted from the project.

Despite their different expectations and ways of working, all of the members of Group C made significant contributions to the development of their prototype. Open discussion

helped the group reach a compromise that allowed each of them to develop new skills and the product according to the level of commitment each person was prepared to make. This would have been particularly important considering the open-ended nature of the project.

Groups B and C adopted different approaches to the development of their designs. Group B began with a clear idea of the project goals, had an existing program to work from and concentrated on developing a predictable design and specifications that would guide production. The members of Group C developed a broad, but coherent, vision of their project and developed general strategies which they could adapt and trial as they produced their prototype. Perhaps the Group A team members would have gone on to consolidate their version and address the inconsistencies in their design if the collaboration amongst the group had not broken down.

### **5.8.5 Influence of the cases**

Analysis of the teams' design statements and comments made by some of the team members, when interviewed by the researcher, reveal that the case projects influenced both the design and management of the team projects.

#### **5.8.5.1 Design ideas**

Some of Group A's design ideas suggest links to the case projects studied earlier in the subject. Firstly, the concept of a visually realistic landscape through which learners can move was a central feature of both *Exploring the Nardoo* and *StageStruck*. The addition of text-based navigation option may have come from the difficulties some students had negotiating the purely visual space. The idea of including the Mould-o-Meter is similar to the simulations in *Exploring the Nardoo*. This is further suggested by the idea of including navigation options within this tool, which is reminiscent of the design of the PDA (personal digital assistant). These speculations are supported by comments from Lynn, who felt that her team had been heavily influenced by *Exploring the Nardoo*.

Group B's design has little in common with either of the case projects. In her interview, Sheryl commented on this:



I don't think the cases particularly influenced our design. Perhaps they would have if we were doing something more similar. Like I noticed the art gallery group. I think their design was really influenced by StageStruck. But ours was a totally different target audience and a really different topic.

Despite the differences though, Anna felt that *StageStruck* influenced her ideas about navigation design because she had felt lost in the package and did not want that to happen to users of her team's package.

There are obvious parallels between the proposed design of Group C's package and both *Exploring the Nardoo* and *StageStruck* – and team members Liz and Joanne acknowledge the similarities. The design is based on a constructivist approach to learning that encourages learners to explore a 'virtual' landscape, which is similar to both of the case projects. As in *Exploring the Nardoo*, problem solving was proposed as the focus for learners' activities. The team mentioned the inclusion of 'genre templates', which are also part of the *Nardoo* package. Movement through a realistic, three-dimensional representation of an interior space is reminiscent of *StageStruck*, as is the idea of a game/simulation. Electronic devices for collecting notes and completing tasks are also a key feature of the case products and the one proposed by the team. It appears that Group C has identified the most relevant design features from the case products and adapted them to suit the team's proposed package.

#### **5.8.5.2 Management issues**

Many of the students highlighted the importance of the design statement in documenting the project in their individual case analysis papers. Therefore, it is reasonable to assume that this awareness might be reflected in their design statements. This is suggested by the teams' use of the document to not only record their design ideas, but also to set out the scope of the project, client and team responsibilities, and specifications for the product's development.

Concern with intellectual property and copyright issues is evident in Group A's design statement. The team stated that they would use a commercially available authoring tool to avoid intellectual property issues, and claimed the rights to the simulation tool they planned to develop. The responsibilities for ensuring copyright clearance were also stated, clearly outlining the requirements of the team and the client. A desire to have these details

documented in the design statement, thereby ensuring they are dealt with at an early stage in the project, may come from reading the *StageStruck* case in which these issues were prominent. In their interviews, Lynn and Kath comment that the cases provided useful information about what happened in real-life projects, for example how roles and responsibilities were distributed and how initial ideas were adapted over time. Lynn felt that analysing the cases helped the members of her team to focus on their project, and Kath found the exercise useful for gaining knowledge about the potential pitfalls.

Although there are few similarities between the case products analysed and the prototype developed by Group B, the design statement suggests that the team were keenly aware of management and process issues. In their interviews, Sheryl and Anna contributed this to a combination of relevant experience and triggers from the cases. In particular, the team was concerned with clearly stating the boundaries of the project, and its responsibilities and those of the client. According to Sheryl, this came from a desire to avoid the kinds of management problems evident in the cases:

After reading through [the cases] I thought, "well there are some things we can manage better". *StageStruck* didn't have a strong project management approach and I thought while we might not be so innovative on the design side, we can get through with a more pragmatic approach.

The team also emphasised the need for clear documentation and specifications in the early stages of a project. This was another issue that Anna felt was made evident by the cases and she wanted detailed specifications to work from when doing the programming.

Group C also commented that the cases were useful in helping them understand the roles and what they entailed. However, both Liz and Joanne felt that while they had gained a good overview from their case analyses they still needed to consult other sources for more information or specific strategies.

## **5.9 Summary**

The findings from this stage of the investigation provide the following insights into the group projects:

- When developing their problem definition, the team members used the client contacts as the main source of information.
- Teams provided little information about target learners and perhaps need to negotiate better access to representatives of the target audience.
- Existing approaches and the availability of resources from the client and within the team were also factors in coming to understand the training/educational problem.
- Teams used the template to document key features of their design problems, and included descriptions of the specifics of the situations.
- Although the teams were concerned with similar issues in describing their proposed solutions, the design statements exhibit different levels of detail and coherence.
- The design statements reflect differences in the approaches taken by teams – one of which was concerned with developing an overall vision or concept, another was more concerned with specifying the details of the package and the other team combined both.
- The cases influenced the design of the prototypes where there was a clear similarity between the types of learning situation.
- The management issues evident in the cases were of more general relevance.
- The teams' design ideas were developed into prototypes with varying degrees of success.
- The teams that developed a coherent vision for the prototype achieved superior outcomes, highlighting the importance of the design phase.
- The third team suffered a breakdown in collaboration and produced a low-quality prototype, demonstrating the importance of teamwork and management of disputes.

The next chapter presents the results of the third stage of the study, which investigated the learners' reflections on the learning experience.

## Chapter Six

### Learners' Reflections

#### **6.1 Introduction**

The analysis of learners' reflections on their project experiences is presented in this chapter. The first section describes the design of the tasks and their relation to the research questions. The second section describes the themes that emerge from the individual reflective papers and collaborative cases produced by the students. This is followed by a discussion of the results.

#### **6.2 The reflective tasks**

Engaging learners in reflective tasks that encourage them to look back on their project experiences was a key element of the learning design. The reflective phase required learners to submit two assignments. The first asked them for an individual response to the following series of reflective questions:

1. What was your role in the project team? Describe your tasks and responsibilities.
2. How did you work with the other members of your team?
3. What were the main design and management issues your team encountered during the project?
4. Choose a particular issue and describe how you addressed it.
5. Was there any information from the cases or readings you studied that was useful in working on your project?
6. Are there any parallels between your project and other projects described in the cases and readings?

The students were also invited to include any other issues they felt were relevant. The aim of this task was to move the learners' attention away from the production tasks they would be heavily involved in during the final stages of their projects, and encourage them to look back on their work over the session and consider some of the broader issues. It was also

suggested that they use this piece of writing as the starting point for the final assessment task – the group reflective case.

The group reflective case was a collaborative writing task that required each of the project teams to prepare a case describing the development of their projects. Teams were asked to address, but not be limited to, the following aspects:

- the original concept ('the big picture')
- the design ideas and considerations that led to the design statement
- how concepts from readings, lectures and demonstrations influenced the design
- how the design ideas were implemented in the prototype and the factors that influenced those decisions
- how team members' ideas about designing educational multimedia products had changed as a result of the project experience.

The team members were asked to consider not only their experiences, but the lessons they had learned that might be useful to them in future work or to other new project designers and developers. No stipulations were made as to the format of the assignment other than it should include an overview of the project and reflections from each of the team members. Sample cases from Phillips and Jenkins (1998) and Alexander and McKenzie (1998) were provided to give learners ideas for how they might present their assignments.

To assist with this task, it had been suggested that learners keep a journal throughout the session to which they could refer when preparing these final assignments. An example of a reflective diary was also provided as part of the subject resources. Other suggested sources included diary checkpoint contributions and project documents.

Like all subjects in the Master of Education (IT) programme, this subject carried an eight credit point weighting but was divided into two parts – a six credit point subject (EDGI931) and an associated two credit point subject (EDGI932). Students could choose either the full eight credit point option or six credit points only. The subject was structured such that the reflective tasks comprised the two credit point component. This meant that the two students

– Barbara and Simon – who were enrolled in EDGI931 only did not complete the reflective tasks. The remaining ten students in the class completed the reflective tasks.

### **6.3 Relevance to the study**

The reflective tasks relate to the third research sub-question, which is concerned with investigating learners' understanding of multimedia design and development issues after their project experiences. Analysis of the individual and group reflective papers sought to identify the aspects of the project experiences learners focused on in their reflections. The aim was to discover how their project experiences enriched their knowledge of multimedia design and development, and how they might have used their experiences to understand the cases and vice versa.

### **6.4 Approach to analysis**

The individual reflective papers were examined first using the following process:

1. Reading and memoing.

The collection of reflective papers was read through several times. Each paper was then re-read closely and marginal annotations were added.

2. Identifying and categorising issues.

An initial list of issues was created from a sub-set of papers. These were then used to derive broader categories. The full set of individual reflective papers was then coded using these emergent categories. An example of this coding can be found in Appendix 6.1.

3. Interpreting.

Each category was examined and the major themes were extracted. An elaboration of these themes was prepared using excerpts from the data to illustrate and support the researcher's interpretation. The theme statements and definitions were refined as new insights were gained.

After this set of themes was developed each of the reflective cases was examined and sections relating to each of the themes were identified. This served both to consolidate

understanding of the themes already developed and to identify any new issues or themes raised. An example of coding for a group reflective case can be found in Appendix 6.2.

Finally, the theme statements were re-written as heuristics that express the practical ideas that emerged from the learners' reflections. Each of the heuristics is discussed under a separate heading below, however there is some overlap between them. The issues discussed within each heuristic relate both to the individual and group reflections. As such the structure of the discussion combines explanation of issues as experienced by individuals and by the project teams.

## ***6.5 Heuristics derived from learners' reflections***

**6.5.1. Develop strategies that address the inherent constraints of the project. Set and adapt goals for the product to work within the time and resource limitations. Consider how the team will work together if there are limited opportunities to meet face-to-face.**

Constraints are a part of every project, and it is within these inherent limitations that the project teams had to operate. As Kath noted, this particular project required "the development of the product according to the requirements of the client and within the constraints of our own resources". Margaret felt that early recognition of the parameters of her team's project made decision-making easier because there were fewer unknowns than were present in many other projects. To Sheryl knowledge of these constraints was an important guard against her own team's "tendency to perfection".

The three constraints commonly identified in the students' reflections were the short time frame for development, the limited expertise of the team members and the lack of a common working space.

Almost every student mentioned the limited amount of time available for completion of the projects. Part of the challenge of developing the prototype was to recognise the factors that were beyond the control of the team, and to determine what could and could not be

achieved in the time available. Steve in particular found the lack of time a serious concern, feeling that it was unrealistic, “particularly when compared to real projects that may take many months”.

Acknowledgement of the time factor prompted different strategies from the teams. Ian realised in the early stages of his team’s project that they would have to step back from what he and the client had originally envisaged, given the limited amount of development time. His team’s strategy was to break the content material down into separate modules and topics so that the scope of the project could be established from the outset.

As work progressed towards the deadline, Rod’s team had to significantly revise the ideas for the Visual Arts Process Diary tool to be included in the prototype:

Some functions were dropped altogether when it was found that they could not be developed to a sufficient standard to be included in even a prototype, while others remained in the package but with a reduced level of functionality compared to the original intention.

The group’s project manager, Liz, highlighted the general importance of good time management throughout the project, citing this as something she and her team could have done better. Other students also arrived at this conclusion.

A lack of expertise in some of the roles was a major concern for all of the teams. This was particularly so in relation to project management, which students seemed to think required both the right personality and previous experience, and graphic design, which was considered a specialised skill. Authoring and instructional design appeared less of a concern, perhaps because all of the students had encountered these in their previous studies, and some in their professional lives. Consideration of expertise was a dominant factor in the allocation of roles. It also influenced Group B to design a product that was achievable using the skills available – evident in this comment from Sheryl:

While I was writing screen specifications, for example, I was quite careful to design screens which I felt would be within Anna’s technical ability to build (while still including some ‘challenges.’)

Working for most of the time in separate locations was a difficulty acknowledged in all of the reflections. This is exemplified by Margaret’s description of her concerns:



I had and still have doubts concerning the practicalities of teamwork when an actual product is being produced when the team members do not share a common work space. My level of confidence in the ability of a team to work together successfully to produce a quality product was low.

Developing strategies to manage team members working in different locations would prove to be a significant challenge, requiring a combination of face-to-face meetings and electronic communication.

Overall, the reflections show that the students were aware of the limitations inherent in the projects and responded by developing strategies to address those constraints. These strategies included limiting the scope and nature of the prototype product, distributing roles according to experience, and using communication technologies that would support collaboration at a distance.

**6.5.2 Use documentation to express and document design ideas and decisions. Design statements, storyboards and project management documents act as a support for collaboration by focusing the group's efforts and as a guide for developing the prototype. They should also be referred to later to resolve disputes.**

As part of the assessment for the subject the teams were required to develop design statements that embodied the proposed solutions to the design problems they were working on. All of the students had experience in preparing a design statement for a pre-requisite subject, and a template was provided (see Appendix 5.1). The teams also developed additional forms of documentation to support the design and development of the product and the management of this process, such as concept maps, flowcharts and checklists.

Many students commented on the value of the design statement as a focus for their early team activities and as a significant milestone for their projects. The reflections suggest that there was a similar pattern of activity for each of the groups in these early stages, with frequent face-to-face meetings held to allow discussion of design ideas and encourage a consensus to be reached. All of the students appeared to view their design statements as the

outcome of a collaborative and consultative process. Kath's comments are indicative of the importance of this document:

The development of our own Design Statement was probably the most useful process we completed - it signalled the beginning of the project, formed an overview, and outlined specific details of the interface.

As an expression of the team's proposed design solution, the design statement was also an important record of intention that could be referred to later in the project. So it became a working document, described by Lynn as "protecting the interests of both the development team and the client". Most teams felt however that they might have made more use of this function. For example, Rod commented that the nature of his team's project made it all too easy to "wander off on tangents" and reflected that:

To a certain extent, this was addressed simply by having a detailed design document to fall back on, however in some cases we may have been too slow to refer back to it. We may have saved some time and energy if, instead of working on things that eventually led nowhere, we first recognised that they were not supported by the design statement and therefore did not warrant our attention.

For Group A, the design statement was also a record of the roles and responsibilities agreed to by the team, although Kath argued that this was of limited value because it was not used to resolve the team problems that arose later.

The design statement was also a starting point for the next phase of planning and development. Group B's, and in particular Sheryl's, commitment to thoroughly documenting ideas meant that the team was able to present a very detailed design statement and from this develop screen specifications. This then enabled the team members to work independently from an agreed blueprint during the production phase.

The storyboard was another documentary tool used by all of the groups and each developed their own format according to their needs. Lynn from Group A noted that her group developed storyboards "as an integral component of the design statement" and presented these to the client for review. Group B members all agreed that they could have done more work on their storyboard, which had been developed prior to the completion of the design statement, but then not revised in light of later changes. Group C's project manager, Liz,

also felt that her team's storyboard could have been developed in more detail and that the lack of specifications proved a problem for the programmer in the production phase.

Other types of documentation were developed to enhance team communication and project management. For example, Liz (Group C) uploaded design documents, meeting notes, updates and timelines to a shared ftp site so that these were then available to other group members. Sheryl's concern for instructional design documentation also extended into her later role as project manager for Group B for which she developed a number of documentary tools. Margaret, Group A's instructional designer, also developed a range of checklists based on a variety of sources to assist her team plan, develop and evaluate the project.

The individual and group reflections highlight the value students placed on good documentation. They came to see the design statements, storyboards and management records as useful, not only to record their ideas, but to also guide their project work. Many of the students also reflected on ways they could have improved their use of documentation.

**6.5.3 In developing the proposed design give consideration to: the needs and expectations of the client and the learners; the resources available to the team; team members' beliefs about teaching, learning and good design; and the affordances of the technology.**

The design task required that the teams develop a prototype package that would meet the needs of the client as determined by negotiations at the beginning of the project. Each team found that the client's brief and pre-existing content were significant influences on the project design, with other factors, such as the characteristics of the target learners and the design team, contributing as well.

Comments by members of Group A suggest that they felt the design of their project was relatively problem-free, largely because of the "clear brief" provided by the client:

Our client ... was after a linear course structure covering fridge management principles and how to expose the consumer to as much marketing as possible, thus selling product. The client was also looking for a new way of delivering a course, moving from the traditional classroom scenario to a multimedia package delivered to vendors of [the company's] products. [Steve]

According to Kath having the content pre-defined meant that the instructional design was “straightforward”, although Margaret didn’t quite agree:

At first this seemed like the perfect situation – we had been handed most of the content and some media elements, but I believe this in fact stifled our creativity. I think our product would have been much more dynamic and interactive had we designed it from scratch.

The Group A team members identified the following factors as influencing their design discussions:

- the requirements from the client
- the existing resources
- an interest in constructivist pedagogy
- the teaching and learning requirements
- a desire for simplicity and clear navigation and
- consideration of their own skills and expertise.

Lynn commented that although the team had tried to incorporate constructivist principles into the original design by adopting a “realistic metaphor” that would allow “teaching in context”, the learning outcomes and need for performance to be measured shifted the focus towards a more prescriptive design.

Group B team members also expressed the belief that the clarity of their initial brief made the design process easy. Their client wanted the re-development of an existing face-to-face safety training program into a self-paced multimedia format. The structure of this program, which according to Anna “was very prescriptive” and “very linear”, was to become a major determinant for the new package. The predominance of video and the serious tone in the existing program were also carried through to the multimedia version.

The team was keen, however, to add navigation options, develop learning activities and use a journey metaphor that would make the package more democratic, interactive and

engaging. Consideration of the characteristics of the target learners was also important when designing features of the package, although on reflection Ian wondered whether the team's perception of the trainees might have been too narrow:

It is important to have a good grasp of one's audience – those to whom the project is being directed. We made some very, very critical design decisions based on our concept of what our audience would require (ie. they will not want to read very much script). I'm not sure that our perception of truck drivers is necessarily based on any more than a stereotypical concept.

According to Anna, many of the design ideas came from the team members' previous study in the Masters program, and from their professional experience. Debate over design features was a characteristic of the team's discussion at this stage:

There were various discussions in our group regarding topics like assessment methodologies and philosophies which also influenced our design decisions. In particular the merits of multiple choice formats was a subject of particular discussion and an area of some dissent I think.

Furthermore, as mentioned in the preceding section, even at this early stage of the project, the team constrained the design according to what the programmer could develop.

Group C's client did not have a pre-determined notion of the product, leaving the design open-ended and largely up to the team. The client stipulated only that the package be more like a game than a tutorial and that it run on a stand-alone machine. Despite this flexibility, which gave the team creative freedom to pursue the constructivist approach they were interested in, the team felt that the lack of an initial concept from the client made the design process difficult. Rod explained that at the beginning of the project the concept was so nebulous there were "literally dozens of options available to us in how the program might look and be structured". Joanne wrote that development of the design required the team:

to consider the theories of learning such as the cognitive strategies to be introduced into the package and how it will assist the user to learn. We were influenced by the constructivist view point and felt it was appropriate for our project; to view instruction from the learner's perspective, consider whether the instructional tasks and the feedback meet the needs of the audience, so that the activities engage and challenge the learner.

The reflective case reveals that Group C were also influenced by a realisation of what the technology could offer, after attending a skills workshop on video production:

After the demonstration on digital video capture, we knew that we wanted to create some video clips and include them into the prototype. This included footage of Aboriginal artists at

work depicting the various styles of traditional and contemporary Aboriginal art available today. We felt that it would add to the learner's experience. [Group C, reflective case]

These reflections show that teams arrived at their proposed designs by considering not only their client's perspective and the needs of the learners, but also their own beliefs about good design for teaching and learning. The teams also discussed how the technology could enhance the learning experience. All of these were weighed up against what they felt they could achieve with the sub-set of skills within the group.

**6.5.4 Establish and manage open, regular communication to foster a good group dynamic, support collaboration and encourage participation in shared decision-making. Develop a mix of face-to-face and on-line strategies to meet the needs of the group according to the expectations of individuals and their geographic locations.**

Teamwork was an essential feature of the project assignment reflecting, as Rod noted, that "designing interactive multimedia is a decidedly unindividualistic endeavour" (after Blum, 1995). Many of the reflections were concerned with working in teams, and the issues raised provide some insights into the complexity of achieving a good team dynamic.

Some students commented on the nature of teamwork – seeing it as more creative than working alone (Margaret), as being reliant on each other (Rod), as developing a shared vision (Liz), and as meeting the expectations of fellow team members (Kath). All of the students saw teamwork as essential to their projects, though the groups achieved mixed success in working together.

Group A was the least successful team, despite a promising start which Kath felt had established "a collaborative environment of enquiry" that allowed the design process to proceed smoothly resulting in a design statement that reflected the ideas of the whole team. Problems arose when Steve, the programmer, began to work separately and made decisions about the prototype without consulting his fellow team members. Kath, Margaret and Lynn expressed feelings of frustration that they were excluded from the production phase and

that many of their contributions were absent from the final product. From Steve's perspective there had been insufficient time to develop a team rapport and, feeling the pressure of the looming project deadline, he "did what most normal people would do – seize control".

One of the main criticisms of Steve was his lack of commitment to communication with the rest of the team, dating from the beginning of the project. Lynn claimed that she tried a variety of strategies, including organising face-to-face meetings, telephoning, emailing and posting messages on the class and private discussion lists, without eliciting much response from Steve. Steve in turn claimed that:

We did not look into utilising online forms of communication other than e-mail, which is limited as a means of facilitating group interaction. Clearly a list-serve would have provided a better mechanism for supporting this need.

These conflicting perspectives serve to illustrate that the breakdown in regular and open communication, not just in terms of sharing information but also in negotiating the process, was a problem for this team. The lack of a common working space and the competing commitments of work and home were also recognised as a challenge to teamwork - making good communication even more vital.

Ian described his group (B) as a team of "capable, mature and responsible people" each of whom was "highly motivated". The success of the team, he said, had been achieved by forming a shared view and sharing responsibility. Reflections from Anna and Sheryl also characterise the decision-making process as involving discussion that led to consensus. The group drew on a variety of communication strategies including meetings, email, telephone calls and a listserve. The group also experimented with live chat tools, but found that these were not sufficiently reliable. Face-to-face meetings were essential for decision-making, and Anna argued that there should have been more meetings in the later stages of the project. The lack of face-to-face meetings in the production stage meant that there had been less opportunity to discuss issues and solve problems as they arose. However, it had been difficult for the geographically dispersed group to meet regularly. The availability of team members and the encroachment of other commitments also meant the team had not been able to work together as much as they would have liked.

Reflections of the Group C team members suggest that at least three of the members developed a successful collaborative relationship. Joanne described the team as supportive and inclusive. Decision-making occurred by consensus as much as possible and communication amongst the group was maintained throughout the project, consistent with the communicative paradigm:

Our group considered client and team relationships on a "communicative paradigm". Visscher-Voerman et al. (1999) discuss "communication to reach consensus". They state that "establishing a shared frame of reference and reaching consensus among all those involved are important elements" to successful interactive multimedia design. We therefore set out at all stages to accommodate the range of views expressed by individual team members. [Group C, reflective case]

This was despite a fourth team member (Simon, the graphic designer) who preferred to work independently.

Simon's desire to work separately was apparent in the early stages of the project and seems to have prompted the team to consider how they would manage the different aims, motivations and levels of commitment driving each member's contribution. While having one member working separately was not ideal and held up the production phase while Simon developed screen graphics, the team tried to work around this difficulty. In discussions about roles early in the project, the team members also recognised that they lacked experience and all would be 'feeling their way' in their roles. This realisation appears to have helped the team members work together and support each other. Like the other teams, they were also dispersed geographically, which they acknowledged as an added difficulty in their reflections.

This analysis indicates that each of the groups encountered similar issues, even though they may have manifested in different ways. Establishing and maintaining open communication among team members was essential for collaboration. This required teams to choose communication strategies that suited their needs and supported their activities, taking into account barriers to participation where possible. In her section of the group reflective case, Margaret offered this advice to others taking on a similar challenge:



I would also recommend finding out exactly what each team member hopes to achieve from the experience as a member of a multimedia development team as the success of the project relies as much on the ability of the team to work productively together as it does on their individual expertise. [Group A, reflective case]

**6.5.5 Be open to adapting the original design ideas as circumstances change during a project. This may mean abandoning or compromising some features to adhere to the agreed time frame, or if prototyping or evaluation reveal flaws in the original plan.**

One of the development issues highlighted by the *Nardoo* and *StageStruck* cases and the subject readings is that initial design ideas may need to be adapted in response to changing circumstances during the course of a project. This was also the experience of the student teams. Some of their planned design features had to be changed as the teams realised the implications of inherent constraints and encountered new limitations.

The main challenge facing the teams was to develop their prototype products within the limited time frame. The importance of this factor was evident from the early stages of the project, as this comment from Ian reflects:

Personally, I underestimated the enormity of the project at the outset. I think this resulted from an overly optimistic outlook and a lack of experience. By our second meeting it became obvious that we could NOT develop a prototype that addressed more than a portion of the entire scope of the package as initially envisioned by the [client] representative and myself.

This realisation prompted Ian's team to adjust the design to suit the short development time. They decided to develop only one module for the prototype. Similarly Group C opted to focus on only one component of the client's collection as a means of limiting the scope of the prototype product developed.

As the teams began to develop their prototypes and put their designs into practice they found themselves again having to amend their ideas. Some features had to be re-designed and others abandoned altogether.

Lynn described how her team had to drop one of the key features of the planned design because of the short time frame:

The team had to pull back on their development ideas due to the constraints of time. It was envisaged that a “mould-o-meter” would be incorporated into the prototype, allowing an interactive view of what happens to products incorrectly stored. This proved to be beyond the scope of the project if the November deadline were to be reached.

For both Groups B and C some of the functionality planned for their products was restricted by the limitations of the authoring tools. Anna wrote that, although she and her team had planned to produce a cross-platform CD, incompatibilities between file formats caused them to limit the product to PC-only. Rod described how his team’s prototype could only demonstrate some of the planned functionality of its key feature, the Visual Arts Process Diary:

For example we wanted the user to be able to select a portion of text from an on-screen article and paste it into their notes. Using iShell, the nearest we could get to this was to have the entire article transfer to their notes where they could then cut out any unwanted portions.

A further change to Group B’s original design occurred when a feature was overlooked in the planning stages:

We chose the metaphor due to its relevance to the target audience of truck drivers and because it seemed like a good way to work through the materials. While we were initially clear about the metaphor, we did not discuss it in our first full-day meeting, so it did not become as intrinsic to the package as we had initially hoped – instead, it became a way of moving between modules only. [Sheryl]

Anna linked this incident to a more general problem with the team’s planning, which focussed too much on the instructional strategies at the expense of interaction and interface concepts. She commented that “although [they were] part of our shared conceptual understanding [they] didn’t get translated into specific detail in our design process and in particular, our roles and the design specifications”.

Margaret commented that one of the main design challenges facing her team (Group A) was to transform the existing paper-based materials into a multimedia format. She described the difficulties encountered as the team tried to develop the visual design as an example of this. The team’s graphic designer, Kath, also reflected on this at length in her paper, revealing some of the problems she faced trying to turn the team’s ideas into reality:

I encountered the problems of finding a similar vision. Eventually, a design was arrived at that was, as expected, quite different to the nature of the existing material, but I hoped that it would work in contrast, and because by that stage I had no resources or concepts left for this design brief. While all acknowledged that the look and feel of the graphic was very attractive, some felt it was in too much contrast with the style of the training tutorial, and so this graphic was shelved.

Unlike the other teams, Group C did not have previous material from which to develop the product. Instead the team had to develop all of media resources required for the project.

This proved a challenge and resulted in changes to some of the plans:

There was an issue with the availability of material, for example, some art pieces we wanted to include did not have a great deal of information. We wanted to include a video segment of Vic Chapman, a local Aboriginal ceramic artist, to support the link between the community and the art gallery. Unfortunately, he was not available in the time frame. [Group C, reflective case]

The importance of re-design at the production stage of the project is illustrated by comments from Anna, the programmer for Group B. Although her workload was concentrated in “producing the actual package” this also included “developing small sequences and little prototypes in order to work out how to build and test the functionality of difficult components” to determine whether her team’s design was “viable”. She described this as “development for design purposes”.

The reflections, outlined above, suggest that all of the groups needed to change their ideas as they became more aware of what they could and could not achieve in the production of their prototypes, either because of the limited time frame or because prototyping revealed design flaws. The issue is summarised neatly by Rod:

It appears to be common that designers and developers can easily get carried away with what they want to include in the project but in the end have to settle for a lesser goal.

#### **6.5.6 Communication, planning and active management are needed during the production phase to coordinate the work of individual team members and incorporate changes to the initial design.**

After the development of their design statements the teams began working to develop their prototype products, and it seems that at this time all of the groups experienced teamwork

and management problems. During the production phase, new challenges arose and a better understanding of the existing constraints meant that changes needed to be made, and that this process needed to be managed. However, comments from the students indicate that it was at this time that the project managers had relaxed and teams were meeting less frequently. The resulting lack of supervision and team contact had implications for all of the teams.

Comments from Group B team members suggest that they had not anticipated the need for changes to the project plan or process during production. The team had developed detailed screen specifications early in the project. These allowed each team member to work independently on elements of the package and the programmer to build the product as a shell until the media resources were ready. As the components were brought together problems arose, but the team became reluctant to change the design. As noted by Ian, “the project is quite far along and major changes will be nearly impossible”.

All of the team members commented that they should have revisited their design ideas at various stages rather than putting so much effort into one version:

At the end of the project, for example, we agreed that it would have been better to get some of the timing issues sorted by prototyping – as the specifications were written. The reality of the project - in which we were each working in isolation, with few team meetings - meant that we could not follow the prototyping model. [Sheryl]

Anna did actually use some prototyping, though not in consultation with the other team members, as indicated by her comments in the group reflective case:

I realised only last week that the others were unaware of the various early prototypes I developed. Ian has recently made some remarks about using a prototyping approach. I built many small prototypes for various sections to check the ideas were functionally possible to implement. I did this in the early weeks of the project and then intermittently throughout and then discarded them. It never occurred to me that part of the design and development process would be to show these to the team. I thought they wouldn't be interested until they could see a whole chunk like a section operating as it should appear. Had we talked about our actual design and development process this might actually have become apparent.

Anna also felt that she had been left to make decisions about how to implement the team's design ideas, and, although she was able to consult with some team members, strong project management was lacking at that time. In the final stages of the project Anna felt that the decisions being made about what should be discarded were “arbitrary” rather than well-

considered. Ultimately, Ian felt that the “project never got to the point where it was complete to our satisfaction” because the group ran out of time. He attributed this to being too ambitious in wanting to stick to the original prototype design and being unrealistic about the time production tasks would take. He felt a more iterative process might have helped the team address this problem.

Rod from Group C also commented that it seemed to be part of his role as programmer to modify the design so that it would work within the bounds of the authoring tool, and commented that:

It is not easy to decide where to draw the line as far as what is 'in' and 'not in' and how closely the functionality should resemble the intended final product.

He felt that closer reference to the project documentation could have helped keep his team focused on the project goals and not be distracted by “the latest idea”. This sentiment is echoed in the group’s reflective case:

Our group started the implementation stage of the prototype based on the storyboard issued to the group. There were “gaps” in this storyboard, which led to inconsistencies during the production stage, especially for the programmer and instructional designer who had to make alterations to the original design.

The members of Group A had planned for prototyping and testing from the early stages of the project. They used a similar process to Group B, developing a shell of the product that was gradually filled with content. This allowed versions to be progressively reviewed by the team, client and members of the target audience, and feedback was channelled back into the production process. Their approach is described in their reflective case:

The Dairy Farmers team also followed the advice of [Phillips and] Jenkins who posits “the point of a prototype is that changing it requires little effort” ([Phillips &] Jenkins 1998, p.40) by developing a shell which demonstrated the basic concepts, presenting it to the client for feedback. In contrast to the opinion of Blum, the team were also aware of the writing of Dave Johnson, who discusses the need to stop designing and start debugging, in order to get something to the client. To this end, several prototypes were developed, with the third being released to a small group of the target client group in order to gain final feedback prior to the full production of the product.

It was a breakdown in teamwork rather than lack of planning and change management that caused most problems for this group. Decision-making had been taken over by the programmer and his lack of consultation disenfranchised other team members from this

stage of project development. These comments from Margaret indicate the frustration she felt at being excluded:

I did not feel I was able to contribute at all during the final stages. My role was relegated to conducting testing and passing on the feedback from the testing to the programmer. I found this to be a frustrating task as I had no control of how the test results would be applied. I felt I had no control of the quality of the final product once the second prototype was developed.

Another outcome of control becoming centralised with an individual was that contributions from other team members were not included. For example Kath had been asked to create the audio resources, but as Lynn noted, Kath's contribution was circumvented "with the programmer choosing to go it alone".

A lack of teamwork was also a problem for Group C, although to a lesser extent. Simon, the graphic designer, preferred to work independently from the other members of the team and what Liz describes as an "over-reliance" on him meant production was delayed while the team waited for the screen designs to be completed.

For Group B the teamwork issues were more subtle. The lack of face-to-face meetings in the production phase meant a lack of coordination between the individual contributions. This is illustrated by Ian's comments that show that detailed project specifications are no substitute for team discussion:

It is very important for the media developer to have a clear idea of exactly what needs to be developed in terms of content and length. In our project, developing the audio clips was extremely easy. All audio was scripted and available in the project specification sheets. The video processing was not as easy. Length and content requirements were less clear. This is an aspect that might have been more closely coordinated between the project manager, instructional designer and media developer. [Ian, Group B, reflective case]

In summary, the reflections of the students emphasise active management of production tasks, including the use of strategies to manage change and the maintenance of team communication and consultation, as vital to project development.

**6.5.7 Discuss and negotiate team roles so that team members develop an understanding of their responsibilities and place in the team. Consideration**

**should be given to processes for decision-making and changing roles, and determining the involvement of the client.**

Early in the project it was suggested to teams that they allocate major roles to divide the work amongst the group members, reflecting the way that work is usually distributed in a multimedia development team. Roles were discussed in the first class meeting, and then left to the groups to negotiate. An early priority was to appoint one person as the project manager. A skills audit worksheet was provided to assist group with these negotiations (see Appendix 6.3).

Two of the teams began with five members, resulting in a re-shuffle of roles when one person from each group withdrew from the subject. After this, each of the teams comprised four members, each of whom was allocated one of the following roles: project manager, instructional designer, programmer or graphic designer. Other tasks, such as content research or media production, were either divided amongst group members or allocated to one person. Group B went so far as to assign each person a secondary support role in addition to a main role.

The negotiation of roles within the groups appears to have been based on two considerations – described by Steve as the “needs and experiences” of individual team members.

Joanne described this process in her team (C):

We had difficulty with assigning roles at the beginning because some of us wanted to learn new skills. But we had to take the pragmatic approach due to our project timeframe.

With the main roles allocated, the next challenge was to clarify the functions and responsibilities of each. For those with little or no experience in their roles, these were far from clear. For example both Liz and Joanne spent time researching their roles:

Initially, my chosen role was a graphic designer, however, after the withdrawal of our fifth member of our team, the role of Instructional designer was passed on to me. I didn't find my role very clear in terms of my whole team. However after some research, it become clearer to me. [Joanne]

Other students had experience or knowledge of their roles and saw the projects as a chance to learn more and extend their existing skills. For example Steve, the programmer from Group A, wrote:

After my experiences with the authoring tool iShell from last semester's work, I wanted to try something different... I turned to Macromedia Director, as I knew we had a copy at our school and that it was a well-supported industry standard, with a volume of text resources available from the library. Nevertheless it took some time to develop some confidence with the package, as had been the case with iShell.

Many of the students gave detailed descriptions of their roles and the tasks involved, exemplified by this excerpt from Margaret's reflections:

My task was to design how the content could best be included in the multimedia project. Before any design could take shape I first needed to determine the overall learning outcomes and general concepts that needed to be addressed. The content was then positioned on a concept map which developed into an outline of the main headings and sub headings. From this document I developed a storyboard indicating the general layout of screens, where content and media elements would appear and how the screens would be linked together.

Defining their roles also required negotiation with other team members to determine how the group would work together. While it was essential to develop a shared vision of the project in its early stages, group consultation was needed throughout the project – otherwise, as Rod pointed out, team members would end up “working on what they *thought* was the requirement, only to find out that [they] were off the track”. Developing an understanding of how roles related to each other was also important, although as Joanne explained, this was not always easy:

We accepted our roles but found that some were overlapping and sometimes it was hard to tell who was supposed to do what.

Decision-making was a key concern for all of the teams. Group B adopted two strategies to address this difficulty – one was to develop detailed specifications for everyone to refer to when working independently, and the other was to distribute the final decision-making power according to each team member's primary role. For Group A the situation of one person taking over control of the project excluded the others from decision-making in the final stages of product, clearly causing a great deal of frustration. By contrast, the members of Group C seem to have shared decision-making throughout the project.



Roles also changed as the project progressed. This occurred most dramatically in Group B when Sheryl replaced Ian as the project manager. This happened amicably and appears to have been the result of two factors – Ian’s increased workload in the production phase which prevented him from concentrating on management tasks, and concerns that emerged about Ian’s suitability for the role, which came mainly from Anna. Ian’s reflections also indicate that he became less confident about the quality of his management as the project progressed.

For Group C team members, the production demands in the final stages of the project saw them all pitch in to complete the prototype, taking on jobs not originally part of their roles:

In the end, we all chipped in and assisted each other to get the job done. I seemed to have more time on my hands so I prepared the multimedia resources which included video clips, audios, sounds and manipulated graphics. [Joanne]

The student’s reflections also provide some insights into the role of the client. All of the groups built a positive relationship with their client. Two of the clients were interested, but not closely involved in the project’s development. Margaret describes Group A’s client as “enthusiastic and knowledgeable”, but as Lynn noted he wasn’t always available for meetings when his input was needed. According to Liz, Group C’s client was “patient and accommodating”, but she felt that his lack of direction made it “difficult to envisage the overall concept”.

By contrast Group B found the client to be a little over-enthusiastic with Ian eventually having to suggest to Ray that he take a step back from the project. Sheryl described the situation:

In the early stages of the project [the client] ... was keen to be involved in all meetings and have input on the design. His presence did, however, tend to restrict our ability to think creatively and brainstorm ideas. I think it would have been better to have an initial meeting to understand his requirements and then to have come back to him later with some design ideas to comment on. Ian suggested to Ray that he did not attend our full day meeting and we were able to progress without him. Unfortunately the project then suffered from the opposite problem – not enough consultation with Ray – as he went on an extended holiday.

In summary, the reflections indicate the importance of team members coming to understand their roles in the team and the expectations of them, including the client’s. Decision-making

processes that were inclusive of all team members appeared to be most successful and an ability to adapt to the changing demands of the project was also important.

**6.5.8 Develop resource management strategies to facilitate access and collaboration during the production phase. Consider storage and organisation of files, file naming conventions, file sharing and distribution, back-up routines and version control.**

Managing the media resources to be incorporated into a multimedia project was a challenge faced by all of the groups. Resource management strategies were developed to guide production and protect against disaster.

Sheryl revealed that she initially thought that file management would be quite straightforward for her team, both because the project was small and because she had developed conventions as part of the screen specifications. Anna described the problems that arose:

A system was agreed but not uniformly followed, necessitating audits from time to time of media sources, their latest versions and locations of files. After an initial review of media and its storage this was not too problematic and ultimately prevented the inadvertent deletion of video material from my computer from being catastrophic.

This near-disaster prompted Ian and Sheryl to refine their team's system and made all of the team members aware of the need to follow the guidelines set down.

Groups A and C used an ftp server as a central repository of project files, which assisted with access, version control and back-ups. Joanne described her team's process as follows:

All team members could access these files in a central location from anywhere and know that they have the most updated version. Initially, we considered getting copies of the prototype on separate zip disk but decided that it would not be practical for version control. I have had first hand experience with file corruptions in Edgi913 and sometimes for no evident reasons. The FTP server is backed up on a regular basis so if a worse case scenario occurred we could at least restore the corrupted files.

Joanne also commented that not having a previous product to work from presented her group with the additional challenge of developing all project resources from scratch. Given the limited development time the team decided to concentrate efforts and try to avoid developing resources superfluous to the project needs. Team members realised that

resource management would help them focus their efforts and developed a system to keep track of their progress.

Resource management was less of an issue for Group A because after Steve took over programming and media production he worked on the files alone, maintaining them on his own computer. Nevertheless both he and Kath commented that the size of the images supplied by the client meant they were difficult to work with, and Lynn noted file exchange problems when receiving each team member's contribution to the design statement.

The reflections show that teams developed some resource management strategies in advance and some proactively as problems arose. These allowed the teams to focus their production efforts, share the files amongst group members and protect their work.

**6.5.9 Project management requires showing leadership as well as providing administrative and organisational support. The project manager must be prepared to intervene when problems arise, vary activities throughout the project and develop a mutually supportive relationship with the members of the team.**

Each of the teams needed to appoint one member to act as manager for the project. This occurred as part of the allocation of roles, and at first, the role was assigned to the person who had initiated the project. This was a logical choice considering the importance of developing a rapport with the client in the early stages of a project. Comments from a number of the students suggest that the teams placed a high value on prior experience when deciding who should act as project manager. Steve described his ideas about who should fill the role:

The team management was also a concern as no person in our group had any experience with development of a project and of the leadership experience required to manage it. Although we had our readings to learn from, it is clear that there is no substitute for experience.

As the semester progressed the project managers and their teams developed their understanding of what the role entailed, although were not always in agreement.

Differences of opinion over the role of the project manager were most obvious in Group A. Steve's comments suggest that although he took control of the project, understanding later that this compromised the teamwork aspect, he would have liked more direction from the project manager:

I feel that an experienced project manager would have made certain that all members made contributions at all stages along the development... We started well, with meetings and involvement of the client, but as soon as the programming component and holidays arrived, communication started to wane. As I worked to author the CD, the project manager released the reigns, happy to wait for the prototype, rather than insist on regular updates.

Kath was also critical of Lynn's handling of her responsibilities:

Although written records were maintained to enable us to refer to agreements about roles, the Project Manager declined to take any action from the time that control of the project was lost on the basis that we were not being paid. This is a very interesting issue: whether intervention in a contentious situation, is the role of the Project Manager, in the context of the 'legal' status of a paid position (or not).

From her own perspective Lynn did not appear to see the breakdown in teamwork as a reflection on herself as the project manager, and instead blamed the situation on Steve's inability to work as a team player. Her reflections on the project manager's role focus on operational aspects, such as ensuring the communication of information to the team and client, rather than resolving conflict between team members.

Ian began as project manager for Group B, considering himself the obvious choice having been the person to make the initial contact with the client. He admitted, however, that in putting himself forward for the position that he downplayed his own lack of project management experience and his "rather weak organisational skills". He further revealed that he "let the project look after itself once production had begun" and as the "organisational side of the project began to slide" remained oblivious to the problems. Concerned about the lack of strong management, Anna urged Sheryl to take over. Ian reflected that on Sheryl's performance, writing that:

Sheryl modelled what a good project manager can do. She brought her project management experience and superior organizational skills to help re-establish the project's direction. I'm sure the other group members were appreciative when she assumed the project's leadership.

Other comments from members of this group on the project manager's role highlight the importance in actively managing the production phase, the need to have a one person focused on project management issues and the project manager's responsibility in negotiating (or making) final decisions.

Acknowledgement of her own lack of experience in project management saw Liz (from Group C) begin by researching the requirements of her role on the Internet and from other sources:

Most material that I read drew similar conclusions that Project Managers involved in multimedia design are generally responsible as reiterated by Greer (1992) for "planning each step, stimulating action on the part of members of the design team, and then making necessary interventions throughout the project."

Liz defined her role broadly, and focused heavily on developing her teamwork skills, commenting that she grappled with issues such as "how team members communicate, how leadership is shared and how effective team members are in resolving conflicts". Rod praised Liz for her ability to support the team, commenting that she "assisted keeping us on track by producing summaries and progress reports as well as flowcharts depicting roles and responsibilities for the next step in the process". Liz's description of her responsibilities as they unfolded throughout the project highlights the changing nature of project management at each stage, something also reflected in many of the other student's comments.

Overall, the learners' reflections on the role of the project manager highlight the importance of having a manager who is willing to take the lead with negotiations and decisions, work through problems, keep team members motivated and informed, and adapt his or her activities in response to the different phases of the project. Although many of the students valued prior experience in selecting their project managers, Liz's success as a project manager suggests that this may be less important than having the confidence and support of the team.

### **6.5.10 Even when projects are designed to involve learners in authentic activities, academic tasks have demands that differ from real-world practice.**

Although learners found the opportunity to work with a client on a real educational problem a valuable and authentic experience, they also recognised that there were ways in which their student projects differed from ‘real world’ projects. These differences had implications for what the teams could achieve in terms of an outcome and for how the team members worked together.

Development time was a major concern for the teams, especially with the realisation that one 13-week session was a much shorter time frame than many ‘real’ projects would be allocated. This limited not only what the teams could develop in their final products, but also had implications for teamwork:

I found this time frame to be unrealistic in terms of getting the interaction going amongst the group members, which I assume was the real “experience” of the course – A team project with active involvement from all members, a sharing of ideas and workload. [Steve]

Furthermore the groups were not comprised of individuals with well-developed specialist skills and an understanding of their roles based on previous experience, as would usually be the case in a real-world project team. By contrast, Lynn described the team formation process as people “coming together somewhat randomly”. The teams then needed to allocate roles, and although prior experience was considered a factor in that process, other considerations were important, such as each person’s interest in learning new skills.

Working together on the project also revealed two further differences from real world projects. One was the impact of work and family commitments that took priority over university study. This limited the amount of time the teams could spend working together, because the project had to be allocated to ‘spare’ time. The varying availability of team members to work on the project was also an issue, with the team striving for an equivalent contributions from each member. This is also different to a real world project for which the input of each team member is not necessarily equal.

The second teamwork issue was the lack of a common working space. Real world projects usually have a dedicated physical working space where the team can come together, although members might also work separately. Although the student teams had access to a postgraduate computer lab within the Faculty, and to meeting spaces on campus or organised by other group members, this was not a substitute for a fixed location allocated to their projects.

Both of these factors meant that groups did not meet as often as they would have liked and some students commented on the impact of this on teamwork, summarised neatly by Sheryl:

Many of the management issues relating to the project were a result of the project being a university assignment, rather than a normal working project. This meant that team members were available only on a part-time basis and that they were geographically separated. If this project had been conducted by a training company with all of the team members working together in one location, many of the issues would not have arisen. Much of the day to day work involved in completing this project was done in isolation. This meant that there was little opportunity to discuss issues as they came up – or to bounce ideas between team members. Team meetings were probably not frequent enough and we spent a lot of time catching up on what each of us had been doing and planning the next section of work, rather than sharing ideas and helping each other.

The nature of the project, a university assignment with assessment items to hand in, also influenced the development process in Anna's view:

Under academic conditions we committed to a design statement by the due date and psychologically committed to it too. And the timing of the assignments means that we were following a far more sequential design model rather than an iterative one. Hopefully we would have taken longer to think through the design and progressively trialled and reconsidered it under real project conditions.

The role of project manager was also unlike its real-world equivalent, an issue that is highlighted in Group B's reflective case:

One of the interesting aspects of managing a university project is the reliance on the enthusiasm and commitment of the team members. While this is also the case in a commercial project, the project manager does have a level of authority in the workplace which they cannot assume in a university project. I think we were lucky to have such a committed team, in which everyone was prepared to complete their tasks. If this had not been the case, the position of project manager would have been a difficult one. The project manager had to rely on a style which is based on cooperation, as opposed to a more directive style which might be appropriate in a commercial setting.

However, the student projects also freed the teams from some of the pressures of a real project, like the need to obtain copyright clearances or to manage a demanding client. The projects provided a safe environment in which the team's could make mistakes, as noted by Ian's reference to his team's near-complete prototype:

Rethinking the project at this point would be very costly in terms of time and money if we were developing it commercially.

In summary, differences between doing project work as part of a university subject and the ideas students had about how real projects are conducted were included in many of the personal and collaborative reflections. While learners could still see the value in being involved in a realistic project they also recognised the different requirements and conditions of the academic setting.

## **6.6 Relating project experiences to the cases**

Two of the focus questions for the individual reflective tasks asked learners to relate their project experiences to the information from the cases they had analysed for the first assignment. These questions asked them about what information they had found useful in completing their projects and asked them about any parallels they could see. Although the group reflective assignment did not specifically require students to make links between their own projects and the *Nardoo* and *StageStruck* cases, there were many references made to the two case projects. Students also included some general comments on the value of the case analysis task.

Students found information from the cases useful in a variety of ways in their own projects. Analysis of the cases allowed students to identify aspects of a successful project that they hoped to emulate in their own work. Kath summed up the message she took from the cases - "to keep the project simple, consistent, realistic and achievable". Other students identified the following as elements to a successful project:

- a good working relationship with the client
- strong project management
- a detailed design statement
- a focus on the goals of the project



- a good team dynamic and collaboration
- evaluation and testing to inform design
- clear overalls goals and objectives to guide the project.

The case accounts also highlighted some of the potential difficulties, alerting students to some of the problems they might also encounter. Anna worried about the project management in her group:

The material in Stagestruck just confirm[ed] my anxieties. The more I thought about their management structure and lack of a clear decision-making process the more I was concerned that we would fall into the same trap.

But as she noted later:

Curiously our discussion of the difficulties with project management in Stagestruck did not prevent us from visiting similar territory.

However Group C team members were able to use insights gained from the cases to develop a strategy which would guide their work:

StageStruck and Nardoo both spent a lot of time developing a large amount of resource materials that they did not end up using in their package. Time was a major factor in our decision making and we had a realistic approach from the beginning to just focus on developing the particular materials we needed for our prototype. [Joanne]

The case accounts also helped learners to understand their roles and the roles of their fellow team members, and the tasks and responsibilities involved. For example, Ian noted that he found the discussion of project management “accurate and applicable”.

Asking students to reflect on the parallels between their own projects and the case projects also prompted a range of responses. The students identified the following similarities:

- similar aims and target audience
- a constructivist approach to design
- clear ideas provided by the client were similar to the *Nardoo* case, but in contrast to the *StageStruck*
- the original design ideas were adapted, requiring decisions about what to include in the final product

- the design process moved teams from high level ideas to more detailed specifications
- too many media resources were developed
- resource management became a major issue
- similar constraints were encountered, in particular time pressures
- estimating the time required for production tasks was difficult
- the challenges of working with a geographically-dispersed team
- difficulties in developing graphic resources
- the need to clarify roles and tasks
- the need for skill development
- the importance of open communication for keeping all team members on track.

Observation of these similarities helped to highlight the importance of these issues in project development. For example, Rod commented on the benefit of a common working space:

Because of Stagestruck's '2 team' approach (Sydney and Wollongong) they faced the challenge of keeping both groups heading in the same direction – something they admit did not always happen. On a much smaller scale and to a minor extent, there were instances in our group where individuals had missed a meeting or had not picked up an important point and were working on what they *thought* was the requirement only to find that were off the track.

The commonalities also highlighted issues that were of unexpected relevance, as Sheryl's comments show:

Another challenge reported in the case studies was management of resources. Initially I did not feel we would have this issue, as we were dealing with a much smaller development and therefore fewer resources. I was therefore surprised to find that we experienced the same issue as the Stage Struck team encountered – in having a large resource management task.

The similarities also helped to illustrate the wider relevance of the student's experiences, exemplified by this comment from Margaret:

I believe most multimedia projects would need to accept some compromise between the *wish list* and the final product. All of the productions I have read about including *Exploring the Nardoo* and *Stagestruck* designed features which were never included in the final product. Some ideas are technically too difficult, did not fit the metaphor, were too messy, too hard for the user to manipulate or not included as there was not enough time. We would have liked to develop a mould-o-meter but decided not to include one when it was realised it would not help to achieve the overall learning outcomes.

The comparison also drew out some of the differences between the case and student projects as well. This allowed students to critically assess some of their own decisions. For example, Sheryl reflected on her team's decision to constrain the design in accordance with the skills of the team's programmer, commenting that:

While this may have constrained the design in some ways, it did avoid the problems experienced by the Stage Struck project in that the initial design had to be discarded when it was too difficult to program.

Acknowledgement of the differences also showed that the students were aware of issues that they had not encountered in their own projects:

While large scale projects such as Stagestruck and Nardoo had big budgets, big agendas and politics, our scaled down version had little of these pressures. ... We also did not have the pressures of commercial considerations present to limit our prototype – in theory there was an unlimited budget (for a prototype), but there were great limits on time. We had the benefit of a definite client and a definite aim – these aspects were invaluable from the start as we had a clear concept to feed into the design process. [Kath]

In addition to reflections that related the case projects to their own project experiences, some of the students also made general remarks about working with the cases. Several students commented on the value of the cases in raising awareness of the issues and strategies important in multimedia development. Lynn's concluding paragraph expresses her view:

There is great value when designing multimedia projects to refer to previous work and case studies. This provides the development team with a clear view of proven approaches, along with indicating where opportunities for improvement exist in subsequent projects. This historical overview can also help the novice developer in identifying possible problems in the management of the project, allowing them to take steps to avoid the same issues encountered by previous development teams.

By contrast Steve had "mixed feelings about the usefulness of the case readings". His comments suggest he would prefer a greater emphasis on the project experience and that he did not find the case project relevant to his team's circumstances:

Whilst I recognise that there are lessons to be learnt from the mistakes of others, I also feel that this was a situation where immersion in the task was the key to developing understanding. The time frame of this course placed the team in what could be considered as "deadline mode". This would be the case for any multimedia development team that was in the process of getting everything finalised in a short time frame. As a consequence I feel that most of the case studies would reflect similar experiences to our own group, especially in these last weeks of the production.

Ian's perspective lies somewhere in between these two, expressing his belief that "the readings and case studies acquired more meaning AFTER I had been through the development process. I find that I learn best from actual experience". A perspective echoed by his team mate Sheryl:

...the design of the package was probably mostly impacted by the readings and experiences from the subjects we completed last semester. I think that many of the readings for this subject will seem more relevant now this project is complete – and I will revisit them over the summer break for that reason. [Sheryl]

## **6.7 Discussion**

### **6.7.1 Emergent themes and heuristics**

The ten heuristics that emerged from the analysis of the reflective assignments are indicative of the kinds of issues the teams encountered during their projects and of the key influences on their ideas about multimedia design and development.

The analysis shows that some of the issues faced by the team were relevant across the project development stages. These are concerned with the need for open communication, an understanding of roles, consideration of the inherent constraints, and the importance of active project management. These five issues were experienced differently by each of the teams and manifested differently in different stages of the project. For example, while the teams considered it important to recognise and work within the inherent constraints they identified at the beginning of the project, it was also important for them to continue adapting to those as the projects progressed and the implications of these limitations became more apparent.

Two of the issues relate specifically to the design phase of the project. Firstly, learners highlighted the importance of the design statement being a detailed, working document. This was also a prominent issue in the individual case analyses and from the project phase data. Also important was the need to find a balance between the factors that influenced the design. The client's expectations were a strong influence on the product design, particularly for Groups A and B. Team did however try to incorporate their own ideas about good

learning design. With little guidance from their client, the members of Group C seemed to be most influenced by their interest in taking a constructivist approach and the features they considered successful from the *Nardoo* and *StageStruck* projects. All of the teams considered the availability of resources in determining their designs, including what their clients would supply and the skill set amongst the team members.

The issues arising during the production phase drew much attention in the reflections. At this stage, team members had begun to focus more on their specialised roles, relying on the shared understanding of the project and the specifications developed during the design phase to guide individual work. Looking back, the teams identified a lack of communication and consultation as a major problem during this phase. Two groups were able to confront and address their problems. Group B negotiated a change of project manager and Group C decided to work around the uncommunicative team member. Group A did not address the dominance of one team member and this had a detrimental effect on the product and team relations. The production phase was also a time when original design ideas needed to be changed and adapted, and issues such as resource management had to be tackled.

The limitations of their projects in providing a real-life experience were also recognised by the students. These observations suggest that there are aspects of student group work that conflicted with the development team experiences they had read about in the cases and the other literature. These differences should be considered when designing cases-based materials and authentic projects. This issue will be discussed further in Chapter Seven.

### **6.7.2 Nature of the reflective tasks**

Examination of the student's individual and group reflections also provides some insights into the nature of the tasks.

In general, the individual papers gave a personal “behind-the-scenes” account of the projects. Learners were able to discuss their own roles in the teams, with some students giving detailed accounts of the tasks they undertook and the responsibilities involved. Some

of the papers were reflective and revealing, while others were more descriptive and distanced themselves from the events. This contrast is most notable in the accounts of Ian, the deposed project manager of Group B, and Lynn, project manager of the troubled Group A. Ian reflects openly on his difficulties as project manager, from the weak organisational skills he downplayed at the beginning of the project, to his failure to notice the problems that arose during the production process. Lynn's reflections show that she developed a good understanding of what a project manager should do, but rather than examining her own part in the breakdown of collaboration in the group, shifts the blame wholly onto another team member.

By contrast, the reflective cases were public documents, in that they were prepared jointly by the team and therefore not something private between the student and the instructor. As a consequence, these are somewhat 'sanitised' documents and reveal less about the problems encountered by the project teams. This is particularly so in the reflective case prepared by the members of Group A. In the overview section they present a broad chronology of project stages, giving a short description of each in terms of the literature, and then team activities and some of the strategies they developed. There is no mention of difficulties or challenges faced, giving the impression of a very smooth development process. This section is followed by individual contributions from each of team members. Teamwork problems were hinted at by Lynn:

If one member of the team chooses to be precious about their role, and not keep the others informed using the agreed communication channels, it can lead to feelings of anxiety and stress, and a feeling of loss of control.

Problems are also suggested by a close reading of Steve's contribution. He focuses his section on his role and activities as the programmer, describing the product as an "unpolished PowerPoint presentation with some multimedia components". He fails to mention his team, and justifies his take over of the project by the amount of the work that he had put into it. He doesn't seem to recognise that the team might have produced something better together.

Reading this group's individual and collaborative accounts, together with the other data collected from interviews and the on-line discussion that reveal the team's problems, it is

clear that the group case glosses over key aspects of the project. The positive side of this, however, is that by downplaying what went wrong and developing more general statements like the quote from Lynn above, they present the issue in a broader context.

Both tasks gave learners an opportunity to tell the whole story of the project, providing a chance for them to describe events and discuss issues not relevant to the design statement. In developing their reflective cases there was a need to ‘fill in the gaps’ so that it might make sense to someone not directly involved in the project. For example, all of the groups provided a description of the initiation of the project as part of the background to the project, with some students also using the opportunity to discuss their initial ‘unrealistic’ expectations.

Looking back seems to have helped the learners critically examine their team projects – in terms of the design of the product, the process of development, and the way they worked together. For example, Group B team members discussed their assumptions about their target audience, concluding that they should have researched their learners more fully.

The reflective process allowed learners to clarify many of the issues they had encountered in the *Nardoo* and *StageStruck* cases, now using their own experiences as a reference point. In particular, preparing the reflective cases encouraged them to look outward from their specific circumstances to consider the wider relevance of the issues.

## **6.8 Key findings**

The findings from this stage of the investigation provide the following insights into the group projects:

- Ten key themes emerged from the analysis of learners’ individual and group reflections.
- Some of these were relevant throughout the life of the project – such as working within the project constraints, fostering open communication, understanding team roles, and having an active project manager.

- In the design phase, the main challenge for teams was to prepare a detailed design statement that would document their ideas for the planned package.
- The teams also needed to find a balance between the client's expectations of the product, their own ideas for good design, and what they could achieve within the bounds of the project.
- Many of the issues apparent in the learners' reflections were related to the production phase, in particular the importance of management and planning to support collaboration, the need to adapt initial design ideas, and the need to develop and use resource management strategies.
- Learners also recognised that while, in many ways, their team projects were like real-life design projects, the academic nature of the task also placed different demands upon them.
- The reflective tasks provided opportunities for both private and public forums for learners to express their ideas.
- Comparison of their own project experiences with the issues raised by the *Nardoo* and *StageStruck* cases allowed learners to consolidate their understanding, critique their actions, look beyond the specific circumstances to a broader context, and consider issues outside their projects.

The next chapter presents a summary of the results from the study overall in terms of the research questions, and a discussion of the implications for practice and further research.



## Chapter Seven

### Discussion

#### ***7.1 Introduction***

This chapter discusses the outcomes of this study, firstly by presenting a summary of the findings in relation to the research questions and outlining the learning outcomes for each stage of the learning design. This is followed by conclusions derived from these findings and their implications for practice. The next section discusses potential directions for further research, and the chapter is concluded with a brief summary.

#### ***7.2 Summary of findings***

This study was guided by a broad research question: How do learners use contextual information presented in cases to construct meaning and solve design problems?

From this arose three key sub-questions, which in turn were further broken down to guide the research design, data collection and analysis:

1. How do learners interpret the case materials?
2. How do learners develop solutions to their project design tasks?
3. What aspects of the projects and cases do learners reflect on at the end of the subject?

A qualitative case study approach was used to investigate a technology-supported, case-based learning environment developed for a graduate subject. Student work and semi-structured interviews were the primary data sources collected. Observations of class meetings, discussion list transcripts and subject documents provided complementary data, enabling rich description of the learning context. The data obtained from the relevant phases of the investigation are discussed in detail in Chapters Four, Five and Six. The key findings from the study are summarised and discussed in relation to each of the three sub-questions as follows.

### **7.2.1 Question 1: How do learners interpret case materials?**

The individual case analysis task produced a diverse range of responses both in terms of what learners wrote about, and how they expressed their ideas. The individual task allowed learners to pursue their own interests, and incorporate their ideas with what they read in the case materials. The small group and whole class discussions brought these different interpretations together, drawing out the multiple perspectives and differing concerns of the project teams. The key features of the learners' interpretations are discussed below.

#### **7.2.1.1 The case analyses included multiple interpretations and demonstrated learners' understanding of the nature and complexity of real-life multimedia development projects.**

The individual analysis task allowed learners to pursue the issues they were interested in and develop their own interpretations of the case events. Some students chose to discuss several key issues in detail, while others covered a wider variety more briefly. Learners also drew together design, management and process issues, explaining how they can impact on each other. Furthermore, by considering the different perspectives of the designers and project managers, learners developed their ideas about the multifaceted roles within a development team.

The differences in learners' interpretations of the cases are exemplified in their accounts of the key decision points and issues that arose. Some accounts were derived directly from the source materials, and this resulted in case-specific descriptions. Other students used general stages to describe one or both of the cases, while others mapped the events directly onto models from the literature. While some accounts were descriptive, other students developed their own interpretations of the 'story'.

Learners also expressed their ideas about the nature of the development process as complex and messy. This indicates the effectiveness of the cases in illustrating that real-life projects are not like the step-wise processes often encountered in multimedia texts (cf. Fenrich, 1997).

#### **7.2.1.2 Project management issues featured more prominently than design issues in the individual case analyses.**

Overall, there was a greater emphasis on management issues rather than design issues, both in terms of the number of references and the degree to which they were expanded on.

Learners were also interested in gaining an understanding of the project manager's role and many discussed the responsibilities that this role entailed. Students also appeared keen to identify the key aspects of successful project management, often making connections to what they might do in their own teams.

Generally, learners discussed design issues in relation to process and management issues from the cases. While this suggests that the cases enabled students to see issues as interrelated and to develop their understanding of the designer's multifaceted role, it appears that the cases were not as helpful in portraying design as a process in which ideas are conceived, negotiated and adapted. Many students did note at a general level, however, that design ideas were shaped by many factors and might later change according to circumstance. Evaluating a particular feature of the product gave learners an opportunity to trace its development from idea to implementation. Again many students did not identify 'design' issues as such, tending to focus more on process and management.

The predominance of management and process issues suggests that perhaps the students found these easier to identify with. This may be because personal and organisational issues are more universal, or perhaps more relevant, particularly to those students taking on the project management role in their teams. It may also be that learners found it difficult to isolate design issues from the cases because there was insufficient detail in the materials, or perhaps the issues were not apparent because a higher level of background knowledge was required to identify them. Alternatively, the design issues may have been self-evident to the students who had previously undertaken individual design tasks, or it may be that the issues simply did not seem relevant.

### **7.2.1.3 Most learners found the cases relevant to their previous experiences as professionals and student designers.**

Some of the students readily made links between the cases and their own professional experiences, even though none of the students had prior experience working in a large multimedia development team. As might be expected, the students who were employed to design and deliver training programs found a high level of relevance in the specifics of the cases. Other students made links to more general experiences, such as collaborating with others in their work environment.

Most of the students also made reference to their own experiences as student designers in a previous subject. These were often reflective and critical, as they considered difficulties they had faced in common with the case designers and how they might have approached the task differently.

Students also considered their own experiences as users of the CD packages –from the perspectives of both learner and teacher. They used their insights to make judgements about the effectiveness of the product's features, for example the useability of the navigation and the effectiveness of the metaphor. Two teachers had also used the packages with their classes and added their observations.

For some students, however, it seemed that the cases were too different from their own experiences and they were unable to make connections. For example, one student commented that he couldn't make comparisons with the cases because he had not worked in a team before. Other students, however, wrote that although they had not worked on a team project they could see some commonalities between the cases and their own experiences.

### **7.2.1.4 Learners used details from the cases in a variety of ways to support their interpretations.**

Most of the learners used the cases as their primary information source, but there was wide variation in the amount of detail they used to support their answers. Some students drew on specific events or comments from the materials to support interpretations and explain their

judgements. This included descriptions of single instances, and the drawing together of multiple sources of evidence. Some students used little specific information from the cases, sometimes leading them to make sweeping generalisations. One student inaccurately reproduced some of the case details, suggesting that he had not read the materials closely enough.

With access to two cases, learners were invited to explore some of the similarities and differences between the two projects. Some students treated the two cases separately, including comparative remarks in a concluding section of their assignment. Other students compared the projects throughout. Overall, this aspect of the task was not performed well. Some students produced comparisons that focused on the superficial aspects. Some students identified commonalities, but ignored significant differences. Furthermore, comparisons were often made without further explanation of their origins or implications. This had the effect of glossing over some of the contextual detail.

#### **7.2.1.5 The individual case analyses included responses that ranged from straight-forward description to sophisticated interpretation and generalisation.**

In analysing the assignments the researcher considered not only ‘what’ learners wrote about but also ‘how’ they wrote. Two main types of responses were found – summarising description and interpretation. Descriptive summaries of case events were needed to give the necessary background information, for example, to describe the process through which the product was developed. A few students relied almost exclusively on this kind of description to express their answers. Most, however, went further with the information, providing some of their own interpretations. These responses drew sources together, adding commentary to the straight description. The balance between descriptive and interpretative responses varied widely across the group and within an individual assignment.

Other response types were less common. A small number of comments simply reproduced material from the cases in paraphrase or quotation. Some students also offered their own judgements, some tentatively and others with more conviction.

Three main types of general statement were identified – general observations about the case(s), generalisations about the nature of multimedia development, and general principles to guide the process. Some students made general statements throughout their assignments, others only when discussing the lessons they had learned from the cases. Some students made few or no general comments, their discussion staying completely within the context of the cases presented.

#### **7.2.1.6 The analysis task was challenging and learners drew on a variety of strategies to prepare their responses.**

The analysis task proved to be a challenge for learners because it was different to the more academic tasks that they were used to, such as essay or report writing. Most of the students interviewed said that they were unsure of what the task required. Despite this, few sought assistance from the instructor.

Learners adopted a range of approaches when working with the materials including browsing, skimming, note-taking and tabulating information. Students found that they needed to go back-and-forth between the descriptive materials and the CD-ROMs, finding that knowledge of each assisted them make sense of the other.

All students interviewed used the assignment questions to guide them and said that these determined the focus of their attention. Some students read in-depth, while others searched through the materials looking for pieces of information from which to develop their answers. Some students focused first on exploring all of the components, at least briefly. One student's comment that she wasn't sure what was in the full set of materials indicates that this was not the approach taken by all of the students.

Some students said they were intimidated by the amount of material included, feeling that they needed to cover it all. Drawing the details together was also challenging because information was presented as multiple, sometimes repetitive, sources and in different formats. One student felt that the differences in the information presented for each case made them difficult to compare.

Overall, the students identified the interviews with key designers to be the most useful component of the case materials, and these became the focus of their attention. The students felt the interviews to be readable, honest accounts that gave a behind-the-scenes view from a range of perspectives. Also of value were the original design statements because these served as models to which the students could refer when developing a design statement for their own projects.

#### **7.2.1.7 The discussion components allowed learners to share their different perspectives and consider the issues more broadly.**

Discussion of the cases occurred in two phases – small group discussion in projects teams and then whole class discussion.

The project teams were asked to consider what design and management issues from the cases might be relevant to their own projects. The discussion was held in the early stages of the subject and, at the time, all of the teams were working with their clients to understand the project requirements and negotiating the distribution of roles amongst the team members.

The focus of the small group discussions shows that each of the teams had different concerns at this stage. One of the teams made little reference to the cases, instead focusing on the features they planned for their own project. Another team spent their time talking about some of the problems the *Nardoo* and *StageStruck* teams had encountered and how they might avoid them. The third team concentrated on the features of the case projects they could use in their own design, and the management strategies they might employ.

The data suggest that in the small group discussion session there was negotiation about which issues were most relevant and why, and that this process consolidated the learners' understanding of those particular issues. The students were able to move beyond the case contexts and consider the more general relevance of the issues.

The whole class discussion followed on from the small group meetings. Facilitated by the instructor, each group shared the key issues they had focused on. This process required

them to explain their project to those outside their group. As various issues were raised, different perspectives on the same issue emerged and prompted further discussion, as the students compared their differing situations. Generalisations emerged from this process, in particular, as learners made observations about what makes a successful project and what challenges their team might have to manage.

The instructor was able to pose further questions, challenging teams to consider issues not yet raised. The forum also provided an opportunity for the students to clarify their understanding of the project task.

### **7.2.2 Question 2: How do learners use the cases to develop solutions to their project design tasks?**

#### **7.2.2.1 The cases developed learners' understanding of the design statement document and provided examples from which teams could draw ideas for their proposed package.**

The importance of the design statement as both a design and management tool was a key issue raised in the individual case analysis assignments. This realisation is also reflected in the design statements that were produced by the project teams. These not only presented the team's design ideas, but also documented the results of the negotiations with the client and deliberations amongst the group members.

Each team focused on similar issues when defining the educational or training problem their design would address, and when presenting their proposed design solution. The design statement template and case examples appear to have acted as a guide for these early activities.

In defining their design problems, teams focused on:

- understanding the client's requirements and expectations
- defining the target audience for the product
- finding out about existing approaches and programs
- identifying available resources (both from the client and within the team).



These activities were essential for familiarising the teams with the context of their problems and are typical of needs assessment activities used to identify important background information for a project (Rossett, 1995).

The three different problems yielded three quite different solutions as expressed in the design statements. One team proposed a traditional training package in which learners would follow a linear path, with their progress dependent on correct answers to quiz questions. Another had ideas of a problem-based learning environment in which trainees would interact with elements in a realistic shop landscape. The third design was for a three-dimensional gallery space that learners could explore, discovering items in the art gallery's collection and finding clues to resolve a challenge.

The proposed designs reflected the students' concerns with presenting not only what they would achieve in the development of their advanced prototypes, but also their visions of the entire package. This involved determining some of the specifics, such as the content elements and learning activities, while also considering the 'big picture' approach. The design statements detailed the features to be included in the prototypes and set these within the context of a larger package.

Two of the teams included ideas from the cases in their design statements. Group C chose to adopt a similar constructivist approach and 'borrowed' other ideas relevant to their proposed design – namely the use of a three-dimensional navigable space, genre templates, an electronic notebook and problem-solving tasks. Group A chose design features and management strategies without taking on the constructivist approach, seeming to pick and choose the ideas they liked, rather than producing a coherent design.

Another difference in the teams' proposed solutions was the different levels of detail provided. Group B produced a detailed explanation of their proposed design, including an annotated storyboard describing each of the screens planned for their prototype. Group C concentrated on developing the big picture of their package concept, only discussing the

key elements of their design in brief. Group A described features of their design, but gave neither a detailed description nor explained how the elements were consistent with each other or the overall approach chosen.

#### **7.2.2.2 Awareness of problems experienced in the case projects allowed teams to implement proactive strategies and respond to issues that arose during the project.**

Data collected from the project group experiences and through learner reflections suggest that managing changes in the original design and managing teamwork are critical to a successful outcome. Learners developed an awareness of these issues through the case analysis and this allowed the teams to implement strategies that might avoid some of the problems experienced in the case projects, for example, by negotiating version control and team communication protocols.

While these proactive strategies were important, the most successful teams were those that were able to respond to problems that arose as the projects progressed. Both groups B and C successfully managed changes to their original design by adapting aspects that ‘didn’t work’ or were too ambitious. They also managed team conflicts, with Group B changing project manager part-way through and Group C working around a team member who was not interested in collaboration. Reflections from these students suggest that although the problems they encountered sometimes differed from those portrayed in the cases, an awareness of the potential pitfalls made them more vigilant in monitoring their project.

A less successful outcome was achieved by Group A. Their product was under-developed, the navigation problematic and the elements not integrated. Many of the team’s ideas were not realised in the final design. This team suffered a serious breakdown in collaboration and experienced communication problems throughout the project. Team members point to this as the primary factor underlying the poor quality outcome they achieved. Without a high level of collaboration supported by good communication the team was not able to discuss and develop their design, and contributions from some team members were not included.

This pattern suggests that success in working as a team did not necessarily come from the absence of team problems and conflict, but from their successful management. For these three teams, open communication appears to have been the key to success or failure.

### **7.2.3 Question 3: What aspects of the projects and cases do learners reflect on at the end of the subject?**

Learners reflected on the value of the cases in helping them identify the aspects of a successful project which they could hope to emulate in their own, and the potential problems they might encounter. As discussed previously, this prompted teams to develop strategies that they hoped would help them avoid some of these problems.

The cases also acted as a real-life reference point with which students could compare their experiences. The similarities allowed them to see the relevance of many issues to the broader context. Alternatively, the differences challenged their ideas and decisions, prompting critical re-assessment. Students also appreciated that the cases contained issues that they did not encounter in their own projects, such as copyright concerns and intellectual property disputes, and so broadened their awareness of multimedia development.

Students commented on the value they placed on the cases. Despite differences between the types of projects depicted in the cases and the types of problems the groups faced, learners felt that the cases provided credible and relevant information. Only one student felt that the cases were not sufficiently related to his own group project to be of assistance, and his comments suggest that he would have preferred to ‘get on with’ what he saw as the primary task – producing the prototype.

The ten main themes that emerged from the learners’ reflections at the end of the session provide insights into the group project experiences. Five of these correspond to particular phases of a project’s development. The nature of the proposed design as the result of many factors and considerations was important during the design phase. Adaptation to change and compromise of original ideas; teamwork, planning and management; and effectively

managing resources were all critical in the production phase. Documentation was a valuable tool in both the design and production phases.

The clustering of issues around the production phase suggests that this was when the teams encountered many of their problems, both in terms of implementing design ideas and managing the resource and teamwork aspects of the project. The importance of the design statement as preparation for the project was also highlighted. The themes are consistent with the data collected during the project phase (see Chapter Five).

The remaining five themes were relevant throughout a project's development:

- Each project had inherent constraints that the team must recognise and work within.
- Open communication was essential to a good group dynamic and collaboration.
- Each team member needed to develop an understanding of their role.
- The project manager was a significant role with responsibilities that changed through the course of the project.
- Working on a project for a university subject was not like a real project.

The final theme above shows that learners were aware that in some ways their projects different from real-life projects. This conclusion was drawn from learners' comparisons between issues arising in the development of their projects and their relevant previous experiences and issues from the two cases.

The two reflective activities gave students a chance to tell the whole story of the projects. The individual reflections, which were shared only with the instructor, gave a behind-the-scenes view of the project. Most students were open and candid about their experiences, although a few were more defensive. These accounts were private and, to some extent, cathartic.

The group reflective case was a document for more public consumption and these accounts were 'sanitised' by the authors, downplaying some of the problems the teams experienced. Preparation of these cases required team members to explain the detail of their situations

and consider the issues in the wider context of multimedia development, and so had a role in encouraging students to generalise from their particular experience.

## **7.2.4 Summary of learning outcomes**

This section summarises the outcomes for learners according to the types of task undertaken. Not all of the students achieved all of these outcomes. Instead the outcomes are indicative of the role that each of these activities had in developing learners' ideas about the cases and their own projects, and about multimedia design and development more generally.

### **7.2.4.1 Analysis of related cases**

#### ***7.2.4.1.1 Individual analysis***

The case analysis task introduced learners to new ideas about multimedia design and development, while also helping them to refine their existing understanding as they related their ideas about the cases to conceptual knowledge and personal experiences. For many students this resulted in an increased awareness of the range of issues that arise in the development of a multimedia package and the complexity of real-life projects. The analysis task also encouraged higher order thinking, such as interpretation and generalisation, in some students.

#### ***7.2.4.1.2 Group discussion activities***

The group discussion activities encouraged learners to consider how the cases related to their own projects and so provided a new context to consider the issues they had identified in their case analysis. This also served to clarify the educational or training problem as discussion focused on issues that related to the team project. In both the small group and whole class sessions the cases provided a common ground for discussion, while at the same time allowing learners to come into contact with the views of others in their teams and in the class. These activities helped learners to consolidate their understanding, and move beyond the context of the cases to consider issues more broadly. This process supported generalisation from the specific situations described in the cases. The discussion also provided an opportunity to clarify issues with the instructor, and for the instructor to prompt learners to consider issues they had not yet identified.

## **7.2.4.2 Collaborative project work**

### **7.2.4.2.1 Design statement**

Preparation of the design statement assisted project teams to define the educational or training problem their projects would address and present their proposed solutions. This encouraged the teams to document both their design ideas and the outcomes of negotiations with their clients. The template provided a structure within which the teams presented their 'big picture' ideas, with varying levels of detail and coherence. The design statements provide an indicator of each project's stage of development and the focus of the team's thinking. The design statement played an important role in the creation of a shared vision amongst team members.

### **7.2.4.2.2 Prototype product**

Through the development of an advanced prototype the teams were able to demonstrate their ideas on-screen. The prototypes showed varying degrees of change from the design statement stage, and this reflected what teams had been able to achieve within the constraints placed on them. The prototype was a product of the team's ideas plus mediating factors such as the time available, the degree of cooperation between team members and the skill set available to the team. The critical role of open communication in supporting collaboration was apparent from this stage.

## **7.2.4.3 Reflection**

### **7.2.4.3.1 Individual reflections**

The individual reflections learners produced were private accounts that allowed them to express their ideas about what happened during the projects. These reflections revealed much about the development process and the teamwork issues that arose, and provided an opportunity for learners to justify and critique their actions and the actions of others. The task served as preparation for the group reflective case by encouraging learners to clarify their thinking about their own perspectives. Comparisons made with the case projects revealed new understanding of case issues in light of learners' own project experiences.

### **7.2.4.3.2 Group reflections**

The group reflective case was a public document that provided an opportunity for the teams to tell the story of their projects in a way that the design statements did not. This helped the

teams to clarify their experiences, explain events and motivations, and justify and critique decisions and actions. These cases presented a 'official' view that hid some of the conflict and 'failure', but also encouraged teams to look beyond the contexts of their projects, thus assisting the process of generalisation. As with the individual reflections, comparisons with the case projects revealed new understanding of case issues.

### ***7.3 Conclusions and implications for practice***

The aim of this study was to learn about the use of cases as learning materials by investigating how learners interpret the information they contain and by considering their role in supporting group design projects. The previous section describes how learners in this study used the contextual information presented in cases to construct meaning and as support for solving design problems. This section develops those findings into a set of conclusions and implications for practice.

#### **7.3.1 The real-life cases provided credible accounts which encouraged learners to develop their own understanding of multimedia design, management and process issues.**

Learners saw the cases as credible, real situations that provided insights into 'how things really happen'. The analysis task raised learners' awareness of a wide range of issues, the interrelations between them, their changing importance over the course of the two projects, and the different perspectives of the team members. The cases provided insights into the process by which the products came to be developed and provided explanations for some of the key design decisions. These accounts, in conjunction with the final software package, provided learners with information about both process and product. Learners were also keen to identify some of the pitfalls experienced in the case projects, particularly in terms of project management. This, they thought, would help them avoid the same mistakes.

Overall, the cases allowed learners insights into complex, authentic situations which they viewed as credible. This helped them make links between their previous knowledge developed from the literature and their own experiences, and the events presented in the case materials. Learners came to appreciate multiple perspectives by considering the different views of the designers in the cases, further illustrating the complexity and

contingencies of real-life situations. These outcomes are consistent with the aims of case-based learning suggested in the constructivist-oriented literature (Jonassen, 1999; Duffy & Cunningham, 1996). It also appears that having access to more than one case allowed many learners to see how issues can manifest differently in different situations. This suggests that multiple cases that allow learners to compare and contrast are more effective than a single case.

Although the cases developed for this study depart from the focused, single-issue cases recommended in the conceptual literature (see for example Graf, 1991; Stolovitch & Keeps, 1991) these outcomes reflect some of the advantages of choosing real-life situations over fictitious or disguised accounts. These cases, which tell the stories of long-term large-scale projects, effectively convey the complexity of real-life situations, allowing learners to identify multiple issues and the relationships between them. The cases are presented as examples rather than models and, as such, are open to interpretation and criticism. Students are able to see that the final version is the product of the many decisions and considerations of the design team according to the particular circumstances of the time. Alternative choices at any stage might have led to a different outcome. From this, students can see that there is no one path and no 'right' answer.

The presentation of the cases as a set of resources rather than as a narrative also differs from the approach suggested by the literature. Rather than detail being arranged and condensed by the case writer/narrator, materials were left, as much as possible, in their rawest form. Personal accounts from the designers were presented as transcripts of the interviews held with the case designer. Original documents were converted to portable document format (PDF) to maintain their original formatting. Only in the overview and timeline sections was it necessary for the case designer to condense the voluminous meeting notes and project descriptions into a more manageable format. The materials were categorised and hyperlinked to allow multiple paths for exploration. This encouraged learners to explore and develop their own interpretation of the materials.



This approach to the design of cases takes advantage of the ability of real-life cases to “mirror real world problems and processes” (Knirk, 1991, p. 76) and carries this through to the incorporation of original materials. The approach supported the development of cases that contain the desired complexity and ambiguity needed to adequately represent realistic situations.

### **7.3.2 Learners needed more support to understand the individual case analysis task and develop their responses.**

The results of the study suggest that many of the learners found the individual case analysis task challenging. Being unlike a traditional academic task, such as an essay, learners were unsure of what approach to take. Furthermore, only one student had prior experience with the use of cases for learning, and that was a very different application. Most students struggled on their own or in consultation with other students, with few seeking clarification from the instructor. The responses provided to the analysis questions varied widely, indicating the learners’ different interpretations of what the task required.

While most students indicated that they valued the analysis task, two in particular held a different view. One student commented that she preferred more condensed information that gave her quick access to ‘the facts’. For her, reading the cases was an unnecessarily convoluted way of getting information. Another student said he simply wanted to get on with what he saw as the main task – developing the prototype. To him, the cases did not directly relate to his situation, and so he did not consider them useful. He was only interested in his specific situation, not the broader issues. Ertmer and colleagues (1996; 1998) also found that learners in their study who did not automatically perceive the value of case-based learning. However, the researchers were not able to determine a specific role of this factor from their study, and recommended that further investigation be undertaken.

The students’ responses suggest that they needed help to understand the purpose of the task and what was required of them. Rather than assume that the purpose and approach to a task is self-evident, the instructor might engage the learners in a discussion that deals with assessment in an open and transparent way (Reeves & Okey, 1996). Such a dialogue may have been effective in this subject by allowing learners to raise issues, examine

assumptions and potentially develop some ownership over the task. This, in turn, may have enhanced the perceived value of the task.

The analysis questions were deliberately broad, encouraging learners to draw on multiple sources and perspectives to construct their responses. The questions invited learners to:

- develop an overview
- form an argument
- highlight and select information
- present their own interpretation of events
- make links to their own experiences and/or ideas from the literature
- trace an issue and discuss it in detail
- make a judgement
- compare and contrast
- generalise to other situations.

The questions prompted a diverse range of responses, with some students offering sophisticated arguments, while others tended towards descriptive reproduction or summary. Across assignments the same question elicited a variety of response types, and within one assignment a student might provide a descriptive response to one question while being analytical in answering another. These results indicate that the case analysis approach did not elicit higher-order responses consistently from all of the students.

Apart from an over-reliance on description, some of the other risks in analysing the cases were:

- over-generalisation characterised by discussion of the cases at a general level only that resulted in glossing over details and complexity.
- over-simplification of details that filtered out relevant information or ignored ambiguity or conflict.
- misrepresentation of events or opinions at odds with the information provided in the cases.

Encouraging learners to make links between cases and their own understanding is considered an important aspect of case analysis in the literature, and prior experience has been found to influence student's thinking about cases (Levin, 1994). Like many classes, the student group that participated in this study came to the subject with a range of prior experiences and knowledge and, not surprisingly, the question asking students to relate the cases to their own experiences produced a wide variety of responses. One student, an experienced designer of face-to-face training programs, referred heavily to her own experiences, noting many similarities and differences. Another student, who lacked prior experience in related activities, found relevance in more general issues, such as puzzling over design ideas and relating to other team members. Another could see very little relevance because of what he felt were fundamental differences between the case projects and his own work. Some students chose not to respond to this part of the question, making links only to concepts from the literature. These differences show that the influence of prior experience on the students' interpretations of the cases is not straightforward. Some students made broad comparisons, while others could not see past superficial differences.

Another aspect of case analysis emphasised in the literature is encouraging learners to generalise both about a case and then from that case to other situations (Miller & Kantrov, 1998). In this study many of the students limited their analyses to the case contexts, with only a small proportion of responses including general observations about the cases or conclusions about the wider context of multimedia development.

The shortcomings of the responses may be due to difficulties students encountered in managing such a rich, diverse information source. Student interviews suggest that at least some found the material complex, conflicting and repetitive. The amount of material was daunting and none of the students used all of the materials. One option might be to remove some of the items that seem extraneous, so that the set of materials seems smaller and more manageable. This would remove some of the richness of the case and may make it less useful for other purposes. Another option would be to provide students with more support in developing information management strategies. This latter approach would be more in

keeping with the aim of providing an ‘authentic’ information source, although investigation is needed to identify strategies which may be helpful to learners.

Furthermore, case designers and instructors may need to include strategies to support learners develop the desired types of responses. The variety of analysis responses produced by learners in this study suggests that case-based reasoning of the kind advocated in the literature does not necessarily come naturally. Although some students appear to need little explicit assistance, other students need scaffolding to support them in different kinds of reasoning, for example generalising and comparing. Simply using a case approach will not guarantee the outcomes suggested by some proponents. Teachers and designers must consider the kinds of reasoning they are trying to promote and provide models and guides than can assist students develop their ideas. These could be provided either by the instructor working closely with each student to offer assistance when needed or could be available as resources, in which case learners must be supported with self-monitoring and diagnosis tools.

### **7.3.3 Discussion played a vital role in broadening learners’ perspectives of the cases.**

The analysis task for this subject consisted of three steps: an individual case analysis, small group discussion in project teams followed by a whole class discussion.

This study found that the discussion components played an essential role in consolidating ideas, broadening learners’ perspectives of the case and encouraging generalisation. These results are similar to Levin’s (1994) findings that discussion prompted students to clarify and elaborate on their ideas as a result of their interaction with other perspectives. By contrast, the learners in Levin’s study who did not participate in discussion tended to solidify their individually-held views because they lacked any stimulus to challenge their thinking.

Observations of the small group discussions in this study indicated that there was active participation, with all members sharing their views. Conducting the small group discussion in project teams was particularly appropriate for this learning situation, with consideration

of issues that might be important in their own projects encouraging learners to move from the cases to the wider context. In this way the small group discussion acted as a ‘warm-up’ by providing a transition to the project phase. The reflections of one student suggest that this was also a neutral ground for raising issues of concern, such as potential project management problems.

The whole class discussion was particularly powerful for eliciting multiple perspectives on the same issue as teams members described their situation and stance. With a public audience the teams had to clearly explain their projects and their design ideas. In so doing this again forced them to clarify their ideas about both their own projects and the cases. As a forum for sharing different perspectives, the whole class discussion also led students to offer more general ideas about multimedia project development. It is likely that this aspect of the discussion particularly assisted those learners who did not develop general principles in the individual assignment, to see the broader relevance of some issues.

This study suggests that these two types of discussion played a critical and complementary role in the development of learners’ ideas about developing educational multimedia software. Discussion allowed the learners to share ideas and confront alternative perspectives that encouraged them to clarify their own thinking. Furthermore, findings suggest that when case-based learning is used to support a focal activity, such as project work or problem-solving, discussion can provide a transition from the case context to the next phase. In this instance, the project teams suggested a natural small group structure, although other groupings, for example by team role, might also have been effective. In subjects where activities are individual rather than collaborative the small groups could be formed to act as support teams.

#### **7.3.4 The study provided insights into the group project experiences and highlighted key issues faced by the teams.**

In addition to investigating learners’ interpretations of the case materials, this study also provided insights into the experiences of the project teams and the issues they faced in working together on the project task.

Each of the teams faced a similar deadline and, working within the structure of the subject and associated assessment tasks, all of the projects followed the same basic pattern: development of the design statement, production of the components of the products, and assemblage and refinement of the final version.

Developing the design statement was a familiar task to these learners and, supported by a template, the teams had little difficulty with the stage. Each team used the design statement as a tool to assist them with the problem definition and a place to document their 'big picture' ideas as negotiated with the client. While the structure of each team's design statement was similar, the different levels of detail included set them apart. These differences may have reflected differing levels in the teams' understanding of their design problems, maturity of their ideas, and extent of their research. They also suggest different approaches to the problem, with one group concerned with setting down the detail early but lacking a unifying concept, while another focused on getting the big picture right.

It was also apparent that the design statements did not encourage students to justify, as well as describe, their design ideas. Nor were the teams required to explain the process by which they planned to develop their product. Presentation of the proposed design at a class meeting could have engaged the students in a process of explaining and defending their ideas that may have helped teams to develop a more coherent vision. Agreeing on a process for working may have alleviated some of the later problems encountered in the production phase. Inclusion of process issues in the design statement or in class discussion may have facilitated also.

Each of the teams achieved quite different outcomes, not just in terms of the nature of the prototypes, but also in terms of the 'quality'. In this study, prototypes were deemed to be of high quality if they met the aims described in the design statement (though the specifics might have changed) and showed integration of the component parts. A high level of functional polish was also essential, so that for example the navigation should be complete.

The results of this study suggested two key factors in achieving a high quality outcome. Firstly, the differences in the quality of the prototypes reflected the differences in the design statements, with the teams who produced a more coherent design statement achieving a better outcome. This suggests that developing a shared vision is critical at this early stage. The two teams who had developed their 'big picture' ideas had a framework to guide them when they needed to adapt some of the details. The other group had described some of the specific features they wanted to include in their package, but their design lacked coherence and the result was a poorly integrated package.

The other factor in developing a high quality product was a good team process. This allowed two of the teams to successfully manage teamwork issues as they arose, particularly in the production phase when team members tended to work more independently and communication was vital. The third team suffered a disastrous breakdown in communication and collaboration that adversely affected their final product. Better support for the project managers to act in their roles and to implement facilitation and mediation strategies may have assisted all of the teams. More active coaching by the instructor throughout the process might also have been effective in addressing team issues in the dysfunctional group. This role might alternatively be performed by an independent mentor, acting as an advisor.

Importantly, differences in the technical and production skills that each team possessed at the beginning of the project did not appear to have a significant effect on the outcome. For example two of the teams lacked experience in graphic design. One developed a simple, consistent interface that combined buttons, photographic images and video segments. By contrast the interface and navigation options developed by the other team were inconsistent in placement and appearance, and graphic elements were poorly integrated with the text.

The outcomes suggest that a coherent, shared vision of the project and good team process with high levels of communication are essential starting points to achieve a high quality outcome. These allow teams to adapt their ideas during the production phase and address any problems that emerge.

### **7.3.5 The cases offered assistance to the project teams by providing design examples and an awareness of management and process issues.**

As discussed above, the case analysis activities raised learners' awareness of the issues that faced the teams who developed *Exploring the Nardoo* and *StageStruck*. The individual writing task and subsequent discussion activities allowed learners to develop their understanding of both the circumstances of the particular projects and the wider significance of the issues.

The cases assisted the learners in two ways. Firstly, they provided descriptions of the design process through which learners could trace the development of many of a product's features and functionality, from the original concept through to implementation in the final version. This was most applicable for the team who undertook the art gallery project. Their brief was open-ended and the client was happy for them to adopt a constructivist framework. As a result many of the design ideas from the two case projects were relevant to their package. One of the other teams tried to incorporate some of the ideas from the case projects, such as the information landscape design and the navigation/simulation tool. These proved difficult to incorporate into their overall structure which used a more traditional tutorial format. The remaining team did not appear to derive any of their design ideas from *Exploring the Nardoo* or *StageStruck*.

Secondly, the case projects raised learners' awareness of the nature of the development process through the activities and events described in the materials, and highlighted the management problems experienced and the strategies used by the project manager. A desire to avoid some of the difficulties encountered by the case teams prompted the student teams to address some issues early, for example, detailing intellectual property rights in their design statements, and developing strategies for version control and communication. The cases also helped students begin to understand their roles and the roles of their fellow team-members.

It appears that significant similarities in the overall approach allowed the art gallery team to transpose design ideas from the case projects to their own. The other two projects required



the development of training materials and were more conventional in their design. It appears that these two teams found it difficult to transfer design features of the case projects into more general strategies. For example, the two training teams expressed interest in adopting a problem-solving approach to learning, a particular implementation of which is exemplified in *Exploring the Nardoo*, but neither developed these ideas in their final project. This suggests that the cases were effective at illustrating particular designs, but less successful in relating these to more general instructional strategies. It may be that the training teams needed more closely-related examples to extract ideas for their designs. This suggests that perhaps the cases should be adapted to reveal more about the thinking behind the design and more explicitly describe the design strategies. The latter provides a significant challenge, considering that it has proven difficult to trace the thinking of expert designers (Le Maistre & Weston, 1996; Perez et al., 1995, Perez & Emery, 1995).

It is also important to note that despite their awareness of management and process issues, teams still encountered many problems, particularly in the production phase, when teamwork and good communication were crucial. One of the dangers was losing sight of their goals as the teams developed and adapted their original ideas. This is another aspect of the process for which the cases seemed to offer little guidance. Redevelopment of the cases so that they offer more help with the process by making production strategies more explicit may be needed. Specifically, learners need access to strategies that help them bridge the gap between having a great design idea (as described in their design statement) and then implementing that idea in their product.

These issues serve to highlight some of the limitations of the cases. As suggested above, it may be possible to redevelop the materials so that they make aspects of the case projects more explicit and accessible, and so better model these processes for learners. It may also be that such modelling is better provided by the instructor so that strategies can be tailored more closely to the needs of the project teams. Closer monitoring by the instructor, or more regular reporting from the team project managers, might also allow for problems to be raised and addressed as the project proceeds, rather than leaving teams to try to deal with issues internally.

The results also suggest that when using cases to support authentic activities, instructors and designers should consider three aspects of ‘authenticity’. This means not just considering how the focal activity relates to the real-world environment, but also how the cases reflect the real world by being genuine credible accounts, and how the cases relate to the problems students might be expected to encounter in their projects. By understanding more about the group project experiences and the types of problems that arise, the cases can be better designed to meet the needs of the students.

### **7.3.6 The individual and collaborative reflections allowed learners to tell their story.**

The reflective activities were important in enabling learners to tell the story of their projects. The individual and collaborative components were complementary, with the ‘private’ and ‘public’ accounts drawing out different information.

Both of the reflective activities required learners to look back over their project experiences and consider their versions of events – the issues faced by the teams, reasons behind particular outcomes, and factors that influenced the outcome. Learners were able to explain, justify and critique their team’s decisions, a process that helped them revise and consolidate their ideas about multimedia development.

The individual reflections gave the story ‘behind-the-scenes’, in often revealing and candid accounts. Some students felt the need to defend their actions, others considered alternative approaches they could have adopted. As collaborative exercises, the reflective cases were more public documents and as such represent the result of negotiations between team members. These versions were understandably more sanitised, but teams were also more likely to draw out general principles and share the lessons learnt from their experiences. The complexity of their accounts and the increasing sophistication of their understanding of multimedia development are apparent from both the tasks. These outcomes are similar to Kleinfeld’s (1996) findings from her study of case writing in a pre-service teacher education program.

In looking back on their own project experience students also re-considered the case projects. Some comments suggest that, through the reflective activities, learners reassessed some of the case events and issues, seeing them in a new light. Their own project experiences also made the cases seem more relevant and useful. Comments indicated that cases became reference points while learners were learning about their roles, and when the teams encountered unanticipated issues.

Although similar themes run through the learners' reflections, the three group projects were different and each of the teams experienced the process differently. The details of the reflections illustrate how key issues manifested differently according to the circumstances of the project teams. It seems likely that rich, realistic, related cases of the kind provided for this subject will be more useful to support the diversity of experience possible in authentic activities than single-issue, closely focused cases. While not supporting learners across the full gamut of activities, these cases provided points of reference that, although not always evident in the initial analysis, many learners identified in the reflective phase.

### **7.3.7 The learners were aware of differences between their group projects and real-life projects.**

Comparing their own group experiences with the case projects served to highlight some of the ways in which the learners' project experiences were a by-product of the project being an academic exercise undertaken as part of a university subject.

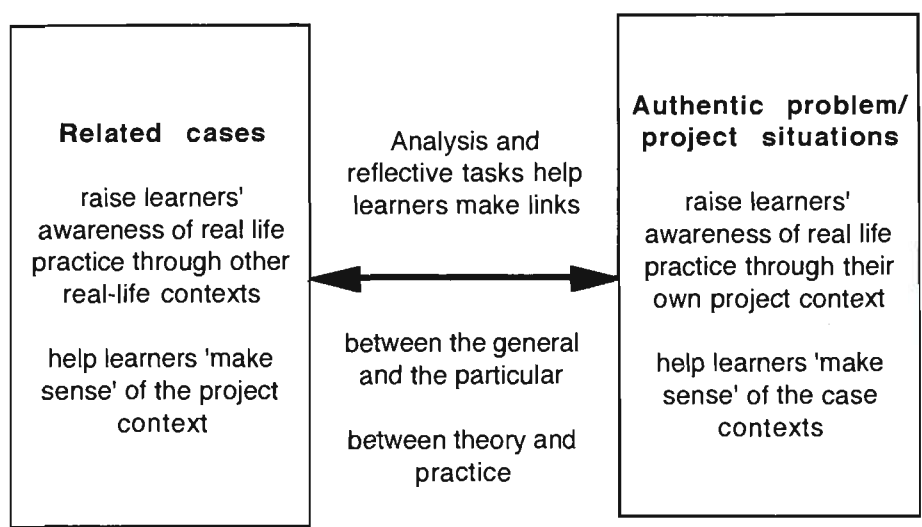
The 'unreality' of the projects arose from the compressed timeline and pattern of assessment that suggested a linear rather than iterative production process. Furthermore, as a team comprised of students there was no natural hierarchy that gave the project manager authority. However, team members brought assumptions of their social hierarchy to the class – for example a student who was a senior teacher in real life might be considered to have authority over more junior teachers. The teams were also unlike real-life project teams in that the students lacked the technical and production skills that specialists bring to a project team and there were concerns about every member making an equivalent contribution to the assessment task. In addition, some real-life issues were not relevant to their projects. For example, without the pressure of a commercial environment, little

attention was paid to ensuring that copyright regulations had been adhered to. All of these factors were limitations on the project itself as an authentic experience, and this was made more obvious by comparison to the case projects.

The students' apparent acceptance of these limitations suggests that rather than abandon these kinds of projects because they lack authenticity in some way, the comparison with related but real projects provides further insights into 'real-world' practice. Rather than avoiding the issue, acknowledging these differences could become a valuable part of discussion throughout the subject. In this way, teachers and learners can address the non-realistic aspects of the project task rather than ignore or simply accept them.

### 7.3.8 Implications for a more generic design model

Although this study investigated a particular learning environment, it is possible to extract a more generic design model and so build on the approaches proposed in the literature. This model is based on the findings of the study that suggest that analysing related cases helps learners understand the context of their own projects, and reflection on their project experiences in turn helps learners gain further insights into the cases (see Figure 7.1).



*Figure 7.1* Relation between case analysis and project tasks.

In practice the idea can be implemented as in this study through a series of analysis, project and reflective activities. The key features of the design are represented in Figure 7.2.

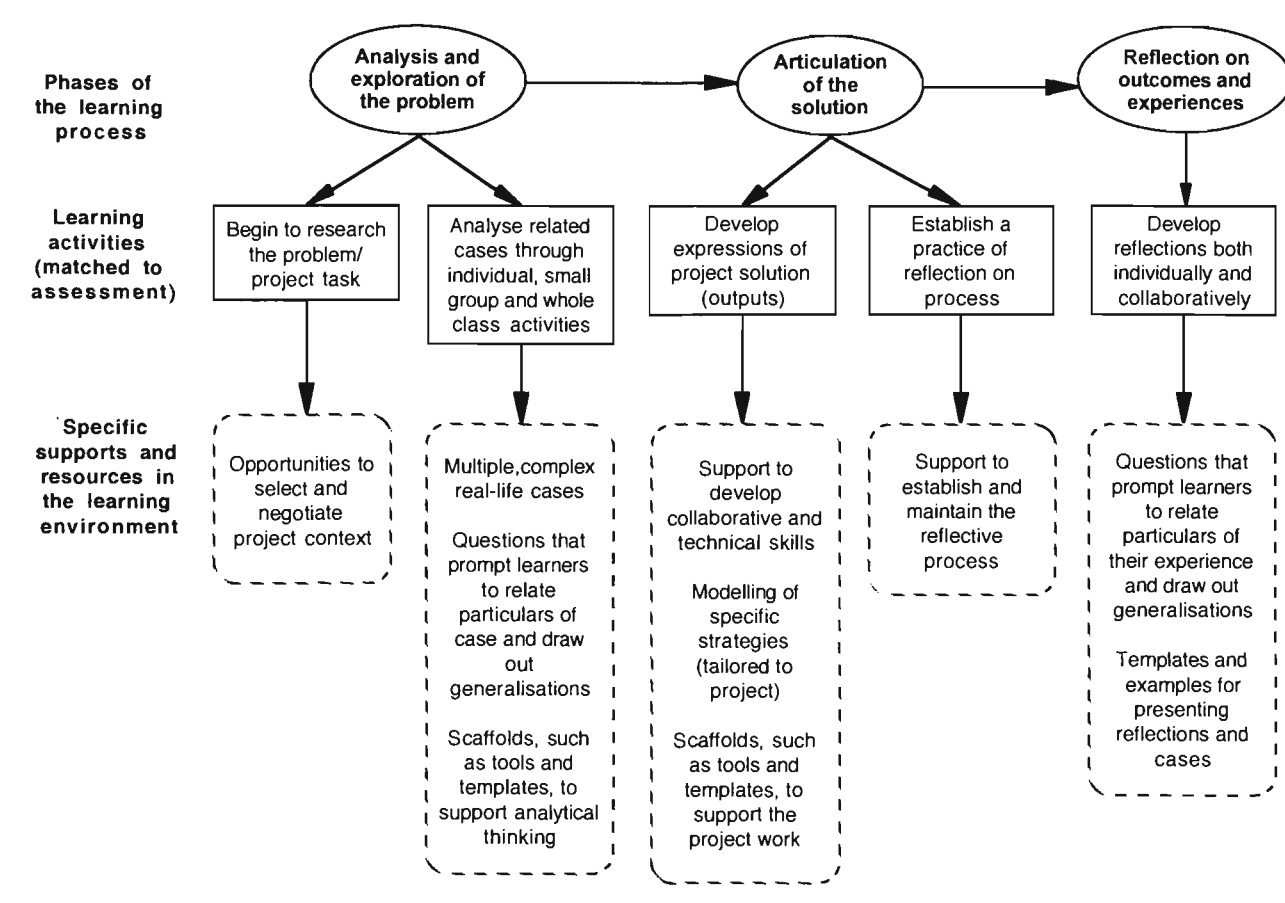


Figure 7.2 Key features of the generic design model

Each phase of the learning process involves a set of learning activities for which specific supports and resources must be included in the learning environment. The learning environment should also provide other appropriate supports such as relevant information resources, tools for communication and collaboration, social and contextual supports and cognitive tools (as proposed by Jonassen, 1999).

The learning environment developed for this study exemplifies one possible implementation of this design model and it is likely that different learning situations will require different approaches and combinations of strategies. The potential for redevelopment and customisation for use in other settings raises issues for further research, which are discussed in the next section.

## **7.4 Further research**

This study was exploratory in nature and use of the qualitative case study approach allowed the researcher to investigate specific aspects, such as the learners' interpretations of the cases, while also developing an understanding of the learning context. As an in-depth examination of a particular situation, the study captured specific details using a range of data sources to provide complementary and confirmatory information. One of the strengths of this type of study is that it allows the focus of the investigation to shift as unanticipated issues arise, and new avenues of interest become apparent. While the unique set of circumstances exhibited in the research setting precludes generalisation from this study to other situations, the findings make a significant contribution to the limited knowledge base and suggest possible directions for further research. The following areas of interest are just some that might follow on from this investigation.

### **7.4.1 Support for learners**

Findings from this study, and from previous work by Ertmer and colleagues (1996, 1998), suggest that students' perceptions of the case analysis task play an important role in how they approach it. A student's previous experience with case-based learning, or lack thereof, may be an important factor as the use of cases becomes more prevalent. Relevant experience in instructional design and project work appears to have played a part in some learners' interpretations of the case materials as well, although a consistent pattern did not emerge from this study. Different approaches to the task were also apparent in this study group suggesting that previously successful strategies, individual preferences and conceptions of learning might also be a factor. Furthermore, the factors that determine the value that learners place on a task need to be understood. All of these warrant further attention as better preparation for the task may enhance its effectiveness.

Support is also needed to help learners develop higher-order response types in their individual case analyses, and so efforts to determine appropriate forms of scaffolding are needed. While many learners spontaneously added their own interpretations, made links to their own experiences and generalised from the materials to a wider context, some of the learners in this study group showed a tendency to describe and summarise the case

information. Activities and templates could be developed to assist these learners construct the types arguments and explanations that the case analysis process aims to elicit. The development of a data collection and annotation tool within the software might also help learners manage the large, diverse resource set.

This study and the limited amount of other research investigating the role of group discussion in case analysis suggests that it is an effective strategy for developing learners' understanding, and that different formats produce different outcomes (Flynn & Klein, 2001; Stepich et al., 2001). More needs to be known about how opportunities for discussion should be incorporated into the analysis process.

While this was not specifically a study of group collaboration, the findings revealed difficulties experienced in the group project activities. Researchers have acknowledged the challenges inherent in designing group work experiences and supporting students to get the most from collaboration (Blumenfeld et al., 1991). The findings from this study suggest that learners needed support for working in teams, for example in the roles they had taken on. Strategies such as peer support and mentoring should be investigated to determine their potential for assisting learners to act in their roles.

#### **7.4.2 Applicability to other settings**

This learning environment was designed to address a particular learning situation, and as such may not be applicable to other settings. For example, the materials and activities developed for a small class of graduate students may not be suitable for larger groups or for undergraduate classes. The approach may be appropriate for instructional design problems, but less relevant to problem-solving or project work in other disciplines. The cases involved projects developed within the students' own institution, featuring designers already known to some of them, and so may have less credibility for other audiences. Such issues have implications for redevelopment of this learning design to suit other situations, for example in conjunction with practical placements, as an in-house workplace training program, involving students working at a distance who do not meet face-to-face, or with more diverse teams comprising members from very different backgrounds.

Furthermore, the cases depict an Australian setting and their inherent cultural bias may render them less useful in other countries. There may also be wider cross-cultural issues in the style of learning encouraged by the application of case-based learning. Do students from other cultures with alternative conceptions of education and learning face different challenges to the Australian students in this study? Investigating the interpretations of learners from other cultural backgrounds may provide insights into the design of case-based learning experiences. In addition, the majority of students in the study group were female and only female students volunteered to be interviewed. This situation may have masked gender-related issues that could play a part on learners' interpretations and approaches to case-based learning.

### **7.4.3 Design of the cases**

Related cases are thought to provide learners with access to a set of relevant situations to which they can refer in tackling a problem task. Such cases should provide a 'window to practice' by revealing the way issues arise in real-world situations and how different circumstances require different responses. When selecting or creating cases to support authentic activities designers must consider how the situations match both the real world and the task set for learners. The cases must assist learners with their challenge, but also remain true to real life. A further complication in developing appropriate cases arises when, as in this subject, the nature of the students' projects are not known before the subject commences and so the cases must be relevant to a variety of situations. In this study some of the students did not perceive the cases provided as particularly related to their team project, while others identified both general and specific aspects they found relevant. This suggests that the notion of 'relatedness' is not straightforward.

In this study the cases traced the development of two large, commercial real-life projects. Although these cases revealed much about real-life practice, the potential mismatch between the cases and the student projects was of concern to the researcher, particularly that students might develop unrealistic expectations of what they could achieve. It appears, however, that the cases helped the teams to develop an understanding of the inherent constraints and need for adaptation that are part of any project. Furthermore, the class discussion about the students' and instructor's expectations of what they would develop



helped to make explicit the differences between the case and student projects. For at least one student, however, the cases were too different to the student projects. This suggests that future students might benefit from reading the reflective cases prepared by past student teams. While these do not always reflect the real world, they would complement the real-life cases. Further investigation of how learners perceive the relation between the cases and their problems is needed to test the viability of this idea.

The potential for multimedia and Web-based cases to offer learners a more realistic and interactive experience has been suggested in the literature (Merseeth & Lacey, 1993; Hudspeth, 1991), but this is yet to be investigated empirically. For example, how are learners' interpretations influenced when materials are presented as visually-rich, realistic or metaphorical environments? Does viewing a video clip or listening to an audio track instead of reading a transcript of an interview make a difference to the learning outcomes? The materials in this study consisted mostly of text, with some graphics and were constructed as a set of hyperlinked resources. The aim was to deliver the materials across the Web and so large media files were not used. Thus this study did not explore the potential for using media such as video and audio. It may also have been possible to make greater use of synchronous and asynchronous communication tools to conduct the small group and whole class discussions. In this study both of the discussion activities occurred at a face-to-face class meeting, but making use of computer-mediated communication could allow learners studying at a distance to take part.

In this study, the rich, diverse set of materials that comprised the cases were time-consuming to research and develop, and daunting for some students to use. It may be possible to reduce the size of the collection, focusing on fewer, simpler resources, without losing the complexity, by identifying the key features which benefit learners most. This might also allow the materials to be used over a shorter time period, such as a workshop or class session. Evaluation of different versions of the materials might provide some guidelines. The set of materials was developed as a collection of resources rather than a narrative so that it would be more transferable to other design subjects. This assumption also needs to be tested.

#### **7.4.4 Nature of authenticity**

Despite the enthusiasm for incorporating authentic activities into learning experiences that is commonly expressed in the literature, a clear understanding of how these might be implemented in practice remains elusive. Few authors have defined what they mean by ‘authentic’, and from those that have come a variety of perspectives. However, some common questions arise. For example, what aspects of the real-life activity must be presented in the task to maximise benefit to learners? Furthermore, what aspects are superfluous? More work also needs to be done in determining how critical contextual information can be extracted from a situation. The findings of this study suggest that there are limitations to the authenticity of an activity incorporated into an academic setting, but that comparing these with real-life situations depicted in cases can enhance learners’ understanding rather than detract from the experience. This idea also needs to be tested.

#### **7.5 Conclusion**

This study challenges the notion that case-based learning is a natural extension of the way people use solutions to past problems when confronted with new situations. While the use of cases in an educational setting may be able to draw on this innate ability, it is neither easy nor automatic. Thus, it is not reasonable to expect that cases can function as surrogate experiences. The outcomes of this study suggest, however, that a case-based learning environment that supports learners interpret and draw conclusions from depictions of real-life events can provide insights into the way practitioners work and help learners make sense of their own project experiences.

The key findings of the study can be summarised as follows:

- Learners engaged with case materials they saw as realistic and credible, developing their own interpretations of the case events and producing a diverse range of responses to the analysis questions.
- In their individual case analyses some learners spontaneously incorporated their own interpretations and derived generalisations from the cases, while others provided descriptive responses and did not move beyond the contexts of the cases.

- High levels of description and instances of over-simplification, over-generalisation and misrepresentation in some responses suggest that the case analysis task did not necessarily promote higher-order thinking.
- Group discussion, as a forum for sharing ideas and confronting different perspectives, was crucial in helping learners to move beyond the specifics of the cases to understand issues in the broader context.
- The analysis of related cases raised learners' awareness of the kinds of issues they might face during the development of their own projects, and to some extent prompted them to adopt strategies to address these.
- In order to achieve a high quality outcome, student teams needed to develop and maintain a coherent shared vision of their project teams, and establish and maintain effective collaboration and communication.
- Individual and groups reflections offered an opportunity for learners to clarify their understanding of their project experiences, to rationalise and critique their decisions and actions, and to draw out lessons for the future.
- The reflections played an important role in helping learners draw together conceptual knowledge, interpretations of the cases and their own project experiences.
- Differences between the student projects and real-life projects, as represented in the cases, provided a point of comparison that enhanced learners' understanding of multimedia design and development.

These findings are a significant addition to the limited research literature on the use of cases for learning, particularly in its consideration of learners' individual perspectives. The findings carry implications for the design and implementation of cases to support authentic activities and suggest further avenues for research. The sparsity of research in this area and the growing popularity and diversity of case-based approaches means that there is still much to learn.

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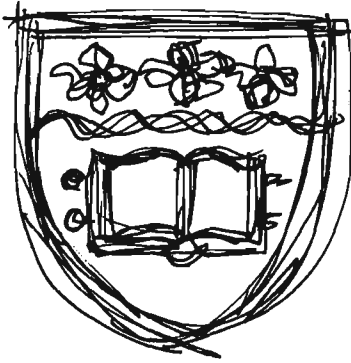
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# **Subject Outline**

**EDGI931 &  
EDGI932**

## **Interactive Multimedia Design**

**Wollongong, Session 2-2000**

**Faculty of Education**

University of Wollongong



# Subject Outline

**Subject Code and Name: EDGI931 Interactive Multimedia Design**

**Subject Code and Name: EDGI932 Project for Interactive Multimedia Design**

Pre-requisites/co-requisites: EDGI911 and EDGI913

Credit points: EDGI931 - 6 credit points; EDGI932 - 2 credit points

Offered: Session 2, 2000 Wollongong

[Note: Contact information has been removed from this document to maintain confidentiality.]

## Subject details

### Subject description

This subject is a second level subject in the specialist strand of Information Technology in Education. As such this subject will focus on the particular problems of delivering educational materials using interactive multimedia. The problems of design for such information technology systems and the ways in which learning effectiveness and efficiency is affected will be examined.

### Objectives

The subject Interactive Multimedia in Education is designed to:

1. prepare students to design and develop interactive multimedia in collaborative teams.
2. experience the team design process and reflect on this experience
3. review the process of interactive multimedia development

### Assumptions

Students will have a background in the use of computers, an understanding of common applications software and some experience in design of software based on instructional strategies. Participants will have developed skills in the use of prototyping software such as, Authorware Professional, Oracle Media Objects, iShell, Director etc.

Web-based and e-mail technologies are considered critical vehicles of communications in this subject, it is expected that students have a competent level of skill using these technologies.

### Method of delivery

Face to face lectures and workshops; Web and e-mail facilitated communications; team meetings.

### Lecture/tutorial times

Unless otherwise advised, class meetings and workshops will be held in Building 22, Room 107 (Multimedia Lab, Faculty of Education)

|         |                  |                     |
|---------|------------------|---------------------|
| Week 1  | 5:30pm - 7:30 pm | Thursday 13 July    |
| Week 5  | 9:30am - 4:30pm  | Saturday 12 August  |
| Week 10 | 9:30am - 4:30pm  | Saturday 14 October |
| Week 13 | 5:30pm - 7:30 pm | Thursday 2 November |

Additional, skill-based workshops will be held on an as-needed basis. Throughout session the class will make use of the Web site discussion forum and e-mail to communicate between face-to-face meetings.

Teams are responsible for arranging meeting times and locations and maintaining communication (as necessitated by their project requirements).

**Text and resources**

There is no required text for this subject. A CD-ROM, containing required resources, will be made available for purchase at cost. Details regarding the resource CD will be communicated to students in the first class meeting. The subject Web site includes subject information, resources and communication tools. It is located at:

[http://webct.uow.edu.au/SCRIPT/EDGI931\\_S2/scripts/serve\\_home](http://webct.uow.edu.au/SCRIPT/EDGI931_S2/scripts/serve_home)

Students require a University of Wollongong wumpus account to access the site. Students may find the following text a useful resource for this subject: England, Elaine and Finney, Andy (1999) *Managing Multimedia: Project Management for Interactive Media*, 2nd Edition, Harlow, England: Addison-Wesley.

**Assessment guidelines**

**Criteria**

Assessment of EDGI931 and EDGI932 will be based on tasks related to an interactive multimedia design and development exercise with both individual and group components. Students will form teams of three or four and assessable tasks will consist of:

|   |                  |
|---|------------------|
| Assignment 1 Case Analysis                  | (20% of EDGI931) |
| Assignment 2 Design Statement               | (30% of EDGI931) |
| Assignment 3 Educational multimedia package | (50% of EDGI931) |
| Assignment 4 Reflective Questions           | (30% of EDGI932) |
| Assignment 5 Reflective Case                | (70% of EDGI932) |

**Performance grades**

|    |                                  |         |
|----|----------------------------------|---------|
| HD | High Distinction                 | 85—100% |
| D  | Distinction                      | 75—84%  |
| C  | Credit                           | 65—74%  |
| P  | Pass                             | 50—64%  |
| F  | Fail (unsatisfactory completion) | 0—49%   |

**Medical certificates**

Please refer to the Faculty of Education Handbook.

**Assignment guidelines**

**Submission**

Given the schedule of face-to-face meeting times, students are encouraged to submit their assignments via e-mail directly to the instructor.

Students should clearly note their name on the filename and within the document of all submitted assignments. Format guidelines for individual assignments are detailed below. E-mailed submissions will be receipted via reply message

**Acknowledgment**

Please refer to the Faculty of Education Handbook. Students should also refer to the University of Wollongong's policy on Plagiarism available in the University Calendar. Plagiarism is not acceptable and may result in the imposition of severe penalties.

**Due date**

The due date is the last date for the University to receive an assignment.

## **Extensions**

Please refer to the Faculty of Education Handbook. An extension of time to submit material for assessment can only be granted in exceptional circumstances.

## **Late submission**

Penalties may be incurred for late submission of assessment tasks. It is the student's responsibility to contact the lecturer regarding late submission circumstances and/or extensions.

# **Assessment tasks**

Assessment tasks are described below. This information is replicated on the subject Web site.

## **Task 1: Case Analysis**

**Due date:** Part A due 6 August 2000; Part B due 16 August 2000

**Weighting:** 20% of EDGI931

**Length:** approx. 2000 words

### ***Part A: Individual response to case questions (12%)***

Due: 6 August 2000

For each of the cases provided, complete the following questions:

1. Describe the major stages and decision points in the process of developing the product. What are the major issues at each stage?
2. How do the experiences of the designers in this case relate to
  - a) other literature you have read about multimedia design and development or
  - b) your own experiences as a designer (for example in your work or for EDGI913)?
3. Choose a particular feature of the product which is discussed in the case.
  - a) Describe how you think it relates to the original concept and goals of the project.
  - b) From the information in the case what do you think were the major design issues in developing this feature?
  - c) Do you think the feature is effective? Explain your reasoning.
4. What are the major project management issues in developing a multimedia CD-ROM that are highlighted by this case? (Use example situations from the case to support your ideas.)
5. What are the main things that you think you learnt from studying this case?

Complete your analysis with a brief comparison of the two cases, highlighting the main points of similarity and difference.

## **Submission instructions:**

Compile your answers into one document and save it as an rtf (rich text format) file called YourNameCA.rtf. E-mail the file to your instructor as an e-mail attachment. [Note: you can save a document as an rtf file in Word by selecting the Rich Text Format option under Save As ] If you are including any non-text components not handled in Word, please send as an email attachment and advise your instructor of the format.

### ***Part B: Group discussion of focus questions (Ungraded, 8% participation required)***

Due: 16 August 2000

In your project meetings this week discuss what issues raised by the cases might be important in your own project. Use the following questions to focus your discussion:

1. Are there any design issues or strategies highlighted by the cases that you think will be important in developing your team's project?

2. Are there any project management issues raised by the cases that could be important for your project team?

Nominate someone to take notes during the discussion and prepare a summary of your main points and post it on the discussion list.

**Submission instructions:**

Post your contribution under the Project Group Discussions (Week 6) forum on the subject Web site.

**Task 2: Design Statement**

**Due date:** 27 August 2000

**Weighting:** 30% of EDGI931

**Length:** approx. 2000 words

Prepare a design statement (approx. 2000 words) for your interactive multimedia software project. Note: The project is to be developed in collaboration with a client.

The design statement should have an emphasis on effective instructional strategies using the technologies of interactive multimedia, and dealing with the problems of screen information, navigation, path analysis, team member responsibility, expertise, client relationships, etc.

Make use of the design statement template, and the other templates available on the resource CD.

**Submission instructions:**

Save your Design Statement as an rtf file called ProjectNameDS.rtf and e-mail it to your instructor as an e-mail attachment. If you are including any non-text components not handled in Word, please send as an email attachment and advise your instructor of the format.

**Task 3: Educational multimedia package**

**Due date:** To be negotiated

**Weighting:** 50% of EDGI931

Each member of the team must have an identifiable contribution to the package that represents an appropriate portion of the total work involved. The project should be developed using a full development cycle. The assessment is based on the initial stages of the development cycle of needs analysis, design and implementation.

**Submission instructions:** To be negotiated.

**Task 4: Reflective Questions**

**Due date:** 29 October 2000

**Weighting:** 30% of EDGI932

**Length:** approx. 1000 words

In preparation for the individual component of the reflective case prepare responses to the following questions.

1. What was your role in the project team? Describe your tasks and responsibilities.
2. How did you work with the other members of your team?
3. What were the main design and management issues your team encountered during the project?
4. Choose a particular issue and describe how you addressed it.
5. Was there any information from the case or readings you studied that was useful in working on your project?

6. Are there any parallels between your project and other projects described in the case and readings?

Use your responses as a starting point in the preparation of your component of the reflective case describing your team's project. You may also reflect on issues not raised above.

**Submission instructions:**

Compile your answers into one document and save it as an rtf (rich text format) file called YourNameRQ.rtf. E-mail the file to your instructor as an e-mail attachment. If you are including any non-text components not handled in Word, please send as an email attachment and advise your instructor of the format.

**Task 5: Reflective Case**

**Due date:** To be negotiated.

**Weighting:** 70% of EDGI932

**Length:** approx. 2500 words

This assignment requires you and your team to prepare a case (approx. 2500 words) in which you reflect on the team development process, problems, advantages and skills developed as well as management and client issues.

Your paper should include (but is not limited to) reflections on:

- your original concept ('the big picture')
- the design ideas and considerations that led to your design statement
- how concepts from readings, lectures and demonstrations influenced your design
- how you implemented your design ideas in your prototype and the factors that influenced those decisions
- how your ideas about designing educational multimedia products have changed as a result of your experiences.

Try to present your paper not only in terms of your experience, but also the lessons it offers you for future project work and the advice you might give other new project designers and developers.

As a strategy for preparing this assignment you might like to keep a reflective journal as you go along. The reflective journal is one form of evaluation which has more of an emphasis on personal evaluation of skills and knowledge of the designer rather than evaluation of the project. These will provide a record of reflections which you can later draw on and refine when preparing your final paper. The weekly program lists diary checkpoints to discuss the progress of your reflections of your experience (see the diary reflective process page for some ideas on how to complete this part of the assessment). An example of a reflective diary is also available. You should also consider your reflective paper from EDGI913 (applicable to 1999 students only) and notes from project meetings as other possible sources of reflective material.

You are free to choose whatever format you would like for your case but it should include group and individual components:

- an introductory section developed collaboratively by the team which gives an overview of the project (you will need to work together on this part)
- a section contributed by each team member which contains their own reflections (prepare your section from the focus questions)

Refer to the sample cases provided for ideas about how you might present your work.

**Submission instructions:**

Save your Reflective Case as an rtf file called ProjectNameRC.rtf and e-mail it to your instructor as an e-mail attachment. If you are including any non-text components not handled in Word, please send as an email attachment and advise your instructor of the format.

## **Appendix 3.2: Descriptions of the case projects**

### ***Exploring the Nardoo***

‘Exploring the Nardoo’ is a multi-award winning CD-ROM developed by the University of Wollongong’s Interactive Multimedia Learning Laboratory (IMMLL) for the Department of Land and Water Conservation.

The major objective of the package is to raise community awareness of water usage practices and their impact on Australia’s inland river systems, and to encourage better ways of managing this valuable resource. The package is aimed primarily at secondary school students and is linked closely to relevant curricula.

‘Exploring the Nardoo’ incorporates innovative strategies that allow students to investigate the impact of ecological and social factors on inland water catchment areas. The use of such instructional strategies is a part of the IMMLL’s strong research focus on supporting learning and problem-solving.

The package is centred around an inland water catchment which learners can investigate through four time zones, ranging from a pristine environment through to the present day, and in four regions along the river’s length.

A range of water management investigations, related to both natural events and human impact, have been embedded into the river catchment regions. Supporting information provided within the environment covers a broad framework of issues through radio, newspaper and television stories; measurement data within the river and; information about representative plants and animals.

As learners move throughout the river environment they gather information and personalise their notes using a personal digital assistant (or PDA) - a tool unique to the program. From these notes learners are able to develop a comprehensive response to an investigation which can incorporate textual, graphic, audio and video resources.

Investigative activities are further supported by simulations that allow learners to explore issues related to blue-green algae, dam management and household water use. Staff of the Water Research Centre also provide access to related information and suggestions, and learners may refer to the help facilities.

### ***StageStruck***

In October 1994, the Australian Federal Government’s Creative Nation statement was issued by the Prime Minister in recognition of the challenge in creating "a dynamic Australian multimedia industry providing Australian content for Australian and international consumers". To foster this development the Federal government allocated \$56.5 million to a range of initiatives, including the ‘Australia on CD’ program. This



program aimed to bring together national cultural institutions, with their wealth of content expertise, and local multimedia developers. Of 243 proposals, ten projects were chosen for development under the 'Australia on CD' program.

One of these, 'StageStruck', was developed in a collaboration between the National Institute for Dramatic Art (NIDA), University of Wollongong, the Sydney Opera House, the Australian Opera, and the Australian Ballet. The CD-ROM package provides an environment that introduces secondary school students to the world of Australian live performing arts.

Set within a performing arts venue, learners journey through a backstage world that showcases performances, processes and people from contemporary companies. They can take a tour with a stage manager, peek into the backstage studios for tips and ideas or visit the Green Room to meet the artists and discover the range of Australian performing arts companies through an extensive information base on Australia's entertainment industry. 'StageStruck' provides learners with tools to create scenes, scripts, costumes and soundscapes so that they can find out more about what goes on 'behind the scenes'.

A theatre space in which students can develop their own performances by selecting and manipulating performers, choreography, scripts and their delivery, sound effects, music and set design elements allows them to take on the role of director. This feature is supported by resources from classic Australian plays and performances. Excerpts come from some of Australia's great writers including Nick Enright, Michael Gow, Dorothy Hewett, Ray Lawler, Louis Nowra and David Williamson; from performances of Shakespeare; and from opera and musicals including Voss, Hansel and Gretel, The Magic Flute, Miss Saigon, The Rocky Horror Show, The Venetian Twins, Bran Nue Dae and many more.

As they explore the information space and create elements and performances, learners can save these in their scrapbook. The contents of the scrapbook can be saved as a small file, ready to be re-loaded for a later 'StageStruck' session. Performance files are small enough to be attached to an email message or downloaded from the Web. In this way individuals and groups using the package around the world can exchange their creations and collaborations can be formed.

### Appendix 3.3: Sample case materials

The following pages are taken from the Web-based case materials. A full version can be viewed on the accompanying CD-ROM.

The following excerpts show:

- the menu page with links to both cases
- the overview page for *Exploring the Nardoo*
- the interview page for *Exploring the Nardoo* with links to interviews with four designers
- the documents page for *Exploring the Nardoo* with links to relevant project files.

**Menu page**

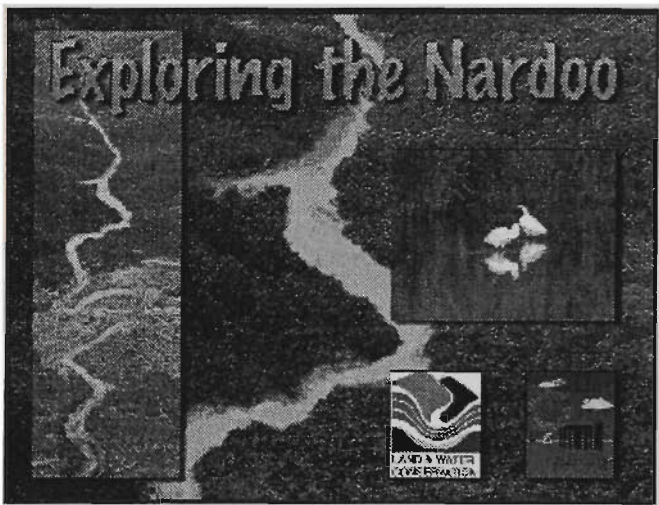
These cases have been developed as a resource for the subject EDGI931/2 Interactive Multimedia Design. The cases provide insights into two major CD-ROM projects undertaken at the University of Wollongong and focus upon the key design and management issues. While these cases describe large, commercial projects you will find that many of the processes and issues relate to the projects you will undertake as part of this subject.

Each case has been constructed through reference to original documents and with the assistance from key members of the design team. Supporting materials include transcripts of interviews with key designers, reproductions of many original documents, and links to relevant readings and Web sites.

You will be provided with copies of the Exploring the Nardoo and StageStruck CD-ROMs so that you can refer to the products as you work through the cases.

Activities have been incorporated into the assessment tasks to assist you in analysing these cases. See the assessment details for further information.

**Exploring the Nardoo**



| Overview  | Interviews  | Documents                               |
|---|---|---|
| Read an overview of the project, including a timeline of the major events | Read through transcripts of interviews with the designers | Browse documents related to the project |

**StageStruck**



| Overview  | Interviews  | Documents                               |
|---|---|---|
| Read an overview of the project, including a timeline of the major events | Read through transcripts of interviews with the designers | Browse documents related to the project |

# Overview of Exploring the Nardoo

## Exploring the Nardoo

### An overview

'Exploring the Nardoo' is a multi-award winning CD-ROM developed by the University of Wollongong's Interactive Multimedia Learning Laboratory (IMMLL) for the Department of Land and Water Conservation.

The major objective of the package is to raise community awareness of water usage practices and their impact on Australia's inland river systems, and to encourage better ways of managing this valuable resource. The package is aimed primarily at secondary school students and is linked closely to relevant curricula.

'Exploring the Nardoo' incorporates innovative strategies that allow students to investigate the impact of ecological and social factors on inland water catchment areas. The use of such instructional strategies is a part of the IMMLL's strong research focus on supporting learning and problem-solving.

The package is centered around an inland water catchment which learners can investigate through four time zones, ranging from a pristine environment through to the present day, and in four regions along the river's length.

A range of water management investigations, related to both natural events and human impact, have been embedded into the river catchment regions. Supporting information provided within the environment covers a broad framework of issues through radio, newspaper and television stories; measurement data within the river and; information about representative plants and animals.

As learners move throughout the river environment they gather information and personalise their notes using a personal digital assistant (or PDA) - a tool unique to the program. From these notes learners are able to develop a comprehensive response to an investigation which can incorporate textual, graphic, audio and video resources.

Investigative activities are further supported by simulations that allow learners to explore issues related to blue-green algae, dam management and household water use. Staff of the Water Research Centre also provide access to related information and suggestions, and learners may refer to the help facilities.



### The project team

Those listed below form the main project team for the 'Exploring the Nardoo' project, with roles in management, design and production. Many other people were involved as subject matter experts, researchers, graphic designers and programmers. For a complete list please refer to the 'Exploring the Nardoo' CD-ROM. The full credits appear on the exit screen.

#### Management

|                                     |                    |
|-------------------------------------|--------------------|
| Project management                  | Rob Wright (UOW)   |
| Project coordination                | Barry Harper (UOW) |
| DLWC project leader                 | Des Cleary (DLWC)  |
| UOW review committee representation | John Hedberg (UOW) |

#### Design

|                      |  |
|----------------------|--|
| Instructional design | Rob Wright (UOW)<br>Barry Harper (UOW)<br>Gwyn Brickell (UOW)<br>John Hedberg (UOW)<br>Christine Brown (UOW)<br>Bob Corderoy (UOW)<br>Margaret McMahon (C) |
| Content expertise    | Mark Harris (DLWC)<br>Vanessa O'Keefe (DLWC)   |
| Graphic design       | Margaret McMahon (C)   |
| Technical advice     | Grant Farr (UOW)   |

#### Production

|             |                  |
|-------------|------------------|
| Programming | Grant Farr (UOW) |
|-------------|------------------|

|                                   |   |
|-----------------------------------|---|
| Content preparation and authoring | Rob Wright (UOW)<br>Bob Corderoy (UOW)<br>Gwyn Brickell (UOW) |
| Graphic design                    | Margaret McMahon (C)<br>Marlene Knight (C)                    |
| Video and audio production        | Stuart Hill (UOW)<br>Judy Spitzer (UOW)                       |

**UOW = University of Wollongong**  
**DLWC = Department of Land and Water Conservation**  
**C = Contract**



### Project timeline

The timeline below focuses on the main events and activities throughout the project. Documents relevant to some of the stages can be found in the [Documents](#) section.

1994

|           |   |
|-----------|---|
| March     | <p>The Interactive Multimedia Learning Laboratory (IMMLL) at University of Wollongong is approached by the NSW Department of Land and Water Conservation (DLWC) to create a CD-ROM package.</p> <p>Initial discussions are held to negotiate a budget and work on the initial concept.</p>  |
| May       | <p>Further discussions are held about the possible design of the product, its goals from DLWC’s perspective and the resources required to complete the project.</p>   |
| June      | <p><u>Project Proposal</u><br/>16 June</p> <p>The proposal document was developed after extensive consultation with the client and formalises the basis for contractual arrangements between the parties. The proposal outlines the IMMLL’s understanding DLWC’s requirements and sets out the timeline, stages and milestones; provides detailed costing; identifies technical issues and; describes the expertise of the group.</p> <p>The proposal is accepted on 20 June.</p>   |
| July      | <p>Meetings held during July bring together members of the team from the IMMLL and DLWC.</p> <p>At the first meeting the roles and responsibilities of each of the team members are discussed and other contact people who might be helpful later in the project are identified. Initial ideas for the simulations are floated and the team overviews the goals of the project, particularly in relation to school curricula. The team also discusses the scope and potential sources for content resources.</p> <p>Throughout the month further meetings are held to expand and refine these ideas which will become the basis for the design of the package. These include the instructional strategies (investigations and simulations), the overall metaphor, visual design, early functionality of the personal digital assistant (PDA) and supporting media. An extensive search of school curricula is undertaken to identify relevant objectives.</p> |
| August    | <p><u>Design Brief and Objectives</u> (Stage 1)<br/>8 August</p> <p>In this first design document the team communicates their understanding of the project, including the goals and constraints, and puts forward some initial ideas for the kinds of instructional strategies that might fit within the relevant school curricula.</p> <p>The team also work on further refining the structure, navigation and learner controls; developing a detailed sample scenario for testing (Zone 4) and; locating existing resource materials and subject matter expertise. Initial work on other scenarios begins. The graphic designer joins the team late in the month.</p>   |
| September | <p><u>Design Statement</u> (Stage 2 - Interim Report)<br/>14 September</p> <p>This document outlines the team’s progress towards the full Design Statement detailing the current state of development of their design and implementation ideas.</p> <p>Work continues on designing the scenarios and supporting media for each of Time Zone 4 (present day) regions and graphics for some of the interface elements. The reference group meets in Wollongong for an update on the</p>   |

|          |  |
|----------|--|
|          | design ideas.  |
| October  | <p><u>Design Statement</u> (Milestone One Report)<br/>28 October</p> <p>This document formalises the design of the final package. The Design Statement provides an overview of the concepts and maps out the structure of the package. Also included are some of the finer details of components, such as the interface design and the functionality of the PDA and simulations.</p> <p>The reference group meets again at the completion of this milestone. The client signs-off in acknowledgment and the team receives the first progress payment.</p> <p>The first prototype is created in HyperCard at around this time. Programmers in the Lab are in the early stages of developing their own authoring tool, MediaPlant, for the project.</p>  |
| November | <p>Development activities this month include:</p> <ul style="list-style-type: none"> <li>• a draft version of the introductory sequence to the package, with a fly-over of the catchment and greeting from a guide</li> <li>• the simulation of personal water use in the home</li> <li>• media resources for the scenarios.</li> </ul>  |
| December | <p>Development activities this month include:</p> <ul style="list-style-type: none"> <li>• future adaptations of the package including a kiosk-style presentation in which users could explore some of the basic ideas of water conservation or an application that focuses on a specific issue such as blue-green algal blooms</li> <li>• location of resources to be used as the basis for information in the filing cabinet inside the Water Research Centre</li> <li>• expansion of the introductory sequence to include presentation and navigation options for first-time or subsequent use and the series of responses from the guides that will support learners as they seek suggestions or help</li> <li>• development of audiovisual resources based on existing footage, for Zone 4.</li> </ul> <p>The design team meets again prior to the Christmas break and reviews their progress.</p>  |
| 1995     |  |
| February | <p>Development activities this month include:</p> <ul style="list-style-type: none"> <li>• development of help files</li> <li>• refinements to the PDA functionality and appearance</li> <li>• refinement of graphics and interactivity inside the Water Resources Centre, in particular the functionality of the filing cabinet and the documents inside it</li> <li>• design of different versions for installation on a hard drive or running from a CD-ROM.</li> </ul>   |
| March    | <p>Work this month include:</p> <ul style="list-style-type: none"> <li>• cross-checking of scenarios with the supporting media, information available from the Water Research Centre and suggestions from the guides to ensure completeness (focus on Zones 3 and 4)</li> <li>• further development of the help system and guides</li> </ul>   |
| June     | <p><u>Prototype for Testing</u> (Milestone Two Report)<br/>9 June</p> <p>This documents outlines the progress made towards developing a prototype for testing and sign-off at this stage provides the second progress payment.</p> <p>After approval of this stage the team continues to develop the media and resources needed for investigations within each of the time zones and these are cross-checked with the supporting resources. Parallel development of the authoring tool continues. Evaluation of the package takes place continuously with feedback sought from subject matter experts, other designers and members of the target audience.</p> <p>Tasks at the stage include:</p> <ul style="list-style-type: none"> <li>• recording of audio for the voice-overs</li> <li>• implementation of Zone 1 scenarios and the supporting information</li> <li>• initial research into the concept of genre templates and consultation with the Department of Education and Training</li> </ul> |

|           |  |
|-----------|--|
|           | <ul style="list-style-type: none"> <li>• requests are made for copyright permission and negotiation for royalties for use of the images</li> <li>• filming of actors that play the guides followed by digitising and editing.</li> </ul>   |
| July      | <p>Further development work includes:</p> <ul style="list-style-type: none"> <li>• preparation of the plant and animation information</li> <li>• further development of Water Research Centre graphics</li> <li>• production and digitisation of media stories</li> <li>• work begins on the development of teacher's resources</li> <li>• audio production.</li> </ul>  |
| August    | <p>Further development work includes:</p> <ul style="list-style-type: none"> <li>• video production</li> <li>• another graphic designer is brought in to assist with the production of graphics for the river environment, while Margaret continues work on the Water Resource Centre</li> <li>• programming of the simulators.</li> </ul>   |
| September | <p>Further development work includes:</p> <ul style="list-style-type: none"> <li>• DLWC review of the simulators and these are revised in response to their feedback</li> <li>• more filming using blue screen techniques to capture video footage for the guides.</li> </ul>  |
| October   | <p>Water Week presentation<br/>21 October</p> <p>The most recent version of the software is demonstrated at the at a Water Week function held by the Department of Land and Water Conservation.</p> <p>Development tasks continue, including:</p> <ul style="list-style-type: none"> <li>• creation of the final version of the introductory video</li> <li>• refinement of the PDA graphics and the drag-and-drop functionality</li> <li>• testing and checking is conducted by Mark, Vanessa and Des</li> <li>• development of the search facility and selection of key words</li> <li>• development of the glossary</li> <li>• creation of final versions of the help movies</li> <li>• licensing arrangements for distribution of QuickTime are made with Apple</li> <li>• testing with Year 11 Biology students and revisions according to feedback and observations</li> <li>• testing on a range of target machines.</li> </ul> |
| November  | <p>Development tasks continue, including:</p> <ul style="list-style-type: none"> <li>• further refinement of graphics for river environment to support the scenarios</li> <li>• implementation of the help tablet</li> <li>• release of a new version of MediaPlant</li> <li>• further testing in-house and with students.</li> </ul> <p>The latest version of the package is submitted to DLWC on 17 November.</p>  |
| December  | <p>Development tasks continue, including:</p> <ul style="list-style-type: none"> <li>• discussions with the distributor about the design of the product packaging</li> <li>• provision of copyright permissions for the audio and video elements to the distributor</li> <li>• review of the draft version of the teacher's manual by DLWC and revisions in response to their feedback.</li> </ul>   |
| 1996      |  |
| January   | <p>Development tasks continue, including:</p> <ul style="list-style-type: none"> <li>• more work on the teacher's manual</li> </ul>  |

|          |  |
|----------|--|
|          | <ul style="list-style-type: none"> <li>• development of the text editor with cut, copy and paste functionality and facility to change fonts and colours</li> <li>• finalisation of the print manual which is to be part of the product packaging</li> <li>• development of the credits screen.</li> </ul>  |
| February | <p>Development tasks continue, including:</p> <ul style="list-style-type: none"> <li>• finalisation of the text for the teacher's manual</li> <li>• creation of graphics for packaging and manuals</li> <li>• presentations to school teachers and career advisors</li> <li>• final testing and reviews by Mark and Vanessa</li> </ul>   |
| March    | <p>Development tasks continue, including:</p> <ul style="list-style-type: none"> <li>• final copyright permissions obtained</li> <li>• contacts made with a CD replication company for the production of the gold master</li> <li>• planning for the official launch, including preparation of information for media kits and guest list for the function.</li> </ul>  |
| April    | <p>Development tasks continue, including:</p> <ul style="list-style-type: none"> <li>• production of the gold master</li> <li>• development of flyers</li> <li>• contact with the press</li> <li>• further preparations for the launch.</li> </ul>   |
| May      | <p>Official launch<br/>13 May</p> <p>The package is launched at an official function by the minister responsible for the Department of Land and Water Conservation. After a formal presentation demonstrating the package, guests are invited to trial the package for themselves using computer facilities set up for the occasion.</p> <p>The official launch is followed by finalisation of the cross-platform version and then further marketing and distribution.</p> |



Exploring the Nardoo

Interviews with the Designers

Follow the links below to read interviews with four of the key designers from the Exploring the Nardoo project.

These semi-structured interviews were conducted earlier this year and allowed interviewees to pursue the topics that were of importance to them. Their reflections are presented in their own words.



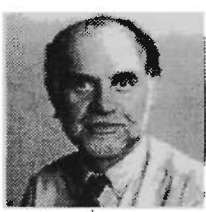
[Rob Wright](#) - designer and project manager



[Barry Harper](#) - designer and project coordinator



[Gwyn Brickell](#) - designer



[Bob Corderoy](#) - designer

## Documents for Exploring the Nardoo

### Contents

[Nardoo Design Documents](#)  
[PDA Development Documents](#)  
[Investigating Lake Iluka](#)  
[Nardoo Papers and Presentations](#)

[Note that some of the following documents are in portable document format (.pdf) or rich text format (.rtf). To load them correctly make sure you have your browser preferences set up to open these files with the relevant plug-in or application.]

### Nardoo Design Documents

#### Nardoo design documents

[Water Resources Proposal](#)  
16 June 1994

[Design Brief and Objectives \(Stage 1\)](#)  
8 August 1994

[Appendix 1](#) - Project-related Syllabus Objectives  
[Appendix 1b](#) - Addendum to Syllabus Objectives  
[Appendix 2](#) - Strategies and Scenarios for Objectives  
[Appendix 2b](#) - Map of Potential Strategies  
[Appendix 3](#) - Inland Catchment Model Design Document

[Design Statement \(Interim Report\)](#)  
14 September 1994

[Appendix 1](#) - Program Flowchart(and [images](#))  
[Appendix 2](#) - Graphics of the catchment

[Zone 1](#), [Zone 2](#), [Zone 3](#), [Zone 4](#) (html)  
[Zone 1 regions](#)  
[Zone 2 regions](#)  
[Zone 3 regions](#)  
[Zone 4 regions](#)

[Appendix 3a](#) - Investigative Scenarios for Zone 4 upper  
[Appendix 3b](#) - Investigative Scenarios for Zone 4 upper middle  
[Appendix 3c](#) - Investigative Scenarios for Zone 4 lower middle  
[Appendix 3d](#) - Investigative Scenarios for Zone 4 lower

[Early mock-up of time zones and regions](#) (working document)

[Design Statement](#)  
Milestone One Report  
28 October 1994

[Program Flowchart \(and \[images\]\(#\)\)](#)  
[Personal Digital Assistant](#)  
[Simulations](#)  
[Generic Simulation Interface](#)  
[Algal Bloom Simulator Functionality](#)  
[Algal Bloom Simulator - Animated Graphic View](#)  
[Algal Bloom Simulator - Graph Output](#)  
[Algal Bloom Simulator Design Notes](#)  
[Personal Water Usage Simulator Functionality](#)  
[Personal Water Use Simulation - Flowchart](#)  
[Personal Water Use Simulation- Graphic Animation](#)  
[Personal Water Use Simulation - Graphic Output](#)  
[Dam Management Simulator Functionality](#)  
[Dam Management Simulation - Flowchart](#)  
[Dam Management Simulation - Graphic Animation](#)

Dam Management - Graphic Output  
Appendix A - Investigation Scenarios  
Appendix B - Sample Graphic Elements

- Sample 1: Aerial View (html)
- Sample 2: Inside the Water Research Centre (html)
- Sample 3: Outside the Water Research Centre (html)

Prototype for Testing  
Milestone Two Report  
9 June 1995

## **PDA Development Documents**

PDA versions (pdf files)

3 August 1994  
11 October 1994 #1  
11 October 1994 #2  
12 October 1994  
13 October 1994  
18 October 1994 #1  
18 October 1994 #2  
18 October 1994 #3  
26 October 1994  
21 November 1994  
22 January 1995  
7 February 1995 #1  
7 February 1995 #2  
30 April 1995

### PDA description

This document outlines the final functionality of the PDA (personal digital assistant).

## **Investigating Lake Iluka**

### **Investigating Lake Iluka**

#### An overview of Lake Iluka

This page provides a brief overview of the Investigating Lake Iluka CD-ROM.

#### A review of Investigating Lake Iluka

Published in Australian Personal Computer Magazine

#### Other reviews

A series of reviews have been compiled by Lake Iluka's Australian publisher, Interactive Multimedia Pty Ltd in Canberra.

#### Exploring User Interfaces to Improve Learning Outcomes

by John G Hedberg, Barry Harper, Christine Brown and Robert Corderoy

A chapter from the book Interactive multimedia in university education: Designing for change in teaching and learning published in 1994, edited by K. Beatie, C McNaught, & S. Wills, (pp. 15-29). Amsterdam: Elsevier.

Note: For those of you with access to a Macintosh there is a demo of

Investigating Lake Iluka on your CD-ROM. Unfortunately it is not available in a Windows PCs version because it was created in HyperCard (a Macintosh only authoring tool).

## **Nardoo Papers and Presentations**

### Overviews (QuickTime Movies)

[If you are viewing this on the Web, download these files by choosing Save to Disk when prompted.]

#### An Introduction to Exploring the Nardoo

- An overview of the package (1.5 MB).

#### The Water Research Centre - an Overview

- A brief look at what resources are available within the Water Research Centre in the Nardoo River Catchment (998K).

#### Using the Personal Digital Assistant (PDA)

- A look at the on-screen PDA describing the functions it performs.(984K)

### Review of Exploring the Nardoo

Published in Australian Personal Computer Magazine

### Other reviews

A series of reviews have been compiled by Lake Iluka's Australian publisher, Interactive Multimedia Pty Ltd in Canberra.

### Multimedia reporting in science problem solving

Barry M. Harper, John G. Hedberg, Robert J. Wright and Robert M. Corderoy

Paper published in the Australian Journal of Educational Technology, 1995, 11(2), 23-37.

### Employing Cognitive Tools within Interactive Multimedia Applications

by John Hedberg, Barry Harper, Robert Wright and Bob Corderoy

Paper presented at the AARE (Australian Association for Research in Education) Conference, Singapore, November, 1996.

### Creating Motivating Interactive Learning Environments: a Constructivist View by Barry Harper

Paper presented at the 1997 Australian Society for Computers In Learning In Tertiary Education (ASCILITE) conference, Perth, December.

## Appendix 3.4: Class schedule

| Meeting                | Activities and events  |
|------------------------|--|
| Week 1<br>10 - 16 July | <p><b>Class meeting</b><br/> <b>Thursday 13 July (5:30 - 7:30)</b><br/> <b>Multimedia Lab, Building 22</b></p> <p>This first class meeting will focus on introducing the subject and a discussion of the associated activities, assessment, schedule, resources and tools. This will be followed by a discussion of possible projects and the formation of project teams. Topics for discussion include:</p> <ul style="list-style-type: none"> <li>• Subject outline and assessment issues</li> <li>• Client briefs and design models</li> <li>• Team formation and role specifications</li> <li>• Project planning documentation</li> </ul> <p><b>Individual/Project team activities</b></p> <ul style="list-style-type: none"> <li>• Spend some time this week familiarising yourself with subject Web site and resources. Review the subject outline and weekly schedule.</li> </ul>   |
| Week 2<br>17 - 23 July | <p><b>Individual/Project team activities</b><br/> <b>Starting A Multimedia Project</b></p> <ul style="list-style-type: none"> <li>• Revise what you understand about the design process.<br/>Spend some time reflecting on what you already know about the process of designing a multimedia product. You might like to do this as a concept map or free writing activity. Make this first entry in your project diary.</li> <li>• Begin to work through the case materials.<br/>Start working through the case materials provided. You will have received copies of both Exploring the Nardoo and StageStruck at the first class meeting. Contact your instructor if you do not have these.</li> <li>• Read the following articles on design models and processes: <ul style="list-style-type: none"> <li>◦ Model for Multimedia Design (Phillips) for an overview</li> <li>◦ Educational Design and Development: An Overview of Paradigms (Visscher-Voerman et. al., 1999) for types of design model</li> <li>◦ Summary from England &amp; Finney: Ch 1, 2, 3 &amp; 4</li> </ul> </li> <li>• Review the Templates and Management Tools (Resources)<br/>Familiarise yourself with these resources. Consider how you might use them later as you develop your project.</li> <li>• Communicate with the other members of your team to undertake some initial planning. Don't forget that you can use your WebCT project group discussion forum. Try to organise a meeting with the client as soon as possible.</li> </ul> |
| Week 3<br>24 - 30 July | <p><b>Individual/Project team activities</b><br/> <b>Creating the Development Team</b></p> <ul style="list-style-type: none"> <li>• Continue working through the case materials.</li> <li>• Read the following articles on the development team: <ul style="list-style-type: none"> <li>◦ Blum Chapter 3 for the overall development process and the starting points</li> <li>◦ Summary of England &amp; Finney, Chapters 11 &amp; 12</li> </ul> </li> <li>• Organise a project group meeting to plan activities and review progress.</li> </ul>   |

|                                      |  |
|--------------------------------------|--|
|                                      | <p>Project managers should post notes and action items on your WebCT project group discussion forum.</p> <ul style="list-style-type: none"> <li>• Reflect on this week's activities in your project diary.</li> </ul>  |
| <p>Week 4<br/>31 July - 6 August</p> | <p><b>Individual/Project team activities</b></p> <p><b>Initial Design Issues</b></p> <ul style="list-style-type: none"> <li>• Work through the case analysis questions and submit these by the end of the week (due 6 August). The questions and submission details can be found on the assessment page.</li> <li>• Read the following articles on design issues: <ul style="list-style-type: none"> <li>○ Blum Chapter 4 for the overall development process, analysis and design</li> <li>○ Summary from England &amp; Finney: Chapters 6, 8 &amp; 9</li> <li>○ Reflect on this week's activities in your project diary.</li> </ul> </li> <li>• Diary checkpoint #1</li> <li>• At this point in any large project team members are often concerned and unsure of the process they are going through. Join the discussion and express your thoughts at this point. You might like to share some of your reflections from your case analysis. Post your contribution under the Diary Checkpoint forum for Week 4 in the WebCT Discussion Forum.</li> </ul>   |
| <p>Week 5<br/>7 - 13 August</p>      | <p><b>Individual/Project team activities</b></p> <p><b>Producing Multimedia</b></p> <ul style="list-style-type: none"> <li>• Read the following articles on production issues: <ul style="list-style-type: none"> <li>○ Read about the overall development process, production, implementation and publishing Blum Chapter 5</li> <li>○ Read summary from England &amp; Finney: Chapters 13, 14 and 15</li> </ul> </li> <li>• Reflect on this week's activities in your project diary</li> <li>• After this Saturday's workshop the nominated member of your group should post a summary of your discussion to the Group Discussion WebCT forum for Week 5. Please post your comments by 16 August.</li> </ul> <p><b>Class Meeting #2</b><br/> <b>Saturday 12 August (9:30am - 4:30pm)</b></p> <ul style="list-style-type: none"> <li>• In your project teams discuss your responses to the focus questions. Nominate a person from your team to take notes and prepare a summary of your discussion to post of the WebCT Discussion Forum (see above).</li> <li>• The rest of the morning session will be a time for project group meetings. Spend some time discussing your progress and begin to map out your design statement. Seek input from your instructor as you need it. Project managers should post meeting notes on the Web.</li> <li>• The afternoon session will review of graphic, audio and video production strategies and tools.</li> </ul> |
| <p>Week 6<br/>14 - 20 August</p>     | <p><b>Individual/Project team activities</b></p> <p><b>Integrating Multimedia</b></p> <ul style="list-style-type: none"> <li>• Work on your design statement this week. As a group you need to discuss the format and content and decide how you will work on it together.</li> <li>• Read the following article on integrating multimedia: <ul style="list-style-type: none"> <li>○ Summary from England &amp; Finney: Chapters 16 and 17</li> </ul> </li> <li>• Review other helpful resources about design of the visual side of your project see for example Interface Design</li> </ul>   |

|                                   |  |
|-----------------------------------|--|
|                                   | <ul style="list-style-type: none"> <li>Continue work on your project.<br/>Organise team meetings as required, book/use UOW facilities, send queries to your instructor by email or keep records of your meetings on your WebCT discussion forum.</li> <li>Reflect on this week's activities in your project diary</li> <li>Diary checkpoint #2<br/>Join the discussion and share your thoughts at this point. Post your contribution under the Diary Checkpoint forum for Week 6 in the WebCT Discussion Forum.</li> </ul>   |
| Week 7<br>21 - 27 August          | <b>Individual/Project team activities</b> <ul style="list-style-type: none"> <li>Submit your design statement this week (due by 27 August)</li> <li>Continue work on your project.<br/>Organise team meetings as required, book/use UOW facilities, send queries to your instructor by email or keep records of your meetings on your WebCT discussion forum.</li> <li>Reflect on this week's activities in your project diary</li> </ul>  |
| Week 8<br>28 August - 3 September | <b>Individual/Project team activities</b> <ul style="list-style-type: none"> <li>Continue work on your project.<br/>Organise team meetings as required, book/use UOW facilities, send queries to your instructor by email or keep records of your meetings on your WebCT discussion forum.</li> <li>Reflect on this week's activities in your project diary</li> <li>Diary Checkpoint #3<br/>Join the discussion and share your thoughts at this point. Post your contribution under the Diary Checkpoint forum for Week 6 in the WebCT Discussion Forum.</li> </ul>   |
| Week 9<br>4 - 10 September        | <b>Individual/Project team activities</b><br><br><b>Evaluation and Testing Multimedia Products</b> <ul style="list-style-type: none"> <li>Continue work on your project.<br/>Organise team meetings as required, book/use UOW facilities, send queries to your instructor by email or keep records of your meetings on your WebCT discussion forum.</li> <li>Read the following articles on evaluating and testing multimedia products: <ul style="list-style-type: none"> <li>Alexander and Hedberg</li> <li>Reeves</li> <li>Read England &amp; Finney: Chap 18</li> </ul> </li> <li>Reflect on this week's activities in your project diary</li> </ul> |
| Session Break                     | Continue to work on your projects. The University will be open during the break. Consult with your instructor as required.   |
| Week 10<br>9 - 15 October         | <b>Individual/Project team activities</b> <ul style="list-style-type: none"> <li>Continue work on your project.<br/>Organise team meetings as required, book/use UOW facilities, send queries to your instructor by email or keep records of your meetings on your WebCT discussion forum.</li> <li>Reflect on this week's activities in your project diary</li> </ul><br><b>Class Meeting #3</b><br><b>Saturday 14 October (9:30am - 4:30pm)</b> <ul style="list-style-type: none"> <li>The morning session will be devoted to project group meetings. This is a time to discuss the latest project issues, assess your progress and seek</li> </ul>    |

|  |   |
|--|---|
|  | <p>input from your instructor.</p> <ul style="list-style-type: none"> <li>Time in the afternoon will be spent on production skills and assistance as needed.</li> </ul>   |
| <p>Week 11<br/>16 - 22<br/>October</p>         | <p><b>Individual/Project team activities</b></p> <ul style="list-style-type: none"> <li>Continue work on your project.<br/>Organise team meetings as required, book/use UOW facilities, send queries to your instructor by email or keep records of your meetings on your WebCT discussion forum.</li> <li>Start working on the group component of the reflective case. As a group you need to discuss the format and content and decide how you will work on it together.</li> <li>Reflect on this week's activities in your project diary</li> <li>Diary Checkpoint #4<br/>Join the discussion and share your thoughts at this point. Post your contribution under the Diary Checkpoint forum for Week 11 in WebCT Discussion Forum.</li> </ul>         |
| <p>Week 12<br/>23 - 29<br/>October</p>         | <p><b>Individual/Project team activities</b></p> <ul style="list-style-type: none"> <li>Continue work on your project.<br/>Organise team meetings as required, book/use UOW facilities, send queries to your instructor by email or keep records of your meetings on your WebCT discussion forum.</li> <li>Complete and submit the reflective questions in preparation for your individual component of the reflective case (due by 29 October).</li> <li>Reflect on this week's activities in your project diary (you could use your responses to the reflective questions as this week's entry).</li> </ul>   |
| <p>Week 13<br/>30 October - 5<br/>November</p> | <p><b>Individual/Project team activities</b></p> <ul style="list-style-type: none"> <li>Continue work on your project.<br/>Organise team meetings as required, book/use UOW facilities, send queries to your instructor by email or keep records of your meetings on your WebCT discussion forum.</li> <li>Reflect on this week's activities in your project diary</li> </ul> <p><b>Class Meeting #3</b><br/><b>Thursday 2 November (5:30 - 7:30pm)</b></p> <ul style="list-style-type: none"> <li>Present your group project to the rest of the class.</li> <li>After project presentations there will be opportunity for final discussions about the subject and negotiation to decide the date on which final work for the subjects is due.</li> </ul> |
| <p>Final Work<br/>Due</p>                      | <p>(to be negotiated)</p> <ul style="list-style-type: none"> <li>Complete work on your project and compile your reflective case for submission by the date negotiated.</li> </ul>   |



## Appendix 3.5: Assessment instructions

### Description

Assessment of EDGI931 and EDGI932 will be based on tasks related to an interactive multimedia design exercise with both individual and group components. Students will form teams of three or four and assessable tasks will consist of the following.

### Assignment 1: Case Analysis (20% of EDGI931)

#### Part A: Individual response to case questions (12%)

For each of the cases provided complete the following questions:

1. Describe the major stages and decision points in the process of developing the product. What are the major issues at each stage?
2. How do the experiences of the designers in this case relate to
  - a) other literature you have read about multimedia design and development or
  - b) your own experiences as a designer (for example in your work or for EDGI913)?
3. Choose a particular feature of the product which is discussed in the case.
  - a) Describe how you think it relates to the original concept and goals of the project.
  - b) From the information in the case what do you think were the major design issues in developing this feature?
  - c) Do you think the feature is effective? Explain your reasoning.
4. What are the major project management issues in developing a multimedia CD-ROM that are highlighted by this case? (Use example situations from the case to support your ideas.)
5. What are the main things that you think you learnt from studying this case?

Complete your analysis with a brief comparison of the two cases, highlighting the main points of similarity and difference.

Length: approx. 2000 words

#### Submission instructions:

Compile your answers into one document and save it as an rtf (rich text format) file called YourNameCA.rtf. Email the file to your instructor as an email attachment. [Note: you can save a document as an rtf file in Word by selecting the Rich Text Format option under Save As...]

#### Part B: Group discussion of focus questions

(Ungraded, 8% participation required)

In your project meetings this week discuss what issues raised by the cases might be important in your own project.

Use the following questions to focus your discussion:

- Are there any design issues or strategies highlighted by the cases that you think will be important in developing your team's project?
- Are there any project management issues raised by this case that could be important for your project team?

Nominate someone to take notes during the discussion and prepare a summary of your main points to post on the discussion list.

Submission instructions:

Post your contribution under the Project Group Discussions (Week 6) forum on the WebCT site

### **Assignment 2: Design Statement (30% EDGI931)**

Prepare a design statement (approx. 2000 words) for your interactive multimedia software project. The project is to be developed in collaboration with a client.

The design statement should have an emphasis on effective instructional strategies using the technologies of interactive multimedia, and dealing with the problems of screen information, navigation, path analysis, team member responsibility, expertise, client relationships, etc.

Make use of the design statement template, and the other templates available on the resource CD.

Length: approx. 2000 words

Submission instructions:

Save your Design Statement as an rtf file called ProjectNameDS.rtf and email it to your instructor as an email attachment.

### **Assignment 3: Educational multimedia package (50% EDGI931)**

Each member of the team must have an identifiable contribution to the package that represents an appropriate portion of the total work involved. The project should be developed using a full development cycle. The assessment is based on the initial stages of the development cycle of needs analysis, design and implementation.

Submission instructions: To be negotiated.

## **Assignment 4: Reflective Questions (30% of EDGI932)**

In preparation for the individual component of the reflective case prepare responses to the following questions.

- What was your role in the project team? Describe your tasks and responsibilities.
- How did you work with the other members of your team?
- What were the main design and management issues your team encountered during the project?
- Choose a particular issue and describe how you addressed it.
- Was there any information from the case or readings you studied that was useful in working on your project?
- Are there any parallels between your project and other projects described in the case and readings?

Use your responses as a starting point in the preparation of your component of the reflective case describing your team's project. You may also reflect on issues not raised above.

Length: approx 1000 words

Submission instructions:

Compile your answers into one document and save it as an rtf (rich text format) file called YourNameRQ.rtf. Email the file to your instructor as an email attachment.

## **Assignment 5: Reflective Case (70% of EDGI932)**

This assignment requires you and your team to prepare a case (approx. 2500 words) in which you reflect on the team development process, problems, advantages and skills developed as well as management and client issues.

Your paper should include (but is not limited to) reflections on:

- your original concept ('the big picture')
- the design ideas and considerations that led to your design statement
- how concepts from readings, lectures and demonstrations influenced your design
- how you implemented your design ideas in your prototype and the factors that influenced those decisions
- how your ideas about designing educational multimedia products have changed as a result of your experiences.

Try to present your paper not only in terms of your experience, but also the lessons it offers you for future project work and the advice you might give other new project designers and developers.

As a strategy for preparing this assignment you might like to keep a reflective diary as you go along. The reflective journal is one form of evaluation which has more of an emphasis

on personal evaluation of skills and knowledge of the designer rather than evaluation of the project. These will provide a record of reflections which you can later draw on and refine when preparing your final paper. The weekly program lists diary checkpoints to discuss the progress of your reflections of your experience (see the diary reflective process page for some ideas on how to complete this part of the assessment). An example of a reflective diary is also available. You should also consider your reflective paper from EDGI913 (applicable to 1999 students only) and notes from project meetings as other possible sources of reflective material.

You are free to choose whatever format you would like for your case but it should include group and individual components:

- an introductory section developed collaboratively by the team which gives an overview of the project (you will need to work together on this part)
- a section contributed by each team member which contains their own reflections (prepare your section from the focus questions)

Refer to the sample cases provided for ideas about how you might present your work.

Length: approx. 2500 words

Submission instructions:

Save your Reflective Case as an rtf file called ProjectNameRC.rtf and email it to your instructor as an email attachment.

## **Reflective diary**

The learning process is enhanced when learners reflect on their experiences as learners. This part of your assessment requires that you continually, throughout the subject, reflect on your experience as a designer and a collaborative team member. You may like to do this by keeping the occasional note, or you may like to keep a personal diary specifically for the purpose. You may like to have a series of headings that help to remind you of the key ideas that you should be focusing on, or you may just like to express how you are feeling about the process.

Students who have taken this subject set previously have commented on such issues as

- the team development
- the development cycle
- client interaction
- what I would do differently next time
- my level of confidence in the team process
- my understanding of the design cycle
- problems that have arisen during the project
- skills I have developed

Your thoughts about the experience are personal, but you will help to clarify your own views, and the views of others in your group, as you participate in the diary checkpoint discussions.

## **Appendix 3.6: Information sheet**

### **UNIVERSITY OF WOLLONGONG INFORMATION SHEET**

#### **Context-based learning environments**

**Researcher: Sue Bennett**

**Supervisors: Professors Barry Harper and John Hedberg**

Dear student

You have been asked to participate in the 'Context-based Learning Environments' research project being conducted by Sue Bennett as part of a PhD supervised by Professors Barry Harper and John Hedberg in the Faculty of Education at the University of Wollongong. This information sheet provides a brief summary of the research aims and outlines what may be asked of you if you agree to participate.

Through investigating the learner's perspective this study seeks to understand more about how case materials can be used to support student learning. The aim of the study is to provide insights for teachers and designers that will assist them in creating and implementing case materials and activities.

As part of the subject 'Interactive Multimedia in Education' you will read and analyse case materials and build a case report of your own project. As a participant in the study your contributions in the form of submitted or contributed work arising from assessment and activities that are part of this subject and, responses in semi-structured interviews and to questionnaires will comprise the primary data for the study.

In agreeing to participate you will be undertaking to:

- allow copies of your work to be collected and analysed
- be interviewed by the researcher
- complete evaluation questionnaires.

Please note that participation in this study is voluntary and that you may withdraw from the study at any time. Should you withdraw any data collected from you will not be included in the final data set. Non-participation or withdrawal will not affect your access to resources or progress in this subject or your relationship with the Faculty of Education.

Data collected will remain confidential and the identity of participants will be protected in any publications arising from this research. Data will be stored in a secure location within the Faculty of Education.

Please feel free to raise any questions you may have about the research and your participation during the class meeting or privately with the researcher.

If you have any further enquiries about the research please contact Sue Bennett on 4221 5738 or sue\_bennett@uow.edu.au; Barry Harper on 4221 3465 or barry\_harper@uow.edu.au or; John Hedberg on 4221 3310 or john\_hedberg@uow.edu.au. Concerns or complaints regarding the way the research is or has been conducted may be directed to the Complaints Officer, Human Research Ethics Committee, University of Wollongong on 42214457.

Appendix 3.7: Consent form

UNIVERSITY OF WOLLONGONG  
CONSENT FORM

Context-based learning environments  
Researcher: Sue Bennett  
Supervisors: Professors Barry Harper and John Hedberg

I have been given information about the study entitled ‘Context-based Learning Environments’ and discussed the research project with Sue Bennett who is conducting this research as part of a PhD supervised by Professors Barry Harper and John Hedberg in the Faculty of Education at the University of Wollongong.

I understand that, if I consent to participate in this project, I may be asked to:

- allow the researcher to collect copies of work I submit for assessment and contribute as part of activities in this subject
- be interviewed by the researcher
- complete evaluation questionnaires.

I have been advised of the potential risks and burdens associated with this research, which include making myself available for interviews, and have had an opportunity to ask Sue Bennett any questions I may have about the research and my participation.

I understand that my participation in this research is voluntary, I am free to refuse to participate and I am free to withdraw from the research at any time. My refusal to participate or withdrawal of consent will not affect my access to resources or progress in this subject , or my relationship with the Faculty of Education.

If I have any enquiries about the research, I can contact Sue Bennett on 4221 5738, Barry Harper on 4221 3465 or John Hedberg on 4221 3310 or if I have any concerns or complaints regarding the way the research is or has been conducted, I can contact the Complaints Officer, Human Research Ethics Committee, University of Wollongong on 42214457.

By signing below I am indicating my consent to participate in the research entitled ‘Context-based Learning Environments’, conducted by Sue Bennett as it has been described to me in the information sheet and in discussion with the researcher. I understand that the data collected from my participation will be used anonymously for thesis and journal publication and I consent for it to be used in that manner.

Signed

Date

..... / ..... / .....

Name (please print)

.....

## Appendix 3.8: Interview guide for students

These questions relate to the subject EDGI931 which was offered in Spring session 2000.

### 1. Your previous experience (ie. before studying EDGI931)

- a. Have you had any experience working in a project team prior to this subject?  
(If yes, describe the project, the team and your role.)
- b. Have you had any experience working on a multimedia project prior to this subject?  
(If yes, please describe the project, if you worked in a team and your role.)
- c. Have you had any experience studying with cases prior to this subject?  
(If yes, please describe.)

### 2. Working with the case materials

- a. How did you work through the case materials when preparing your first assignment?

Did you look at the following components of the cases?

|                                     | Nardoo | StageStruck |
|-------------------------------------|--------|-------------|
| Overviews                           |        |             |
| Timelines                           |        |             |
| Interviews                          |        |             |
| Original documents                  |        |             |
| Publications describing the project |        |             |
| CD-ROMs                             |        |             |

- b. What aspects of the case materials did you find useful? Why?  
What aspects of the case materials did you find difficult? Why?

### 3. Developing your own project

- a. What was your role in your project team?
- b. Were there any issues highlighted in the cases that helped you develop the design for your project?
- c. Were there any issues highlighted by the cases that helped you manage or participate in the team process?
- d. What resources did you find most useful in developing your own project?

### 4. Preparing your reflective case

- a. Have you prepared your group reflective case yet?  
(If yes, please describe the process that you went through?)

## **Appendix 3.9: Interview guide for instructors**

These questions relate to the subject EDGI931 which was offered in Spring session 2000.

### **1. The class meetings**

- a. What was the structure of your class meetings?
- b. What was usually discussed?
- c. Did this change over the course of the subject? (If yes please explain how and why you think this change occurred.)

### **2. Your role as tutor**

- a. In your role as tutor how did you communicate with students to deal with their queries (eg. class meetings, phone, email)? (For each method please explain what made it suitable for that purpose.)
- b. What was the nature of the queries you received and in what proportion (eg. technical, design, management, theoretical etc.)?

### **3. What were the issues raised with you about the following and how did you respond to these?**

- a. the cases and analysis questions (their first assignment)
- b. the group discussion about the cases (held in week 5/6 class meeting)
- c. the projects
- d. the reflective cases (their final assignment)

### **4. What were your impression of the students' use of the following support materials:**

- a. the case materials (describing the Nardoo and StageStruck projects and the accompanying CD-ROMs of these packages)
- b. the readings
- c. list of relevant URLs
- d. subject Web site (including discussion forum)

### **5. What were your impressions of each of the groups and how they worked together on their projects?**

- a. Group A
- b. Group B
- c. Group C

### **6. What would you say are the main challenges or difficulties posed by this subject:**

- a. for the students
- b. for you as their tutor

### **7. What would you say are the main benefits offered by this subject:**

- a. for the students
- b. for you as their tutor



## Appendix 3.10: Member checking consent form

*Research study: Context-based learning environments*

*Researcher: Sue Bennett*

*Supervisors: Professors Barry Harper and John Hedberg*

Dear [student name],

Thank you for agreeing to review the parts of this case study in which you were involved. Please find attached hard copies of the relevant sections from my doctoral thesis and the original data that formed the basis of my interpretations.

Please consider the following questions as you review each section and add your comments directly on this copy attached:

- Is this an accurate account of what happened in the subject EDGI931 in Spring session 2001?
- Is there any information that you believe should be added?
- Do you agree with the interpretations presented by the researcher?

Please note that your identity and the identity of other participants in this study will be disguised in the final version of this manuscript.

Please read, sign and return the consent form below indicating that you understand and agree to the conditions outlined.

Thank you for your assistance,

Sue Bennett

-----  
I, [student name] agree to review the case study report about the subject EDGI931 in which I was enrolled in Spring session, 2001.

I agree to:

- provide the researcher with feedback on the key questions listed above
- maintain as confidential the identities of those who participated in the study
- allow the researcher to quote my feedback verbatim if necessary.

Signed:

Date:

## Appendix 4.1: Nodes and descriptions

| Node                | Description  | Example quote  |
|---------------------|--|--|
| 1. Response Type    | This set of codes characterises the type of response the student has given.  |  |
| 1.1 Descriptive     | This set of codes characterises a descriptive response.  |  |
| 1.1.1 Reproducing   | This category codes a descriptive response that reproduces information directly from the case.   | The NSW Department of Land and Water Conservation (DLWC) approached the Interactive Multimedia Learning Laboratory (IMMLL) at the University of Wollongong to develop an educational multimedia package.   |
| 1.1.2 Summarising   | This category codes a descriptive response that summarises or synthesises information presented in the case. This includes re-wording and re-structuring of a number of events into one statement. This type of response does not present new information.   | This involved creating the overall structure and content of the project, with design briefs and statements being forwarded to the client, with the final design statement being signed off by the client, giving a stable starting position for the project.                           |
| 1.2 Interpretation  | This category codes a response that seeks to explain a statement further by interpreting information from the case or adding new information. This type of response seeks to explain the background or circumstances of an event. This may include the use of literature or personal experience to support interpretation. | While not alluded to in the interviews, this may have caused problems for the team, as there would have been a new software to work with, and transferral of information from <i>Hypercard</i> to <i>MediaPlant</i> .  |
| 1.3 Judgement       | This category codes a response that presents a judgement or makes a claim about issues and events. This type of response goes beyond presenting and interpreting information which is been presented and offers a value judgement.   | While each metaphor provides a realistic learning environment (one can almost smell the must on the sets) as stated in the original goals and concepts, I felt that the Nardoo metaphor assists with navigation, while the StageStruck metaphor was a barrier to effective navigation. |
| 1.4 Generalisation  | This category codes a response that presents a general observation about issues and events in the case, or extracts a general principle or procedure.  | Legal and intellectual property issues are a major consideration when developing a product.  |
| 2. Response support | This set of codes characterises the source of evidence used to support the response.   |  |
| 2.1 Not identified  | The student offers no support for the statement or the source for their statement is not identifiable.   | In addition the project manager must consider the platform that the project will run on, and the type of software used and its feasibility.  |

| Node                 | Description  | Example quote   |
|----------------------|--|---|
| 2.2 Opinion          | The student offers personal opinion in support of their response, eg. I think, I believe etc.  | Although a very clever approach, I felt that it detracted from the learning environment.  |
| 2.3 Case             | The student offers examples or evidence from the case in support of their response. The reference to the case should be direct, otherwise the comment should be coded as unsupported because it is not obvious. The includes references to the CD as well as the text materials. | During this phase, the Nardoo team were familiarising themselves with client expectations in order to gain an understanding of their needs, and to match those needs with a multimedia solution and to identify team members.                                       |
| 2.4 Experience       | The student offers their own experience and/or observations as a teacher or learner to support their response. This also includes references to their experiences using the CD-ROMs that are part of the case materials.   | For example, in EDGI913, instead of developing a basic project, which would fit well within the timeframe, I attempted to develop all of the screens for my authoring project, running out of time.   |
| 2.5 Literature       | The student uses concepts or evidence from the literature to support their response.   | Phillips and Jenkins, in Interactive Multimedia Design (1998, p38-58) identify several models for developing interactive multimedia.  |
| 3. Issues            | This set of codes identifies issues from the cases that students refer to in their responses.  |   |
| 3.1 Design           | This set of codes characterises statements about design.   |   |
| 3.1.1 Background     | This category codes background issues inherent in the situation, including the goals of the client, and the desired outcomes of the project,   | The Department of Land and Water Conservation initiates the project in response to a specific perceived need.   |
| 3.1.2 Implementation | This set of codes relates to the implementation environment, including the target audience, instructors, learning situation and physical environment.  |   |
| 3.1.2.1 Situation    | This category codes issues that relate specifically to the learning situation, including curriculum requirements, and the classroom setting.   | Review of school curricula occurs to link project to school education objectives and initial objectives are specified.  |
| 3.1.2.2 Teacher      | This category codes issues that relate to the role of the teacher.   | The teacher must play an important role here, in the form of guiding students, making certain that they have studied the help movie, that they can use the tool, and in making certain that appropriate activities are chosen for the students cognitive abilities. |

| <b>Node</b>                  | <b>Description</b>  | <b>Example quote</b>   |
|------------------------------|---|--|
| 3.1.2.3 Learner              | This category codes issues related to the characteristics and role of the learner.  | The PDA relates to the project objective of providing a motivating environment for learners. It is the tool which students use to become involved in the learning experience, through making notes and conducting experiments.   |
| 3.1.3 Product                | This set of codes characterises statements made about the design of the product.  |  |
| 3.1.3.1 Instructional design | This category codes issues that relate to the instructional design of the package, including the role of the learning theory, and the instructional approach.         | Both packages, Exploring the Nardoo and StageStruck share similarities in their design, adopting a constructivist approach to learning, employing a democratic environment within their metaphor to allow the user to navigate and "construct" their own learning experience.  |
| 3.1.3.2 Graphic design       | This category codes issues that relate specifically to the graphic design of the package. (Note: Interface design is included in the functionality category.)         | A major struggle for the designers was in fitting all the functionality of the PDA in the available screen space. While a more static and fixed size device (as in Iluka) may have been envisaged at the start, the eventual solution was to have various elements extend and contract as determined by the user.  |
| 3.1.3.3 Content              | This category codes issues that relate specifically to the content of the package, including scope of content, decisions about what to include, and the use of media. | A key issue during this process was the sheer amount of content available. Decisions needed to be made as to what could and could not be included. For example it was envisaged that there would be six simulators available but due to time and budgetary constraints, only 3 were included in the final design.  |
| 3.1.3.4 Functionality        | This category codes issues that relate to the functionality of the package and its interactivity.   | The number of simulations intended to be included in the package, the amount of feedback provided within them and the functionality of the PDA were all areas where further development was desired but not possible given the available resources.  |
| 3.1.3.5 Features             | This category codes more general features, including the use of metaphor, inclusion of tools etc.   | One of the most interesting features in the Stagestruck package is the 'database of movements' which allows the student to construct his or her own stage sequence using one or more performers. Although this feature is in keeping with the original goal of the package to allow users to create their own material it is quite different to what was originally envisaged. |

| Node                      | Description  | Example quote  |
|---------------------------|--|--|
| 3.1.4 Factors - Product   | This category codes factors and constraints that affect the design of the product.   | One must also be able to adapt to changes that take place during the progression of the product. Changes in staff and changes brought about by outside agencies will have an effect on a product. Just how much of an impact depends on how flexible the design brief is and how much freedom the developers have to explore.                    |
| 3.2 Management            | This set of codes characterises the management issues raised in the students' responses.   |  |
| 3.2.1 People              | This category codes people management issues.  | Arguably the most difficult part of managing a project comes in the form of the people management skills required for the task. When you bring together a group of people from many different backgrounds such as programmer, graphics artists, instructional designers and the like, you are introducing personality dynamics into the picture. |
| 3.2.1.1 Client            | This category codes issues related to managing the client, including contractual arrangements and negotiations, and the client's role. | The client is the source of information regarding project outcomes, time frames and funding. The major stages and decisions that have been made in the creation of Exploring the Nardoo have come about through careful involvement of the client.   |
| 3.2.1.2 Team              | This category codes issues related to managing the project team.   | The role of teamwork is important in the development of any multimedia product. This was particularly evident in the development of Exploring the Nardoo. Coming to grips with the crucial issues at the time involved much discussion, as suggested by Rob Wright.  |
| 3.2.1.2.1 Roles           | This category codes issues related to defining and managing the team roles.  | Initial design meetings detailed the roles and responsibilities of the team members while the consortium meetings continued to discuss and define the level of involvement in the design process from each of the members.   |
| 3.2.1.2.2 Project manager | This category codes issues related specifically to the qualities and task of the project manager                                       | The project manager must also have well developed "people skills", for example, when Nardoo employed a second graphic designer it was "a balancing act because I (Rob Wright) did not want to tread on Margaret's toes".   |
| 3.2.1.2.3 Selecting Team  | This category codes issues related to selecting team members.  | Major decisions were also made about when to bring in new team members with particular expertise. In this case an extra graphic designer and a simulations expert were introduced during the production.   |

| Node                             | Description  | Example quote  |
|----------------------------------|--|--|
| 3.2.1.3 Working                  | This category codes issues related to teamwork.  | It is interesting to note that even at this early stage, there were concerns regarding the collaborative process within the group. This problem became a major theme as the project developed.   |
| 3.2.2 Planning & Organisation    | This set of codes characterises the issues related to planning and organisation.   |  |
| 3.2.2.1 Funding                  | This category codes issues related to negotiating and managing funding for a project.  | It became apparent that a useable model could not be developed with the budgetary constraints, however extra funding became available, and the project moved ahead to the design stage.  |
| 3.2.2.2 Scheduling               | This category codes issues related to time management and scheduling for the project.  | For example, a video editing tool was called for but was not able to be fully developed in the time available.   |
| 3.2.2.3 Change                   | This category codes issues related to managing change during a project, including the kinds of changes, and strategies for management. | Changes are inevitable as features are tested and ideas clarified, but change has to be managed carefully or the development process will become unwieldy and deadlines and budgets will not be met. Changes must also be a danger in potentially demotivating some team members and causing friction, although this was not mentioned in the case materials.                                    |
| 3.2.2.4 Documentation            | This category codes issues related to the use and management of documentation.   | One of the major issues reinforced in the case studies is the development of a design statement, which then acts as a blueprint, protecting the major stakeholders against major change in direction.  |
| 3.2.2.5 Resources                | This category codes human and media resource management issues, including intellectual property and contracts.                         | In this project copyright permissions were important. As it was the first multimedia project that performers and their agents and companies had worked on it took a long time to sort out contracts. People who worked on this project came from a variety of backgrounds and all brought with them their own expectations.  |
| 3.2.2.6 Marketing & Distribution | This category codes issues related to marketing and other post-production activities.  | A consideration of the development team was to make the project commercially viable. The U.S. publisher seemed to miss the point about the constructivist nature of the project. In order to make the project more saleable to U.S. teachers, the publisher produced a huge manual. This was contrary to the nature of the project and was more of a marketing decision than an educational one. |

| Node                      | Description   | Example quote  |
|---------------------------|---|--|
| 3.2.2.7 Production tasks  | This category codes issues related to the management of production tasks, for example managing the workload.      | Other management issues included backing up of work and archiving of information on CD to avoid accidental loss of work and time wasted. For example some students were employed to come in and do some work for a day and the next day the work that was created could not be found. It was important to manage the versions of the prototype to ensure that they didn't replace a new version with an old one. |
| 3.3 Process               | This set of codes characterises issues that relate to the process of developing a multimedia product.             |  |
| 3.3.1 Nature              | This category codes statements that describe the nature of the development process.                               | Both projects describe an iterative design process in which early design ideas are re-visited and reworked throughout the project.   |
| 3.3.2 Models              | This category codes statements in which models of the design process referred to or developed by students.        | In this work, as was the case with Exploring the Nardoo, the team appears to have combined aspects of the various development paradigms proposed in Visscher-Voerman et.al., (1999), selecting useful features from the four paradigms, recognising the good and bad components of each.   |
| 3.3.3 Ideal               | This category codes statements which describe ideals for the development process - the way things should be done. | It would have been more effective to work on one concept effectively, check that it worked, then develop the other concepts if required.   |
| 3.3.4 Factors - Process   | This category codes factors that impact on the development process.   | Due to the nature of difficulties arising from NIDA wanting to retain rights over some of the features of this project and the developer's wishes to retain rights, a long period is evidenced between the proposal and the first design statement.  |
| 3.3.5 Stages & Activities | This set of codes characterises statements related to specific stages in the development process.                 |  |
| 3.3.5.1 Initiation        | This category codes activities and issues related to the initiation phase of the project, including the proposal. | Intensive liaison with the DLWC and relevant parties occurs to scope the project and concept, resulting in a project proposal that contains sufficient details to form the basis of a project management document and contract.  |

| Node                   | Description   | Example quote   |
|------------------------|---|---|
| 3.3.5.2 Design         | This category codes activities and issues related to the design phase of the process, including prototyping to test design ideas.   | Design process is to start small and narrow and expand if necessary. This is an iterative process incorporating feedback and review, and revisions to design and design statement as much as possible. There are a series of sign-off points at Stage 1, Stage 2 and finally sign-off on the Design Statement (Milestone One) and development of a simple prototype signal the close of this stage. |
| 3.3.5.3 Production     | This category codes activities and issues that are part of the production phase. This may include prototyping if there is a production focus rather than exploring design ideas.  | Testing and developing different versions of the prototypes went underway. The DCA reviewed each of the prototypes and give comments and feedback. There were issues concerning the meeting of deadlines.   |
| 3.3.5.4 Evaluation     | This category codes activities and issues related to product evaluation – formative and summative. This includes bug testing and peer review.   | The product was continuously evaluated during the design and development stages (formative evaluation) during the design and development stages. The Nardoo project also incorporated summative feedback from Investigating Lake Iluka, a project previously developed by IMMMLL.   |
| 3.3.5.5 Implementation | This category codes activities and issues related to implementation, including post-production and marketing.   | Both products were completed and then introduced to the public via an official launch. The launch incorporates a formal presentation demonstrating the package with guests invited to trial the package for themselves.   |
| 3.3.5.6 Prototyping    | This category codes activities and issues related to prototyping. (Note: This is included as a separate category because it comes out strongly in the case analyses and is not always identified as part of the design or development.) | During this stage a prototype, which was a mock of several of the key features from the program, was developed. The prototyping stage was used to ensure that the interactivity and navigation were functional, and was designed to obtain feedback as early as possible during development.  |
| 3.4 Technical          | This category codes technical issues and decisions, including selecting and developing software tools.  | The change from QuickTime version 2.5 to 3.0 and the licensing arrangements brought about by Apple midway through the work meant that significant video resources could not be utilized in the final product.   |



## Appendix 4.2: Coding profile for Anna

|  | Q1 | Q2 | Q3 | Q4 | Q5 | Comparison | Total |
|--|----|----|----|----|----|------------|-------|
| (1 1 1) /Response Type/Descriptive/Reproducing                     | 0  | 0  | 0  | 0  | 0  | 0          | 0     |
| (1 1 2) /Response Type/Descriptive/Summarising                     | 34 | 0  | 7  | 0  | 0  | 0          | 41    |
| (1 2) /Response Type/Interpretation                                | 33 | 11 | 23 | 12 | 11 | 19         | 109   |
| (1 3) /Response Type/Judgement                                     | 2  | 0  | 7  | 0  | 0  | 0          | 9     |
| (1 4) /Response Type/Generalisation                                | 0  | 5  | 0  | 8  | 6  | 0          | 19    |
| (2 1) /Response support/Not identified                             | 0  | 1  | 0  | 0  | 0  | 0          | 1     |
| (2 2) /Response support/Opinion                                    | 1  | 0  | 0  | 1  | 4  | 0          | 6     |
| (2 3) /Response support/Case                                       | 68 | 2  | 36 | 18 | 17 | 19         | 160   |
| (2 4) /Response support/Experience                                 | 0  | 13 | 0  | 0  | 5  | 0          | 18    |
| (2 5) /Response support/Literature                                 | 0  | 0  | 0  | 0  | 0  | 0          | 0     |
| (2 6) /Response support/Irrelevant                                 | 0  | 0  | 0  | 0  | 0  | 0          | 0     |
| (3 1) /Issues/Design   | 0  | 0  | 0  | 0  | 0  | 0          | 0     |
| (3 1 1) /Issues/Design/Background                                  | 3  | 0  | 3  | 0  | 0  | 3          | 9     |
| (3 1 2) /Issues/Design/Implementation                              | 2  | 0  | 2  | 0  | 1  | 0          | 5     |
| (3 1 2 1) /Issues/Design/Implementation/Situation                  | 1  | 0  | 1  | 0  | 0  | 0          | 2     |
| (3 1 2 2) /Issues/Design/Implementation/Teacher                    | 0  | 0  | 0  | 0  | 0  | 0          | 0     |
| (3 1 2 3) /Issues/Design/Implementation/Learner                    | 1  | 0  | 7  | 0  | 3  | 2          | 13    |
| (3 1 3) /Issues/Design/Product                                     | 1  | 0  | 3  | 0  | 2  | 0          | 6     |
| (3 1 3 1) /Issues/Design/Product/ID                                | 6  | 0  | 4  | 0  | 2  | 3          | 15    |
| (3 1 3 2) /Issues/Design/Product/Graphic design                    | 0  | 0  | 0  | 0  | 1  | 0          | 1     |
| (3 1 3 3) /Issues/Design/Product/Content                           | 4  | 1  | 7  | 0  | 2  | 2          | 16    |
| (3 1 3 4) /Issues/Design/Product/Functionality                     | 4  | 0  | 6  | 0  | 0  | 1          | 11    |
| (3 1 3 5) /Issues/Design/Product/Features                          | 6  | 0  | 6  | 0  | 2  | 0          | 14    |
| (3 1 4) /Issues/Design/Factors - Product                           | 5  | 3  | 5  | 1  | 2  | 1          | 17    |
| (3 2) /Issues/Management   | 0  | 0  | 0  | 0  | 0  | 0          | 0     |
| (3 2 1) /Issues/Management/People                                  | 0  | 0  | 0  | 0  | 0  | 0          | 0     |
| (3 2 1 1) /Issues/Management/People/Client                         | 9  | 2  | 1  | 2  | 1  | 2          | 17    |
| (3 2 1 2) /Issues/Management/People/Team                           | 3  | 1  | 0  | 1  | 0  | 0          | 5     |
| (3 2 1 2 3) /Issues/Management/People/Team/Roles                   | 1  | 1  | 1  | 1  | 0  | 0          | 4     |
| (3 2 1 2 3 6) /Issues/Management/People/Team/Roles/Project manager | 1  | 1  | 0  | 3  | 1  | 0          | 6     |
| (3 2 1 2 4) /Issues/Management/People/Team/Selecting Team          | 4  | 0  | 0  | 0  | 0  | 0          | 4     |
| (3 2 1 5) /Issues/Management/People/Working                        | 3  | 1  | 0  | 3  | 1  | 0          | 8     |
| (3 2 2) /Issues/Management/Planning & Organisation                 | 0  | 1  | 0  | 1  | 0  | 0          | 2     |
| (3 2 2 1) /Issues/Management/Planning & Organisation/Funding       | 0  | 1  | 0  | 0  | 0  | 0          | 1     |
| (3 2 2 2) /Issues/Management/Planning & Organisation/Scheduling    | 0  | 0  | 0  | 3  | 0  | 0          | 3     |
| (3 2 2 4) /Issues/Management/Planning & Organisation/Change        | 0  | 0  | 0  | 0  | 0  | 0          | 0     |
| (3 2 2 5) /Issues/Management/Planning & Organisation/Documentation | 4  | 0  | 0  | 0  | 1  | 0          | 5     |
| (3 2 2 6) /Issues/Management/Planning & Organisation/Resources     | 4  | 0  | 3  | 2  | 0  | 1          | 10    |

|   | Q1 | Q2 | Q3 | Q4 | Q5 | Comparison | Total |
|---|----|----|----|----|----|------------|-------|
| (3 2 2 7) /Issues/Management/Planning & Organisation/Marketing & Distribution | 2  | 0  | 0  | 0  | 0  | 0          | 2     |
| (3 2 2 8) /Issues/Management/Planning & Organisation/Production tasks         | 0  | 0  | 0  | 2  | 0  | 0          | 2     |
|   |    |    |    |    |    |            |       |
| (3 3) /Issues/Process   | 0  | 0  | 0  | 0  | 0  | 0          | 0     |
| (3 3 1) /Issues/Process/Nature  | 3  | 1  | 0  | 1  | 1  | 0          | 6     |
| (3 3 2) /Issues/Process/Models  | 0  | 0  | 0  | 0  | 0  | 0          | 0     |
| (3 3 3) /Issues/Process/Ideal   | 0  | 0  | 0  | 1  | 0  | 0          | 1     |
| (3 3 4) /Issues/Process/Factors - Process                                     | 4  | 2  | 0  | 0  | 0  | 0          | 6     |
| (3 3 5) /Issues/Process/Stages & Activities                                   | 0  | 0  | 0  | 0  | 0  | 0          | 0     |
| (3 3 5 1) /Issues/Process/Stages & Activities/Initiation                      | 5  | 0  | 0  | 1  | 0  | 1          | 7     |
| (3 3 5 2) /Issues/Process/Stages & Activities/Design                          | 11 | 3  | 1  | 1  | 1  | 1          | 18    |
| (3 3 5 3) /Issues/Process/Stages & Activities/Production                      | 6  | 0  | 0  | 0  | 1  | 0          | 7     |
| (3 3 5 4) /Issues/Process/Stages & Activities/Evaluation                      | 4  | 0  | 1  | 0  | 0  | 0          | 5     |
| (3 3 5 5) /Issues/Process/Stages & Activities/Implementation                  | 4  | 0  | 0  | 0  | 0  | 0          | 4     |
| (3 3 5 6) /Issues/Process/Stages & Activities/Prototyping                     | 4  | 0  | 0  | 0  | 0  | 1          | 5     |
|   |    |    |    |    |    |            |       |
| (3 5) /Issues/Technical   | 5  | 3  | 5  | 0  | 0  | 0          | 13    |
|   |    |    |    |    |    |            |       |
| approach to task  | 0  | 0  | 0  | 0  | 0  | 0          | 0     |
| Case materials  | 0  | 0  | 0  | 0  | 0  | 0          | 0     |
| Compares cases  | 0  | 0  | 0  | 0  | 0  | 0          | 0     |
| references  | 0  | 0  | 0  | 0  | 0  | 0          | 0     |

# Appendix 5.1: Design statement template

University of Wollongong, Interactive Multimedia Learning Laboratory

## Design Statement for a IMM Product

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A Design Statement describes the project in detail. The design statement is usually developed from a client brief, or the request for proposal document following a needs assessment. The costing, time line and prototype should all be able to be developed from this document. Replace all the materials in "<" and ">" with your information.

---

### <Document/Project Title >

|          |                     |
|----------|---------------------|
| Version: |                     |
| Date:    |                     |
| Author:  |                     |
| Status:  | <Draft or Approved> |

# Design Statement for <Title of Project>

---

## 1. Background of the Package

---

*<This should be a full description of the background to the package with reference to previous examples, other approaches and previous experience of the topic or context. Why is this project being undertaken and what is it going to achieve?>*

## 2. Package Concept

---

*<The package concept is the overall goal and perceived need for the project from the potential user's perspective. It should also be a summary of the functionality and scope of the project. >*

## 3. Needs Assessment (Problem Analysis)

---

*<The detailed Why for the project!*

*The Needs Assessment section of this document :-*

- outlines the process of gathering information for a development team to respond to a request by making recommendations about how to solve a problem.*
- reports on the information gathered from the needs assessment*
- describes why the package is needed, who will it support, what alternate ways to solve the problem have been attempted.*
- describes the environment in which the package will be used*
- describes the target audience and*
- describes the technical constraints of the proposed implementation environment including configuration and maintenance issues. >*

## 4. Resources Available Review

---

*<A description of any information and technical expertise available or required and how will it be accessed. This description would include a content list and description of content depth, and identification of content experts. The range of resources both currently available and intended would also be described>*

## 5. Goals and Objectives

---

*<A statement of the major goals and then a detailed listing of objectives to be achieved. The goals and objectives should be specific to the package. The detailed objectives should outline all achievable outcomes and be specific for each section and subsection of the project.>*

## 6. User/Learner Tasks and Instructional Analyses

---

*<The intended approach and any specific design guidelines that came out of the needs analysis. The design guidelines should be matched to the tasks required of the learner/user if the project has competency based outcomes. This should describe how the goals are going to be achieved in learning tasks.*

*Specific strategies such as simulations, games and learning environments should be described and the way they might link to the outcomes described.>*

## 7. Design and Structure

---

*<This section should contain a detailed description of specific preferences for structuring the content and a complete description of the design including:-.*

- *Treatment of the content -metaphor and what context is being created.*
- *Instructional strategies to be used including the task/challenge for the user.*
- *The relevance of the context to user.*
- *The user interface*
- *The artistic treatment supporting the design.*
- *Navigation pathways*
  - *content/ resource access*
  - *context of embedded help and how it can be used*
- *The storyboards*
  - *the screen blueprints for each screen*
  - *links from storyboard to navigation*
- *Concept maps and flow charts of structure.>*

## 8. Proposed Resources and Media Format

---

*<A description of the visual and audio resources that will be used for the package identified above in the resources review and what resources will need to be developed eg. images, animations, video, music etc.*

*This description should include some storyboards for video and audio resources, animation flow charts and some details of the intellectual property issues that will impact on the resources>*

## **9. Implementation Environment and Constraints**

---

*<A full description of the implementation environment should be presented. The description should include information about the technology available to users, during the training (if different) and at the desktop, networking details, and training management details.*

*A full description of the constraints and specific requirements should be included. eg Macintosh only, PC only, must be available on CD-ROM, online only, Web based etc. The constraints may also be related to time of access, location for access to the training materials. Additionally, if the materials are for accreditation, access and security to the resources will need to be considered.>*

## **10. Evaluation Procedures**

---

*<Describe the evaluation procedures that are essential to the package and how they will be implemented. This description should include both formative and summative evaluation as well as the support for evaluation that will be available from each interested stakeholder. A full description of the evaluation procedures and protocols should be included. eg how to ensure potential users are available for formative evaluation throughout the project, etc.>*

## Appendix 5.2: Example of analysis notes for design statements

### Group B

| Section of design statement  | Their description (parameters of project)  | Their ideas (interpretation of project)  | Issues discussed (key issues raised)  | Researcher's notes  |
|------------------------------|--|--|---|---|
| 1. Background to the project | <ul style="list-style-type: none"> <li>▪ Large industrial client</li> <li>▪ Safe handling and transport of a dangerous chemical</li> <li>▪ Hazard prevention &amp; response</li> <li>▪ Targeted at drivers working in contract companies</li> <li>▪ Builds on existing induction training</li> <li>▪ Current classroom training with print and video support materials</li> <li>▪ CD package will allow control of delivery and content</li> <li>▪ Accreditation</li> <li>▪ Want a high level of learner engagement</li> </ul> | <ul style="list-style-type: none"> <li>▪ Expertise of the team</li> </ul>  | <ul style="list-style-type: none"> <li>▪ Training situation</li> <li>▪ Why required by client</li> <li>▪ Target audience</li> <li>▪ Existing training</li> <li>▪ Client's reasons</li> <li>▪ Team members</li> </ul>  | <ul style="list-style-type: none"> <li>▪ Straight description of background factors and the client</li> <li>▪ Doesn't put within a wider industry context.</li> <li>▪ Clear description though and they seem well-informed about the client and training needs.</li> </ul>                            |
| 2. Package concept           | <ul style="list-style-type: none"> <li>▪ Goal to educate about hazards and response procedures</li> <li>▪ General information about chemical (hazards and site)</li> <li>▪ First part of training sequence (pre-requisite)</li> </ul>  | <ul style="list-style-type: none"> <li>▪ Highly interactive, learner-centred approach</li> <li>▪ Use of multiple media including narration, video and graphics</li> <li>▪ Minimal text</li> <li>▪ Quizzes and exercises at the end of each module</li> <li>▪ Situation-based exercise on completion</li> </ul> | <ul style="list-style-type: none"> <li>▪ Overall goal and emphasis</li> <li>▪ Defines scope of this package</li> <li>▪ General instructional approach</li> <li>▪ Media use</li> <li>▪ Tasks and activities</li> </ul>                                       | <ul style="list-style-type: none"> <li>▪ Expresses their plans for this package.</li> <li>▪ Gives an overview and general description.</li> <li>▪ No justification for choices. Expect this to come later in the document as detailed are presented.</li> </ul>                                       |
| 3. Needs assessment          | <ul style="list-style-type: none"> <li>▪ Based on existing materials (videos and fact sheets)</li> <li>▪ SME from client</li> <li>▪ Target learners (all drivers, then only new and relief drivers)</li> <li>▪ Replacement for current training</li> <li>▪ Self-paced, but supervised to ensure all parts are</li> </ul>   | <ul style="list-style-type: none"> <li>▪ Considerations for further development beyond prototype stage</li> <li>▪ Maintenance plan</li> <li>▪ Client's responsible for further work</li> <li>▪ Minor updates as part of this project.</li> </ul>   | <ul style="list-style-type: none"> <li>▪ Resources available</li> <li>▪ Target learners</li> <li>▪ Implementation (process, technical)</li> <li>▪ Development and maintenance issues</li> <li>▪ Client responsibilities</li> <li>▪ Project scope</li> </ul> | <ul style="list-style-type: none"> <li>▪ Nothing about the characteristics of the target learners.</li> <li>▪ Not really the place to be discussing development issues.</li> <li>▪ Obviously feel they need to have the boundaries of this project clearly stated in the project document.</li> </ul> |

| Section of design statement        | Their description (parameters of project)  | Their ideas (interpretation of project)  | Issues discussed (key issues raised)  | Researcher's notes   |
|------------------------------------|--|--|---|--|
|                                    | <ul style="list-style-type: none"> <li>completed.</li> <li>▪ Client to oversee company's initial implementation</li> <li>▪ Used in driver's workplace</li> <li>▪ Computers available but not networked</li> </ul>  |  |   |  |
| 4. Information review              | <ul style="list-style-type: none"> <li>▪ SME will provide detailed content</li> <li>▪ Access to site for collection of photos and video</li> <li>▪ Content for each module (lists and table)</li> <li>▪ Extensive use of existing video</li> <li>▪ Additional print resources from the client</li> </ul> | <ul style="list-style-type: none"> <li>▪ Three modules</li> <li>▪ Linear path</li> <li>▪ Content listed has been reviewed with the SME</li> <li>▪ Emphasis on prevention</li> <li>▪ Extracts from video with voice-over</li> <li>▪ Voice-overs to be produced by the team.</li> <li>▪ Additional resources to be produced – video, photos, graphics, VO, other sound (see 8.)</li> <li>▪ These kept to a minimum.</li> </ul>   | <ul style="list-style-type: none"> <li>▪ Overall structure</li> <li>▪ Information collection</li> <li>▪ Topics for each module</li> <li>▪ Information sources</li> <li>▪ Resource production</li> </ul> | <ul style="list-style-type: none"> <li>▪ Clear account of the content to be included. Detailed mapping out of content for each module.</li> <li>▪ A good indication of the work they have done so far.</li> </ul>  |
| 5. Task and instructional analysis |  | <ul style="list-style-type: none"> <li>▪ Content influenced the instructional approach</li> <li>▪ Content has to be learned so a prescriptive approach chosen</li> <li>▪ Linear progression through pre-requisites</li> <li>▪ System records progress</li> <li>▪ Can complete in multiple sessions</li> <li>▪ Presentation then activities</li> <li>▪ Audio information with visuals for support</li> <li>▪ Text in point form only</li> <li>▪ Optional summary</li> <li>▪ Activities get learners involved and give them feedback; and determine progress to next module</li> <li>▪ Photos and videos are preferred to</li> </ul> | <ul style="list-style-type: none"> <li>▪ Overall approach</li> <li>▪ Implementation</li> <li>▪ Presentation approach</li> <li>▪ Role of media</li> <li>▪ Learning tasks</li> </ul>                      | <ul style="list-style-type: none"> <li>▪ Not clear here how activities are included in sections and modules.</li> <li>▪ Broad justification of the overall approach but doesn't explain why in detail.</li> <li>▪ Mainly descriptive without much justification.</li> <li>▪ Not much details on the tasks.</li> <li>▪ How does the prescriptive linear approach fit with being learner-centred?</li> </ul> |



| Section of design statement | Their description (parameters of project)  | Their ideas (interpretation of project)   | Issues discussed (key issues raised)   | Researcher's notes  |
|-----------------------------|--|---|--|---|
|                             |  | give credibility (not pics and animation) and illustrate site context<br>▪ Final assessment task to solve problem situations  |  |   |
| 6. Goals and objectives     | ▪ Overall goal to alert learners to hazards and know correct procedures to follow<br>▪ Specific behavioural objectives for each module |   | ▪ Overall training goal<br>▪ Specific objectives   | ▪ Reasonable detail here.<br>▪ Clear and will provide guidance for developing modules.<br>▪ Very specific behavioural objectives.   |
| 7. Design and structure     |  | ▪ Truck journey metaphor – relevant to drivers<br>▪ Guide as a co-driver<br>▪ Modules as stops<br>▪ Map will show progress through the journey<br>▪ At the end of journey driver is assessed on ability to negotiate a series of obstacles, leading to accreditation.<br>▪ Prescriptive<br>▪ Content broken down into small chunks<br>▪ Exercises to ensure learner engagement and feedback<br>▪ Opportunity to review materials<br>▪ Context (metaphor) relevant to role<br>▪ Learner guided from one module to another<br>▪ Limited choice in deciding order of sections within modules<br>▪ Can quit at any time or move within module<br>▪ Help provided by voiceover<br>▪ Structure of | ▪ Metaphor/treatment<br>▪ Content presentation and structure<br>▪ Navigation options<br>▪ Help facilities<br>▪ Graphic design<br>▪ Screen layout (interface)<br>▪ Screen specifications<br>▪ Documentation | ▪ Quite detailed. Seems as though they have made a lot of their design decisions by this stage. Use of metaphor and physical landscape similar to the cases, although more democratic.<br>▪ Journey is more a guided tour than their own journey.<br>▪ Shows they have stepped out of a traditional tutorial presentation at least a little! Graphics to suit the context although may be stereotypical? Is this their version of being learner-centred?<br>▪ Have considered what learners will need. All seems consistent with the prescriptive approach they have decided on, although how is it learner centres and interactive<br>▪ Don't make their case well or justify their decisions<br>▪ Specs are important to this |

| Section of design statement   | Their description (parameters of project)  | Their ideas (interpretation of project)   | Issues discussed (key issues raised)   | Researcher's notes   |
|-------------------------------|--|---|--|--|
|                               |  | module (intro, content, optional summary, activities) <ul style="list-style-type: none"> <li>▪ Graphic design to be relevant to the audience (industrial and masculine)</li> <li>▪ Use company-commissioned artworks</li> <li>▪ Layout simple and uses template for consistency</li> <li>▪ Navigational information on all screens</li> <li>▪ Sample graphics and storyboard</li> <li>▪ Specifications for each screen to be developed</li> </ul>   |  | group.   |
| 8. Media                      | <ul style="list-style-type: none"> <li>▪ Company and broadcast videos available</li> </ul>   | <ul style="list-style-type: none"> <li>▪ Most video will be digitised from existing sources</li> <li>▪ New audio to give better quality</li> <li>▪ New script to complement visuals better (chunks)</li> <li>▪ Photos and other graphics will be developed</li> <li>▪ Some visuals sourced from site</li> <li>▪ Specifications to be developed for each screen</li> <li>▪ Team development responsibilities</li> <li>▪ Voice talent</li> <li>▪ Music to add interest</li> <li>▪ Copyright considered</li> <li>▪ Permissions needed</li> <li>▪ Text in point form</li> </ul> | <ul style="list-style-type: none"> <li>▪ Media use</li> <li>▪ Sources for media</li> <li>▪ Team responsibilities</li> <li>▪ Copyright considerations</li> <li>▪ Documentation</li> </ul> | <ul style="list-style-type: none"> <li>▪ Team seem to be concerned with the need to develop specifications – from cases?</li> <li>▪ Also include team responsibilities – want to get that down on paper.</li> <li>▪ Don't justify or explain their use of media, eg. why is text in point form.</li> </ul> |
| 9. Implementation environment | <ul style="list-style-type: none"> <li>▪ Delivery on CD</li> <li>▪ Technical requirements</li> <li>▪ Training supervised by client rep to ensure accreditation requirements are met</li> </ul> | <ul style="list-style-type: none"> <li>▪ Training manager needs a system for keeping track of trainees</li> <li>▪ Not part of this package</li> <li>▪</li> </ul>  | <ul style="list-style-type: none"> <li>▪ Delivery medium</li> <li>▪ Technical requirements for implementation</li> <li>▪ Role of instructor</li> <li>▪ Scope of project</li> </ul>       | <ul style="list-style-type: none"> <li>▪ Justification of delivery medium and role of instructor.</li> <li>▪ Want to promote interactivity.</li> </ul>   |

| Section of design statement | Their description (parameters of project)   | Their ideas (interpretation of project)  | Issues discussed (key issues raised)  | Researcher's notes   |
|-----------------------------|---|--|---|--|
|                             | <ul style="list-style-type: none"> <li>CD because it allows high level of interactivity and fast data access</li> </ul> |  |   |  |
| Constraints                 |   |  |   | <ul style="list-style-type: none"> <li>Not discussed</li> </ul>  |
| 10. Evaluation              |   | <ul style="list-style-type: none"> <li>Evaluation planned being developed</li> <li>Content accuracy responsibility of client and will need to sign off</li> <li>Simple prototype will be first sign-off stage</li> <li>Feedback from client trainers and trainees</li> <li>Full prototype tested with target learners who will then be interviewed</li> <li>Performance on tasks also part of evaluation against benchmarks</li> <li>Full prototype tested against classroom method</li> </ul> | <ul style="list-style-type: none"> <li>Accuracy of content</li> <li>Formative evaluation</li> <li>Summative evaluation</li> </ul> | <ul style="list-style-type: none"> <li>Later sign-offs not mentioned. Could be more on summative evaluation</li> </ul>   |
| 11. Prototype               |   | <ul style="list-style-type: none"> <li>Specifications for what the prototype will include.(intro, map, module 2 info and quizzes)</li> </ul>   |   | <ul style="list-style-type: none"> <li>Obviously want to get this clear with the client.</li> </ul>  |
| 12. Attachment              |   | <ul style="list-style-type: none"> <li>Structure of module 2 as detailed storyboards</li> <li>Sample graphics</li> </ul>   |   | <ul style="list-style-type: none"> <li>Detailed description of each screen type including function, features and learner interactions.</li> <li>Sample graphics don't illustrate metaphor well.</li> </ul> |

# Appendix 5.3: Example of analysis notes for team products

## Group B

| Feature                                | Descriptive notes   |
|--|---|
| Concept/Approach                       | <ul style="list-style-type: none"><li>▪ Guided tutorial</li><li>▪ Serious and information</li></ul>   |
| Tasks and activities                   | <ul style="list-style-type: none"><li>▪ Exercises<ul style="list-style-type: none"><li>○ VO intro explains task<ul style="list-style-type: none"><li>▪ Multiple choice – 4 questions</li><li>▪ Full narration</li><li>▪ Feedback after all questions have been answered.</li><li>▪ Tell you how many you have right.</li><li>▪ Then presents the ones you got wrong and what the answers are.</li><li>▪ Choice now for review or no review.</li></ul></li><li>○ Interviews with real drivers<ul style="list-style-type: none"><li>▪ Pick one</li></ul></li><li>○ Choose protective clothing<ul style="list-style-type: none"><li>▪ Drag-and-drop (can only get this one right)</li></ul></li><li>○ Choose correct steps<ul style="list-style-type: none"><li>▪ Don't need to get in order (can't get wrong either)</li></ul></li><li>○ True and false<ul style="list-style-type: none"><li>▪ Drag and drop statements into T &amp; F zones</li><li>▪ 6 statements</li><li>▪ Feedback at end</li><li>▪ Tell you which you got wrong and why.</li></ul></li></ul></li></ul> |
| Information structure and presentation | <ul style="list-style-type: none"><li>▪ Title section with graphics and music</li><li>▪ Introduction section. A video clip with voice-over. Video sets scene – man getting into truck. Narrator introduces package, explains the structure, and gives instructions.</li><li>▪ Takes you into module. Introduction to the module. Explains sections – hazards of BTX shown in an illustrated graphic. Gives instruction – detailed.</li><li>▪ Module menu. When one is complete the graphic fades. Can still go back to other topics though. Choose one</li><li>▪ After choosing a section. Presents information in video with narration, plus some still photos and diagrams. No options here. Have to watch thing unless you click the truck and get back to the module menu.</li><li>▪ Optional summary. Or go straight to exercise.</li><li>▪ Summary is audio with text for main points</li><li>▪ Exercises</li><li>▪ If correct then back to main menu. If not then can review until all answers are correct. (Review takes you to the summary)</li></ul>            |
| Navigation                             | <ul style="list-style-type: none"><li>▪ Automatic sequence through title and intro</li><li>▪ Now can click on timeline. Only the section you are up to though (Here only completed section or help.)</li><li>▪ Timeline always available.</li><li>▪ Module – collage of graphics. Click on one for the section you want.</li><li>▪ Summary/Exercise buttons – can choose.</li><li>▪ Review/No review</li></ul>  |
| Interface design                       | <ul style="list-style-type: none"><li>▪ Background graphic – artwork plus company logo</li><li>▪ Large video/text frame</li><li>▪ One piece of information on the screen at any one time.</li></ul>   |

| Feature             | Descriptive notes   |
|---------------------|---|
| Media use           | <ul style="list-style-type: none"> <li>▪ Text <ul style="list-style-type: none"> <li>○ Titles</li> <li>○ Instructions for login</li> <li>○ Labels for map</li> <li>○ Button labels</li> <li>○ Help</li> <li>○ Exercise questions</li> </ul> </li> <li>▪ Graphics <ul style="list-style-type: none"> <li>○ Title sequence (photos, overview of site)</li> <li>○ Map of journey (timeline)</li> <li>○ Button icon (truck)</li> <li>○ Visual support for narration</li> </ul> </li> <li>▪ Audio <ul style="list-style-type: none"> <li>○ Title music</li> <li>○ Music under some clips (appropriate)</li> <li>○ Narrator – gives instructions</li> <li>○ Narrator – information</li> <li>○ Narrator – reads out questions (redundant text)</li> </ul> </li> <li>▪ Animation</li> <li>▪ Video <ul style="list-style-type: none"> <li>○ Visual support for narrated information</li> <li>○ Sometimes full-screen.</li> </ul> </li> </ul> |
| Features and tools  | <ul style="list-style-type: none"> <li>▪ Map (truck icon)</li> <li>▪ Help (text button)</li> <li>▪ Graphic of timeline, text explanation, background music</li> </ul>   |
| Technical           | <ul style="list-style-type: none"> <li>▪ Large video clips are very memory intensive</li> </ul>   |
| Additional comments | <ul style="list-style-type: none"> <li>▪ Needs a registration number</li> <li>▪ Heavy use of video</li> <li>▪ Predominately visual/audio</li> <li>▪ Teamwork evident (also from the credits)</li> <li>▪ Bug in the TF exercise</li> </ul>   |

# Appendix 6.1 Example of analysis of student reflective paper

## Joanne

| Student's paper   | Issues raised  | Related theme(s)   |
|---|--|--|
| <b>1. What was your role in the project team?<br/>Describe your tasks and responsibilities.</b>   |  |  |
| Initially, my chosen role was a graphic designer, however, after the withdrawal of our fifth member of our team, the role of Instructional designer was passed on to me. I didn't find my role very clear in terms of my whole team. However after some research, it become clearer to me.  | <ul style="list-style-type: none"><li>▪ Role changed from initial allocation</li><li>▪ Role unclear, new to role</li><li>▪ Did research to learn about role</li></ul>  | Each team member needs to develop an understanding of their role.  |
| There were some tasks that we carried out with the help of my group and these included conducting audience analysis; determining package concept and gathering content material – print materials obtained from our client, including the Aboriginal Kit and searching the internet. We didn't conduct a full needs assessment, however, we establishing from our client that an IMM package had never been developed for the Wollongong Art Gallery. I also assisted in the development of learning objectives. We agreed to have a high level of interactivity and learner control.   | <ul style="list-style-type: none"><li>▪ Role as a part of the group</li><li>▪ Activities and tasks undertaken as group and in role</li><li>▪ No previous material to work from</li><li>▪ Design principles – interactivity and learner control</li></ul>             | Each team member needs to develop an understanding of their role.<br><br>The proposed design is the result of many factors and considerations. |
| My main tasks and responsibilities involved analysis of tasks to be performed by the learner according to the learning objectives; evaluating content, selecting and developing instructional strategies appropriate to the target audience and their level of ability; selecting media appropriate to the instructional objectives, strategies and audience needs in terms of the cost to develop each medium, its accessibility, teaching function, interactivity and user-friendliness. Lastly, I will also need to develop an evaluation methodology for the prototype which includes designing formative and summative evaluation instruments. | <ul style="list-style-type: none"><li>▪ Description of own role</li><li>▪ Tasks and responsibilities specific to role</li><li>▪ (past and future)</li></ul>  | Each team member needs to develop an understanding of their role.  |
| As an instructional designer, my job is to focus on pedagogy, to consider the theories of learning such as the cognitive strategies to be introduced into the package and how it will assist the user to learn; we were influenced by the constructivist view point and felt it was appropriate for our project; to view instruction from the learner's perspective, consider whether the instructional tasks and the feedback meet the needs of the audience, so that the activities engage and challenge the learner and not as simple such as drag and drop exercises that can be boring.  | <ul style="list-style-type: none"><li>▪ Focus of own role</li><li>▪ Tasks and responsibilities</li><li>▪ Factors influencing the design (learning theory, chosen approach, interactivity)</li><li>▪ Features planned for the product – Learning activities</li></ul> | Each team member needs to develop an understanding of their role.<br><br>The proposed design is the result of many factors and considerations. |
| <b>2. How did you work with the other members of your team?</b>   |  |  |

|   |  |   |
|---|--|---|
| I think initially everyone was a little cautious at first, having little or no previous experience in producing an IMM package in a group environment. This was certainly a new experience for me. We got on well, encouraging each other and listened to all the ideas from each member. Towards the end of our project, we realised the amount of technical skills we had in our group, these included iShell, Sound Edit, Video Capture equipment (Adobe Premiere, SimplePlayer, Media Cleaner, Photoshop and 3D MAX.  | <ul style="list-style-type: none"> <li>▪ Lack of previous experience</li> <li>▪ Group dynamic is supportive and inclusive</li> <li>▪ Technical skills gained seen as an outcome</li> </ul>   | <p>Each project has inherent constraints which the team must recognise and work within.</p> <p>Open communication is essential to a good group dynamic and collaboration.</p> |
| It was essential to meet face-to-face on a regular basis to develop our project. I preferred this arrangement and felt that it was the best way to collectively generate our ideas and make decisions, however, it was difficult to keep the regular meetings because team members were busy with other commitments.  | <ul style="list-style-type: none"> <li>▪ Regular team meetings face-to-face</li> <li>▪ Importance for discussion and decision-making</li> <li>▪ Regular communication</li> <li>▪ Impact of other commitments</li> <li>▪</li> </ul>                                   | Open communication is essential to a good group dynamic and collaboration.  |
| Most of the main decisions were made by consensus between the team members. No one dominated the group discussions. We all listened to each other's ideas and I felt comfortable about voicing my ideas.  | <ul style="list-style-type: none"> <li>▪ Decision-making occurred by consensus</li> <li>▪ Group dynamic as inclusive and equal</li> </ul>  | Open communication is essential to a good group dynamic and collaboration.  |
| <b>3. What were the main design and management issues your team encountered during the project?</b>   |  |   |
| <b>Main design issues:</b>  |  |   |
| We wanted to create a user-interface that was interactive, colourful and attractive for kids. Navigation was to be simple and easily accessible. We were influenced by the constructivist approach where the learner can decide on where to go and what to do whatever is suitable to their learning style. For example, they can read information on the paintings in the gallery or attempt a puzzle game or the art detective. The 360° panoramic view adds to this constructivist point of view where construct their own understanding and learn by discovery and exploration. As suggested by our client, we created a game simulation which is fun and challenging for our target audience rather than a tutorial which they would probably find boring. | <ul style="list-style-type: none"> <li>▪ Design principles – interactivity, constructivist, style of product</li> <li>▪ Design of the product – interface, activities</li> <li>▪ Factors influencing the design – chosen approach, client's initial ideas</li> </ul> | The proposed design is the result of many factors and considerations.   |

|   |   |  |
|---|---|--|
| <p>The VAPD was a main feature of our prototype which is a similar concept to the PDA in Nardoo. This was our biggest challenge to create with all the functionality and a vital learning tool. This was the toughest hurdle to try and get as much of the functionality working as possible. Due to time constraints, we aimed at making only several functional to give a basic idea of how it would work.</p>  | <ul style="list-style-type: none"> <li>▪ Design of the product – VAPD as major feature</li> <li>▪ Factors influencing the design – Nardoo</li> <li>▪ Implementation of planned features a challenge</li> <li>▪ Constraints on the product – time available</li> </ul>   | <p>The proposed design is the result of many factors and considerations.</p> <p>Adaptation to change and compromise of original ideas are part of project development.</p> <p>Each project has inherent constraints which the team must recognise and work within.</p> |
| <p><b>Main management issues:</b></p>   |   |  |
| <p><b>Communication</b></p> <p>Maintaining communication between members of our project team was a challenge. Not everyone members of team attended all our scheduled meetings and some important emails weren't read or replied to. It was difficult to organise the regular meeting times because team members have other work and family commitments. Several times we had to call someone at home or work to find get an update or keep them updated because we hadn't heard from them for a while. I felt that there wasn't a 100% commitment from the whole team. In the real world you can't afford to team members not contributing as it would be costly to the project, you would most likely to be removed.</p>  | <ul style="list-style-type: none"> <li>▪ Importance of communication – maintaining, commitment to</li> <li>▪ Team members not always available for meetings</li> <li>▪ Impact of other commitments</li> <li>▪ Lack of commitment</li> <li>▪ Communication strategies used</li> <li>▪ Not like a real-world project</li> </ul>   | <p>Open communication is essential to a good group dynamic and collaboration.</p> <p>Working on a project for a university subject is not like a real project.</p>   |
| <p><b>Roles/responsibilities</b></p> <p>We had difficulty with assigning roles at the beginning because some of us wanted to learn news skills. But we had to take the pragmatic approach due to our project timeframe. We accepted our roles but found that some were overlapping and sometimes it was hard to tell who was supposed to do what. In the end, we all chipped in and assisted each other to get the job done. I seemed to have more time on my hands so I prepared the multimedia resources which included video clips, audios, sounds and manipulated graphics. At times, it didn't seem like there was an equal distribution of the workload but eventually everyone's time and expertise were invaluable whether or not it is part of their role.</p> | <ul style="list-style-type: none"> <li>▪ Allocation of roles was difficult</li> <li>▪ Aims of individuals were considered</li> <li>▪ Time constraints – need to be pragmatic</li> <li>▪ Negotiating roles and tasks – boundaries between roles unclear</li> <li>▪ Tasks and responsibilities shared</li> <li>▪ Distribution of workload not always even</li> <li>▪ All helped at end of project</li> <li>▪ Contributions were made by all team members</li> </ul> | <p>Each team member needs to develop an understanding of their role.</p> <p>Each project has inherent constraints which the team must recognise and work within.</p>   |



|   |  |   |
|---|--|---|
| <p><b>File management</b></p> <p>This was more of an issue once we began developing the prototype. It became less practical to send and download files via email as it was too time consuming and was overloading our mailboxes with these huge files. We requested for space on the FTP server to store all our files where all members of our group could access and view any changes or additions to the prototype. It was a very practical solution in terms of version control and file backup.</p>  | <ul style="list-style-type: none"> <li>▪ Resource management in production phase</li> <li>▪ FTP server access allowed team to exchange files</li> <li>▪ Assisted with version control and backups</li> </ul>   | <p>Resource management is essential for smooth production.</p>  |
| <p>However, with our new file management system in place, we still had problems. Several times, the server went down and I couldn't access any information. One weekend, I came into the lab ready to do two full days of work but I couldn't anything. Sometimes, it would go down 3-4 times a day. It was very frustrating and couldn't come at a worse time.</p>   | <ul style="list-style-type: none"> <li>▪ Technical problems with server crashes delaying progress</li> </ul>   | <p>Resource management is essential for smooth production.</p>  |
| <p><b>Authoring Tool</b></p> <p>We experienced technical problems with iShell. The software had upgraded to a new version which we didn't have a license for and we were unable to download the old license. The licenses on some of the computers in the lab was still valid but we were concerned that although that we might be able to produce the prototype now, we may not be able to present it at a later date as the license would have expired by then. Purchasing the new version ishell2 would cost approximately \$999 which we do not have in our budget. I already have problems running my Edgi913 prototype from last semester which was created in version 1.1.1.</p> | <ul style="list-style-type: none"> <li>▪ Choice of software tools</li> <li>▪ Technical problems with tool and licensing</li> <li>▪ Implications for implementation</li> </ul>  | <p>Working on a project for a university subject is not like a real project.</p>  |
| <p><b>Client Knowledge</b></p> <p>Our client provided us with lots of flexibility with the development of the project. The flexibility stem from the fact that our client had little knowledge and experience with IMM educational packages. It may have been easier for us to develop our concept had we obtained more information about what the client wanted. On the brighter side, we felt no pressure from our client but who without, a previous educational packages to work from, we found it difficult to envisage the overall concept.</p>   | <ul style="list-style-type: none"> <li>▪ Client role – provide brief, initial ideas, lack of experience</li> <li>▪ Factors influencing the design – client brief</li> <li>▪ Design would have been easier with more to go on</li> <li>▪ No pressure – good working relationship</li> <li>▪ Needed to develop own vision, nothing to work from</li> </ul> | <p>The proposed design is the result of many factors and considerations.</p> <p>Each team member needs to develop an understanding of their role.</p> |
| <p><b>4. Choose a particular issue and describe how you addressed it?</b></p>   |  |   |

|   |   |   |
|---|---|---|
| Communication was a big issue. I made sure that I sent emails to the group updating any changes or additions that I had made and had regular phone contact when we didn't have meetings. I felt I was a team player and tried to be there to help with any part of the project. It was frustrating at times but I made the decision to just get on with the project rather than waste time worrying about it.   | <ul style="list-style-type: none"> <li>▪ Communication a big issues</li> <li>▪ Communication strategies used</li> <li>▪ Commitment to communication</li> <li>▪ Working as part of a team – frustrations, teamwork</li> </ul>  | Open communication is essential to a good group dynamic and collaboration.  |
| <b>5. Was there any information from the case or readings you studied that was useful in working on your project?</b>   |   |   |
| <p>StageStruck and Nardoo both spent a lot of time developing a large amount of resource materials that they did not end up using in their package. Time was a major factor in our decision making and we had a realistic approach from the beginning to just focus on developing the particular materials we needed for our prototype. I think this was one of our strengths as team. We considered the problems with the huge memory use when doing the video captures and only created what was needed.</p> <p>Like StageStruck we also focused on a constructivist framework to appeal to our young audience.</p>   | <ul style="list-style-type: none"> <li>▪ Too many resources developed in case projects</li> <li>▪ Time &amp; technical constraints</li> <li>▪ Need for realistic approach – developed what they needed</li> <li>▪ Factors influencing the design of the product - similar aims to StageStruck</li> </ul>            | <p>Each project has inherent constraints which the team must recognise and work within.</p> <p>Resource management is essential for smooth production.</p> <p>The proposed design is the result of many factors and considerations.</p> |
| StageStruck had problems with version control and file backups which was very important to note. It was at the right time when we started using the FTP server. It meant that version control was maintained and the programmer was able to make changes without any problems. All team members could access these files in a central location from anywhere and know that they have the most updated version. Initially, we considered getting copies of the prototype on separate zip disk but decided that it would not be practical for version control. I have had first hand experience with file corruptions in Edgi913 and sometimes for no evident reasons. The FTP server is backed up on a regularly basis so if a worse case scenario occurred we could at least restore the corrupted files. | <ul style="list-style-type: none"> <li>▪ Version control and backup problems for StageStruck</li> <li>▪ FTP server used to store files</li> <li>▪ Other options considered less practical</li> <li>▪ Backups to protect previous work</li> <li>▪ Technical problems – awareness from previous experience</li> </ul> | Resource management is essential for smooth production.   |
| We need to remember that there is a big difference between our project compared with Stagestruck and Nardoo. There were a lot of people and huge support teams for them. We only have four in our team. We have to be realistic with the production of a prototype as our time frame is much shorter, we have less resources to work with and we don't have any funding.  | <ul style="list-style-type: none"> <li>▪ Didn't have the resources of the case projects</li> <li>▪ Needed to be realistic about what could be achieved</li> <li>▪ Constraints of time and resources</li> </ul>  | <p>Working on a project for a university subject is not like a real project.</p> <p>Each project has inherent constraints which the team must recognise and work within.</p>  |

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|--|---|---|
| <p>I found Blum's eight phases of the development process very useful for our team. We modelled this process as best as we could to ensure that we didn't leave any steps out. We also kept in mind that we were only developing our prototype and not the full blown version. I can appreciate how using a model such as this can produce effective IMM packages.</p>   | <ul style="list-style-type: none"> <li>▪ Used Blum model of development process</li> <li>▪ Didn't want to miss steps</li> <li>▪ Need to remember aim</li> </ul>   | <p>Working on a project for a university subject is not like a real project.</p>  |
| <p><b>6. Are there any parallels between your project and other projects described in the case and readings?</b></p>   |   |   |
| <p>Like Nardoo and Stagestruck, Art dimensions has been developed aimed at secondary school students. We found the PDA feature in Nardoo to be a valuable learning tool and wanted to adopt the idea in our prototype which we call the VAPD. Both Stagestruck and Art Dimensions explored new areas/concepts that had not been previously developed and therefore the design process was initially overwhelming for both teams.</p>   | <ul style="list-style-type: none"> <li>▪ Similar target audience</li> <li>▪ Similar feature included in their design</li> <li>▪ Design process challenging – trying new ideas</li> </ul>  | <p>The proposed design is the result of many factors and considerations.</p>      |
| <p>We applied the consensus approach (Visscher-Voerman et al., 19xx, pp18-21) throughout the design and development processes of our project. According to Visscher &amp; Voerman, the communicative paradigm, the social part of the development process receives considerable attention. Establishing a shared frame of reference and reaching consensus among all those involved are important elements." The consistent communication between each team member as well as our client worked out very well and all the major decisions have been made by consensus.</p> | <ul style="list-style-type: none"> <li>▪ Decision-making occurred by consensus</li> <li>▪ Communicative paradigm adopted</li> <li>▪ Importance of shared vision and involvement</li> <li>▪ Maintaining team communication</li> <li>▪ Keeping the client up-to-date</li> </ul> | <p>Open communication is essential to a good group dynamic and collaboration.</p> |

# Appendix 6.2: Example of analysis of group reflective case

## Group C

| Students' written work  | Main issue(s)   | Related theme(s)   |
|---|---|--|
| Introduction  |   |  |
| <p>In trying to decide what our project would be based upon, we were initially presented with two options. One option was to develop a tutorial style instructional package detailing the maintenance of elevator systems (for Otis Australia).</p> <p>The second option grew out of a desire on the part of our project manager to create something with a community focus. Whilst the first option was more concrete and in many ways far simpler to implement, we decided to accept the challenge of the second option and set about finding a suitable project. This was not straightforward as we needed to find something which could include an educational focus to satisfy the requirements of our course of study. It would not be sufficient to simply build an information package on some community group or activity.</p> | <ul style="list-style-type: none"><li>▪ Choosing a project</li></ul>                |  |
| <p>We wanted to use the local community itself as our source of inspiration and at first explored avenues such as Wollongong Council. This eventually led to us making contact with Wollongong Art Gallery. To us, the Gallery was an ideal choice as we considered it an important cultural resource within our community and it also has a strong educational focus. From their viewpoint, the Gallery was also keen as they saw an opportunity to promote their activities in a new way.</p>   | <ul style="list-style-type: none"><li>▪ Initiation of the project</li></ul>         |  |
| 1. Your original concept - 'the big picture'...   |   |  |
| <p>In mapping out our first thoughts and ideas, we determined two broad aims:</p>   | <ul style="list-style-type: none"><li>▪ Two aims for the project</li></ul>          |  |
| <p>Firstly, it would provide a virtual tour of the gallery, informing users of such things as its function and the roles of the gallery staff. It would also familiarise users with the content of the gallery and thereby act as an advertisement encouraging people to visit the gallery. The gallery collections include Aboriginal, Contemporary and Historical works, which would be accessible via separate modules within the package.</p>   | <ul style="list-style-type: none"><li>▪ Virtual tour for general audience</li></ul> | <p>The proposed design is the result of many factors and considerations.</p> |

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| <p>Secondly, the package would provide educational experiences in keeping with the Visual Arts Syllabus – Stage 4 (years 7-10). The current and revised Visual Arts Syllabus, concentrates on three main content areas – Subject Matter, Forms and Frames. Within the context of each of these categories many themes can be explored through various interpretations presented in such forms as painting, printmaking and ceramics. The learner is now placed in a role to evaluate artworks in terms of critical and historical study thus gaining insight into the beliefs and values of their own and other societies.</p> <p>In the package, users can, for example, read background material or view a video, which enhances their understanding of the cultural and historical meaning and significance of the artwork they are viewing.</p> | <ul style="list-style-type: none"> <li>▪ Educational package for visual arts students</li> <li>▪ Syllabus</li> <li>▪ Relation to package</li> </ul>         | <p>The proposed design is the result of many factors and considerations.</p> |
| <p>The introduction of particular instructional strategies would assist the student's learning. We wanted to introduce concepts to the learners with the aid of a game simulation strategy rather than a tutorial or drill and practice style which we thought kids would find boring.</p>  | <ul style="list-style-type: none"> <li>▪ Game/Simulation approach</li> </ul>  | <p>The proposed design is the result of many factors and considerations.</p> |
| <p><b>2. The design ideas and considerations that led to your design statement</b></p>  |   |  |
| <p>We wanted to create a package that was visually appealing with the interactivity to attract our target audience and engage them in the learning by introducing instructional activities containing fun things to do. We wanted to create a user-friendly package containing simple navigational tools and easy access to the activities.</p>   | <ul style="list-style-type: none"> <li>▪ Engage target audience through visual design and interactivity</li> </ul>  | <p>The proposed design is the result of many factors and considerations.</p> |
| <p>We were influenced by the constructivist approach where learners shape their own understanding and learn by discovery and exploration. This learning approach is supported by Bruner, 1973 who claims that "active participation is best achieved by providing discovery learning environments that let children explore alternatives and recognise relationships between ideas." Therefore, the development of a democratic environment is ideal to foster this learning process. The panoramic views using 3D animations and graphics enable the user to choose what they want to see and do with little instruction except for a general help facility that they can access at any time.</p>  | <ul style="list-style-type: none"> <li>▪ Adopted a constructivist approach</li> <li>▪ Based on democratic principles</li> <li>▪ Free to navigate</li> </ul> | <p>The proposed design is the result of many factors and considerations.</p> |
| <p><b>3. How concepts from readings, lectures and demonstrations influenced your design</b></p>   |   |  |

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| <p>Our group considered client and team relationships on a “communicative paradigm”. Visscher-Voerman et al. (1999) discuss “communication to reach consensus”. They state that “establishing a shared frame of reference and reaching consensus among all those involved are important elements” to successful interactive multimedia design. We therefore set out at all stages to accommodate the range of views expressed by individual team members.</p> | <ul style="list-style-type: none"> <li>▪ Communicative paradigm – team philosophy</li> <li>▪ Decision-making by consensus</li> <li>▪ Importance of communication</li> </ul> | <p>Open communication is essential to a good group dynamic and collaboration.</p>             |
| <p>Our previous experience as students in EDGI 911 and 913 engaged in constructivist learning theory provided us with strong ideals in this field of educational theory. We wanted to avoid drill and practice and tutorials that often bore children in this age group. The constructivist learning approach we have adopted led to design tasks that are “student centred” based on “discovery learning and selfdirected learning”(Roblyer, 1998).</p>      | <ul style="list-style-type: none"> <li>▪ Influence of previous study</li> <li>▪ Constructivist theory – wanted to use</li> </ul>  | <p>The proposed design is the result of many factors and considerations.</p>                  |
| <p>After the demonstration on digital video capture, we knew that we wanted to create some video clips and include them into the prototype. This included footage of Aboriginal artists at work depicting the various styles of traditional and contemporary Aboriginal art available today. We felt that it would add to the learner’s experience.</p>   | <ul style="list-style-type: none"> <li>▪ Technology – what it could offer</li> </ul>  | <p>The proposed design is the result of many factors and considerations.</p>                  |
| <p>We were impressed with the ‘Nardoo’ and particularly ‘Stagestruck’ packages and wanted to adopt some of their ideas in our prototype such as the panoramic views and the VAPD learning tool. We wanted to create an educational experience that was visually appealing and interactive to cater to our young audience.</p>   | <ul style="list-style-type: none"> <li>▪ Case projects</li> <li>▪ Specific tool - VAPD</li> </ul>   | <p>The proposed design is the result of many factors and considerations.</p>                  |
| <p><b>4. How you implemented your design ideas in your prototype and the factors that influenced those decisions.</b></p>   |   |   |
| <p>We were influenced by some limitations in the iShell software, for example, the cut and paste ‘Notes’ capability within the VAPD is very basic. We wanted to be able to include more features such as better editing tools. It was intended that the user could copy a selected section of text from an on-screen article and paste this into their notes. The best we could achieve for our prototype was to copy the entire article only.</p>            | <ul style="list-style-type: none"> <li>▪ Adapted tool because of constraints of authoring software</li> </ul>   | <p>Adaptation to change and compromise of original ideas are part of project development.</p> |
| <p>We had only aimed to have several aspects of the VAPD functional to demonstrate how it would be used. We did not expect to have it totally functional due to the limitations of our authoring software – iShell.</p>   | <ul style="list-style-type: none"> <li>▪ Limitations of authoring tool</li> <li>▪ Scope of prototype project</li> </ul>   | <p>Adaptation to change and compromise of original ideas are part of project development.</p> |

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| There was an issue with the availability of material, for example, some art pieces we wanted to include did not have a great deal of information. We wanted to include a video segment of Vic Chapman, a local Aboriginal ceramic artist to support the link between the community and the art gallery. Unfortunately, he was not available in the time frame.  | <ul style="list-style-type: none"> <li>Adapted package because some information not readily available</li> </ul>  | Adaptation to change and compromise of original ideas are part of project development.  |
| The panoramas, which were delivered for the first prototype, did not allow interactivity such as hotspots, therefore a 'workaround' solution was devised using Left & Right navigational buttons to change views. We did pursue this as a design issue right through to the final week but due to technical and time constraints we were forced to remain with our temporary solution.                          | <ul style="list-style-type: none"> <li>Panorama interactivity was adapted from original plan</li> <li>Technical and time constraints limited further development</li> </ul>   | <p>Adaptation to change and compromise of original ideas are part of project development.</p> <p>Each project has inherent constraints which the team must recognise and work within.</p> |
| There are a lot of text readings for the paintings in our prototype. To appeal to the learners' senses in order to keep them interested and motivated to learn, we introduced various other media. These include video clips, audio tracks and photos to cater for different learning styles. Where large blocks of text were concerned, we opted to create a page turning effect to avoid excessive scrolling. | <ul style="list-style-type: none"> <li>Included multiple media to maintain audience interest</li> <li>Targeted to audience</li> </ul>   | The proposed design is the result of many factors and considerations.   |
| Children love to explore and to cater for this, they are able to move their mouse over objects with filter effects which tell them that there is something there for them to investigate.   | <ul style="list-style-type: none"> <li>Aim to encourage exploration</li> <li>Interface design</li> </ul>  | The proposed design is the result of many factors and considerations.   |
| <b>5. How your ideas about designing educational multimedia products have changed as a result of your experiences.</b>  |   |   |
| We needed to adhere to project timelines. We can't afford to wait for material to arrive, for example, we experienced periods of downtime in programming while waiting for graphics to be provided.   | <ul style="list-style-type: none"> <li>Organising production work</li> </ul>  | Teamwork and management are essential in the project's production phase.  |
| This was a very different experience from our first semester subject where we all built our own product. In the current scenario we needed to learn to listen to each other and accommodate their views and ideas.  | <ul style="list-style-type: none"> <li>Teamwork a new experience</li> <li>Need for communication</li> </ul>   | Open communication is essential to a good group dynamic and collaboration.  |
| Our group could have moved more quickly to a consensus on exactly what it was we wanted to produce. Once settled we needed to keep focussed on that concept. In practice, although we had a detailed design statement, it was not clear that we all had the same concept cemented in our minds. We probably spent too much time re-visiting material such concept maps, flowcharts and blueprints.              | <ul style="list-style-type: none"> <li>Working together</li> <li>Consensus decision-making</li> <li>Develop a shared understanding</li> <li>Need for detailed design documents</li> <li>Need for specifications as well as high level concepts</li> </ul> | <p>Open communication is essential to a good group dynamic and collaboration.</p> <p>Documentation is a valuable tool for design and management.</p>                                      |



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| <p>According to Phillips (1998), "We should not assume anything in IMM design, as there is a tendency in team relations to assume that he or she knew what was required." Communication between members is essential to keep up-to-date with responsibilities and overall contribution to the project design. It wasn't always convenient to meet face-to-face within our group. Email communication was used extensively, however, this required commitment from all members to read and respond promptly. Other matters such as work and family commitments meant that on occasions it was not used effectively.</p>                         | <ul style="list-style-type: none"> <li>▪ Communication is essential</li> <li>▪ Electronic communication as well as face-to-face meetings</li> <li>▪ Need to participate</li> <li>▪ Impact of other commitments</li> </ul> | <p>Open communication is essential to a good group dynamic and collaboration.</p>  |
| <p>We needed to take advantage of the design stage of the project to produce detailed specifications. Our group started the implementation stage of the prototype based on the storyboard issued to the group. There were "gaps" in this storyboard, which led to inconsistencies during the production stage, especially for the programmer and instructional designer who had to make alterations to the original design. One should not undervalue the use of pen and paper to communicate key concepts between members at this stage.</p>  | <ul style="list-style-type: none"> <li>▪ Need for detailed specifications to guide production</li> <li>▪ Need for alterations to the original design</li> <li>▪ Need for communication about changes</li> </ul>           | <p>Documentation is a valuable tool for design and management.</p> <p>Adaptation to change and compromise of original ideas are part of project development.</p> |
| <p>Multi-skilling was necessary working within such a small group. It is important for all team members to share the workload so that the project does not fall behind. This issue can be avoided by finding out exactly the skills and availability of team members.</p>  | <ul style="list-style-type: none"> <li>▪ Sharing of roles, tasks and skills</li> <li>▪ Need to manage roles and workload</li> </ul>   | <p>Each team member needs to develop an understanding of their role.</p> <p>Teamwork and management are essential in the project's production phase.</p>         |
| <p>It seemed like an overwhelming task at first but we were very pleased with what we achieved. We would agree as a group that if we had to do another project, our skills in project development would be improved. Being part of a group, everyone has different skills, abilities and expertise. For this reason, it was a challenge for us to work as part of a team but we learnt a great deal about our roles and responsibilities. We never realised how involved and challenging it was to develop an educational multimedia package. It was important for the team to remain positive and motivated throughout the whole process.</p> | <ul style="list-style-type: none"> <li>▪ Have developed project skills</li> <li>▪ Working as part of a team</li> <li>▪ Learning about roles</li> <li>▪ Importance of motivation</li> </ul>                                | <p>Each team member needs to develop an understanding of their role.</p> <p>Teamwork and management are essential in the project's production phase.</p>         |
| <p><b>Other Project Issues</b></p>   |   |  |



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| <p>Our client provided us with lots of flexibility with the development of the project. The flexibility probably stemmed from the fact that our client had little knowledge and experience with IMM educational packages. It may have been easier for us to develop our concept if our client was able to specify what he wanted and provide some constraints for our project. On the brighter side, we felt no pressure from our client, though it took us some time to establish the overall concept, despite feedback from him. However, our client was very helpful particularly with material for our content such as interview recordings, taking graphic shots of paintings and text information.</p> | <ul style="list-style-type: none"> <li>▪ Role of the client</li> <li>▪ Initial client brief – influence on design</li> <li>▪ Good client relationship</li> </ul> | <p>Each team member needs to develop an understanding of their role.</p> <p>The proposed design is the result of many factors and considerations.</p>                       |
| <p>Although we experienced difficulty at first with establishing the scope and overall concept of our project, our team maintained our focus, during the development process, on what we knew we were able to achieve in the time frame that we had. This was a positive decision as it enabled us to concentrate on the things we needed to do.</p>   | <ul style="list-style-type: none"> <li>▪ Focus during development stage</li> <li>▪ Decide what should be developed</li> <li>▪ Time as a constraint</li> </ul>    | <p>Teamwork and management are essential in the project's production phase.</p> <p>Each project has inherent constraints which the team must recognise and work within.</p> |
| <p>We had the opportunity to further develop our existing skills such as Photoshop, Sound Edit and iShell, as well as learn some new technical skills such as using digital video capture equipment and accessing the student server from home using FTP software.</p>   | <ul style="list-style-type: none"> <li>▪ Technical skill development part of the project and an outcome</li> </ul>   |   |
| <p>We've had to develop our negotiation and communication skills and understand that we all have different work patterns and other commitments such as work and family and needed to organise meetings around them. We needed to ensure that we kept all our team members up to date with any developments or changes and we also needed to be in touch by reading our emails, attending all meetings etc.</p>   | <ul style="list-style-type: none"> <li>▪ Communication skills as part of teamwork</li> </ul>   | <p>Open communication is essential to a good group dynamic and collaboration.</p>   |
| <p><b>Advice you might give other new project designers and developers</b></p>   |  |   |
| <p>The weekly progress reports, which we established earlier on in our project, were very useful to keep everyone informed of what is going on, what tasks have been completed and what is still outstanding and who is responsible for each task.</p>   | <ul style="list-style-type: none"> <li>▪ Progress reports to keep team informed</li> <li>▪ Documentation of progress shared</li> </ul>                           | <p>Open communication is essential to a good group dynamic and collaboration.</p> <p>Documentation is a valuable tool for design and management.</p>                        |
| <p>The FTP server was useful for addressing the issue of file management. It was easy to use and access. Our work was backed up and you could also address the issue of version control at the same time. This avoided the need for each member to work on separate copies which would require exchanging of versions and the danger of loss of data files. The only difficulty encountered here was the transfer of large files such as video clips. Without high speed access, it was not possible to do this from home, requiring the occasional visit to the lab.</p>  | <ul style="list-style-type: none"> <li>▪ Managing resources – developed strategies to address</li> <li>▪ Some limitations due to speed of technology</li> </ul>  | <p>Resource management is essential for smooth production.</p>  |

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| <p>It is important to remember that you are developing a prototype not the complete product and you need to be realistic with what you can achieve and focus on completing those tasks. The prototype must be sufficiently functional so that it works without major 'bugs' and yet does not need to have every area fully fleshed-out. The challenge is to produce something which gives an accurate reflection and feel for what the final product will achieve when delivered. This of course must be achieved within a finite timeframe.</p>   | <ul style="list-style-type: none"><li>▪ Only developing a prototype</li><li>▪ Understand limits of project</li><li>▪ Be focused on the goals</li><li>▪ Awareness of constraints like time</li></ul> | <p>Each project has inherent constraints which the team must recognise and work within.</p> |
| <p><b>Conclusion</b></p>   |   |   |
| <p>Despite some difficulties along the way and the occasional yearning to want to run off and do an individual project, we have all learnt a great deal about the requirements and demands of working together as a development team. The project offered us many opportunities to put into practice the concepts from our readings and observations of other projects. The process of studying others' experiences and then being immersed in your own is a very comprehensive way to develop the necessary skills for working in this field.</p> | <ul style="list-style-type: none"><li>▪ Working as a team was rewarding</li><li>▪ Put ideas into practice</li><li>▪ Cases then experience as a learning experience</li></ul>                        |   |

Appendix 6.3: Skills audit form

EDGI931/2 Interactive Multimedia Design  
Skills Audit  
Wollongong Class - Session 2, 2000

Team: \_\_\_\_\_

Identify skills required to fulfil project roles.

| Skill Area                          | Specify requirements: | Team Member(s) |
|-------------------------------------|-----------------------|----------------|
| IShell                              |                       |                |
| Graphics                            |                       |                |
| • Scanning                          |                       |                |
| • Photoshop                         |                       |                |
| Audio                               |                       |                |
| • Recording                         |                       |                |
| • Editing                           |                       |                |
| Research and<br>Resource Collection |                       |                |
| Instructional Design                |                       |                |
| Other (specify):                    |                       |                |
|                                     |                       |                |