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A Framework to guide professional learning and reflective practice

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A Framework to Guide Professional Learning and Reflective Practice.

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

Doctor in Education

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Faculty of Education

Bronwyn Hegarty

Masters in Science (Dist), Bachelor of Science (Biology and Chemistry) (Hons)

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A new type of thinking is essential if mankind is to survive and move to higher levels
(Albert Einstein, 1946).

CERTIFICATION

I, Bronwyn Ann Hegarty, declare that this thesis, submitted in partial fulfilment of the requirements for the award of Doctor of Education, 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 academic institution.

Bronwyn A. Hegarty

May 2011.

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ABSTRACT

The exploratory qualitative case study investigated a previously untested framework to scaffold reflective writing about professional practice. The framework was based on the concepts of paying attention and noticing events in practice and used a theoretical framework informed by a number of researchers (e.g., Boud & Walker, 1990; Boud et al., 1985; Rodgers, 2002b; Tremmel, 1993). Recommendations from a small preliminary study, in which reflective strategies were used to scaffold the development of a professional portfolio, also influenced the design of the intervention in the main study.

This research study contributes to current knowledge about the use of frameworks and feedback for supporting professional learning and reflective practice. Written reflections about practice most commonly demonstrate descriptive reflection, and studies have shown that achieving higher levels of reflection is challenging. This research explored an approach to reflection that included the act of noticing or being mindful when reflecting about practice, and attention to feelings. These dimensions of reflection are considered important for encouraging practitioners to engage meaningfully with their experiences, deepen their reflection and learn from them. Therefore, the aim of the research was to explore whether encouraging paying attention and noticing events influenced the quality of reflections.

The participants were seven post-graduate education students enrolled in a multimedia design subject in a Masters of Education programme and their lecturer. The reflective framework was integrated into the assessments for the subject, and used to structure and prompt written reflections about practice experiences. The subject lecturer provided written feedback on each written reflection. The written reflections together with other assignment work comprised an electronic design portfolio, developed over the course of the subject as evidence of practice. This student work, together with the written feedback from the teacher, responses to an initial questionnaire and interviews with the students and teacher comprised the dataset for the study.

A variety of methods were used to analyse the data collected, including descriptive statistics, coding systems, content and thematic analysis, and constant comparative analysis, thus contributing to the quality of the outcomes. The analysis particularly focused on determining the levels of reflection demonstrated in participants' writing, analysed using a hierarchical taxonomy based on frameworks developed by Sparks-Langer, Simmons, Pasch and Colton (1990), and Hatton and Smith (1995). The content of participants' reflections and their experiences of undertaking the reflection were also examined.

Overall, the approach to reflective writing by the participants in this study indicated that they engaged in noticing their experiences, and through analysis of these were able to gain new knowledge about their practice, make decisions based on that learning, and also set goals for future actions. Furthermore, all participants indicated that they found the reflective framework useful for assisting them to write reflectively, claiming it provided structure, and most intended to engage in reflective writing in the future. However, the study also found that lower levels of reflection were more common in participants' writing than higher levels of reflection. This finding is similar to others' research (e.g., Hatton & Smith, 1995; McCollum, 2002; Sparks-Langer et al., 1990; Ward & Cotter, 2004) and highlights the difficulties in supporting reflection. The outcomes of this research study suggest that reflective processes can be successfully scaffolded and supported to promote reflection, professional learning and reflective practice, but more needs to be done to support the process. It should also be acknowledged that this was a small scale exploratory study and the findings may be specific to the particular context in which it was conducted. For this reason the final chapter of this thesis includes suggestions for further research.

1 CHAPTER ONE: INTRODUCTION TO THE STUDY

1.1 Introduction

The way in which educational practitioners (in particular, postgraduate education students) reflect when writing about their experiences (levels of reflection), how reflection supports learning (reflective learning) and what they reflect on (professional focus) was pivotal to this exploratory study. Also, the role of scaffolding in supporting professional learning and reflective practice was of specific interest. Hence for the research, an intervention, the Three-Step Reflective Framework, was developed and used for the first time to facilitate the processes of reflection, reflective learning, and reflective writing, engaged in by practitioners who were postgraduate education students when participating in the research, studying a multimedia design subject as part of a Masters in Education. The writing which these practitioners produced during their study was collated along with artifacts in an electronic design portfolio. The reflective framework was used to structure their writing and was separate to the ePortfolio. Hence, the role played by electronic portfolios in facilitating reflection is mentioned only briefly in this chapter since the emphasis was on the reflective framework. The way in which the framework influenced the level of reflection in participants' writing was of particular interest since reflective writing is generally considered to be more than description of events, and this is discussed further on. The concepts of reflection and reflective learning, professional learning and the links to reflective practice are introduced in this chapter, along with information about the role that reflective writing has in promoting reflective practice.

Reflection is generally regarded as a specific and prolonged form of thinking, which if used effectively by professionals can help them to make sense of actions in practice and learn from them (Boyd & Fayles, 1983; Boud, Keogh & Walker, 1985; Dewey, 1933; Moon, 1999). Not only can reflection help practitioners to learn from practice, it can also be used to develop understanding and professional knowledge for change (Loughran, 2002). When engagement in reflection encourages meaningful and deep

learning this is defined by Moon (2004) as reflective learning, and is recognised as the cornerstone to reflective practice (Boud et al., 1985). According to Boyd and Fayles (1983): “reflective learning is the key element in learning from experience”, because reflection can influence the outcomes of practice (p. 100). In their research, five parameters of reflective learning were found: 1. inner discomfort “that something does not fit”; 2. clarification of how the problem affects the self; 3. openness to new perspectives – internally and externally; 4. resolving the problem through a process of learning and change; and 5. deciding whether to apply the learning to practice. They believed that intervention would be most effective in the fourth stage, and that strategies could be used to help practitioners to capture new information effectively and become aware of other views and how they impacted on their practice (Boyd & Fayles, 1983).

Professional learning is another term in common use, and is also associated with reflective practice as it is known to facilitate the development of new knowledge and understanding, skills and insights (Kwakman, 2003; Parsons & Stephenson, 2005). In many ways, the concepts of professional learning and reflective learning are very similar because both processes involve learning, are likely to lead to changes in practice, and involve reflection about practice. In other words, these concepts are strongly connected to reflective practice (Hoban, 2002; Moon 2001). Researchers are not always in agreement about the most effective methods for determining whether reflection and reflective learning has taken place, and whether practitioners are engaging in reflective practice (Pedro, 2005). Even so, the importance of reflective practice is acknowledged, and is regarded as necessary for preparing professionals who are able to engage in lifelong learning, and ongoing appraisal and development of their practice (Davis, 2003).

The concept of reflective practice is associated with developing effective and responsive practitioners, and consequently has gained importance in teacher education and other areas of professional preparation (Fook, White & Gardner, 2006; Parsons & Stephenson, 2005; Peltier, Hay & Drago, 2005). Through reflection on practice, and by using reflection for action (defined by Schon, 1983), practitioners are believed to be

more equipped to face the challenges posed by change and the uncertainty of practice. However, it is difficult to obtain a single definition of reflective practice, distinct from reflection, as the terms are often used interchangeably (Hatton & Smith, 1995; Jay & Johnson, 2002). Also, the type of reflection associated with effective reflective practice is poorly understood (Pedro, 2005).

In this study, reflective practice was regarded as a unique process involving more than simple reflection about practice (Parsons & Stephenson, 2005). It was believed to involve a combination of professional learning, effective reflection and the development of metacognition; factors which work together to keep practice responsive, ethical and worthwhile. Effective reflection, in the context of this research, was based on the model of reflection provided by Boud et al. (1985). They claim practitioners must work through several phases in order to learn about their experiences: 1. describe and deconstruct the experience; 2. mull it over (i.e., stand back from the experience); 3. evaluate the experience; and 4. synthesize new knowledge or develop insight as a result (Boud et al., 1985). According to these principles, any professional development or professional learning that influences practice must integrate a meaningful reflective process if new knowledge and understanding, and insights are to be gained (Boud & Walker, 1998; Moon, 2004), leading to improved decision-making or better autonomy in practice (Tsangaridou & O'Sullivan, 1994).

Reflective practice is claimed to be more likely to occur when practitioners regularly “question the status quo”, and wish to address problems or discontent which can arise in practice situations (Larrivee, 2000, p. 297). Regardless of the context or definitions for reflective practice, its importance for professionals lies in the manner in which they practice. Practitioners who demonstrate self-awareness, and are able to challenge traditionally-held assumptions through critical appraisal of their work, are more likely to develop professional expertise, change their actions and improve practice (Clouder, 2002). Reflective practice is regarded as a form of “professional artistry” (Schon, 1987, p. 14), and an embodiment of the whole person or practitioner, whose knowledge and

judgment about practice cannot be separated even when the environment changes (Dreyfus & Dreyfus, 2005; Paterson, Wilcox & Higgs, 2006).

The best way to facilitate the reflective process for practice is a significant challenge facing educators and researchers (Hatton & Smith, 1995). The way in which reflective practice can be facilitated to change professional perceptions and strongly held assumptions, habits and systems, is still an area under debate (Loughran, 2002). Whether there is an optimal strategy for scaffolding reflection concerned with practice, or even the need to do so, is still unclear. Much research about documenting reflective practice, through the development and use of journals and portfolios for reflective learning, is available. As well, a multitude of frameworks and models are in use for encouraging and supporting reflective writing. Techniques such as reflective writing and the use of dialogue are considered by several researchers to be helpful for reflective practice because they raise reflection from a state of abstract thought to one where reflection produces learning which can influence practice (e.g., Boud & Walker, 1998; Boyd & Fales, 1983; Moon, 2001; Nsibandé, 2007). Recording events from practice, for example, in writing, adds permanency to experiences enabling practitioners to return to them, again and again (Boud et al., 1985), undertaking a process described by Schon (1983) as re-framing. In this way, practitioners can use reflection to re-evaluate their practice, extract meaning from their experiences, and develop new knowledge (Boud & Walker, 1991). Methods for teaching reflective writing are diverse, and although a number of interventions and frameworks are in use to guide practitioners, it is difficult to establish which approaches are the most effective (Jay & Johnson, 2002). As yet, the most effective frameworks for guiding reflective writing beyond description have not been established (Hatton & Smith, 1995), and it is not clear whether writing should be structured (Bolton, 2001). The difficulty lies in getting practitioners to write in a way that is more than a descriptive account about an event (Hatton & Smith, 1995).

The quality of reflection that manifests in writing about practice is related, not only to the level of reflection, but also to the ability to critique others' perspectives in relation to the self and to practice (Hatton & Smith, 1995). A further issue is whether critical

reflection is essential for reflective practice, particularly if practice is to be transformed, and also, how critical reflection can be facilitated to encourage practitioners to change assumptions, habits and systems and transform their practice (Fook et al., 2006). The desired endpoint for reflective practice is regarded as having the ability to reflect during practice (reflection-in-action) rather than on practice (reflection-on-action) (Hatton & Smith, 1995; Schon, 1987). Evidence about these differing viewpoints is limited, and further research is needed to clarify the components of reflective practice.

In this chapter, the background and rationale for the study, including the importance of scaffolding professional learning for reflective practice and contemporary methods of recording reflective writing, are introduced. The importance and purpose of the research, and the research design, including the research questions, context and the underlying reasons for using the case study approach, are presented. Definitions of reflection, professional learning and reflective practice are provided as these concepts are pivotal to the study. The limitations of the study are outlined along with a preview of the rest of the chapters.

1.2 Background and rationale for the study

The initial thrust for this research study was to find an easy to use and logical process to encourage practitioners to engage in reflection and reflective writing while compiling an electronic portfolio of their experiences and work. Many of the frameworks for guiding reflective writing are complicated and difficult to use, or have been designed for use within specific disciplines or contexts (Bulman, 2004b; Moon, 2001). Therefore, something simpler and pragmatic was needed to scaffold the process of reflective writing for the specific group of participants (postgraduate education students) taking part in the study.

The use of reflective strategies for supporting learning and reflective practice has been investigated in many research studies over the years. Various frameworks and models for guiding and structuring reflection and reflective practice have been developed and utilised by a number of researchers such as: Boud and Walker, 1991; Bulman, 2004b;

Driscoll, 2007; Hatton and Smith, 1995; Johns, 2005; Moon, 2001; Sparks-Langer, Simmons, Pasch, Colton and Starko 1990; Tsangaridou and O'Sullivan, 1994; Taylor, 2006; and Valli, 1997). The various frameworks are generally used to stimulate reflection about professional practice so that practitioners can engage in critique and gain insights into their experiences (Boud & Walker, 1991; Donaghy & Morss, 2000; Tsangaridou, 2005). It is widely regarded that reflective practice is not an intuitive undertaking and requires support in the form of structured writing and mentoring (Boud & Walker, 1991; Boyd & Fales, 1983; Zepke, 2003).

A commonly-held belief is that the level of a practitioner's experience and the support available for the reflective process (e.g., organisational, mentoring, time, and dialogue), pre-determines the success of reflection associated with practice (Boyd & Fales, 1983; Bulman, 2004b; Donaghy & Morss, 2000; Fook et al., 2006; Ottesen, 2007). The stimulus for reflection, the reflective process itself, and the outcomes may determine whether reflection is of sufficient depth and breadth to shape reflective practice (Moon, 2007). Therefore, several perspectives were considered when developing a definition of reflective practice for this research study. It is evident from a review of the literature that the notions of reflection and reflective learning (Boyd & Fales, 1983; Moon 2001), professional learning (Kwakman, 2003; Parsons & Stephenson, 2005), and reflective practice are strongly interlinked (Allan, Zylinski, Temple, Hislop & Gray, 2003; Mansvelder-Longayroux, Beijgaard & Verloop, 2007).

The reason the practice of reflection is regarded as integral to professional life is because of the links between learning, making meaning about experience and changing practice (Atkins, 2004). In particular, any learning where practitioners are transformed (known as transformational learning) through being able to change their assumptions, attitudes and beliefs, or apply knowledge in different contexts, is regarded as beneficial. Transformational learning is generally thought to transpire as a result of engaging in critical reflection (Leach, Neutze & Zepke, 2003). Therefore, developing a framework for scaffolding reflective writing which articulated learning about practice and encouraged critical reflection was fundamental to this research. The intention in this

research study was to improve on existing frameworks as a means of advancing knowledge in this area. For instance, although well-established frameworks (developed by Hatton & Smith, 1995; and also Sparks-Langer et al., 1990) formed the theoretical basis of the study they pre-empted the possibility that reflection might occur in the early stages of writing about practice experiences (see Table 1, Section 2.2.2). The researcher believed that reflection could occur when describing practice experiences because the practitioner had to reflect to recall events through what is regarded as noticing (Tremmel, 1993). Therefore, a custom-designed framework was developed to encourage this. Details about the design of the framework can be found in Section 3.4.2.

1.2.1 Scaffolding professional learning for reflective practice

The act of reflecting critically on practice is not considered an intuitive skill (Fook & Gardner, 2007), and critical reflection is a more likely outcome when direction and guidance is provided to scaffold the process (Donaghy & Morss, 2007; Fook & Gardner, 2007; Hatton & Smith, 1995). Learning about practice has been shown to increase significantly, as a result of supported reflection (e.g., Baker, 1996; Cowan, 2006; Moon, 2004; Nsibande, 2007).

The forms which facilitation or scaffolding might take have long been a widely studied topic of research (e.g., Gelter, 2003; Hatton & Smith, 1995; Moon, 2001; Osmond & Darlington, 2005). For example, there is consensus in the literature that skills for reflective learning need to be taught and supported by experienced teachers if learners are to make use of new knowledge in a variety of different situations and contexts (Moon, 2001; Weiser, 1997; Yancey, 1997). The reason the provision of structure to support reflection is necessary is so that an effective reflective process is undertaken. It is increasingly common for teachers and health professionals to be encouraged to create portfolios of evidence about their practice, to promote effective reflection (Bain, Mills, Ballantyne & Packer, 2002).

The incorporation of reflection into pre-service training and professional development in a wide range of disciplines (e.g., Teaching, Health, Police, Business, Marketing, Management, Sciences, and Human Resources), necessitates the development of reflective writing skills, if professionals are to demonstrate changes to their practice (Atkins, 2004; Clouder, 2000; Moon, 2006; Peltier et al., 2005). Moreover, it is important to differentiate between writing which is merely descriptive and writing which contains reflection, and to promote advanced reflection; various researchers have addressed this (e.g., Hatton & Smith, 1995; Sparks-Langer et al., 1990). For example, Hatton and Smith (1995) differentiate between non-reflective description of events (known as descriptive writing), reflective description with justification (known as descriptive reflection), exploration of alternatives and other perspectives (known as dialogic reflection), and critical reflection. According to Hatton and Smith (1995), frameworks can successfully promote deep reflection in practitioners' writing.

1.2.2 Documenting reflection

Reflective writing contains reflection, in some form, and may be present in descriptive written records such as journals or portfolios. The writing may demonstrate a superficial level of reflection or include analysis and reasoning in a deeper and more complex manner (Moon, 2001). Practitioners may write down descriptions of events and experiences or critical incidents, and leave it at that. Or they may analyse their experience to determine what happened, and why they and others, acted in the way they did. It is claimed to be beneficial to explore the situation from many angles, weighing up personal responses and the responses of others, as well as critiquing the outcomes of the event or experience (Hatton & Smith, 1995). Loughran (2002) believes rationalization and justification of practice tends to maintain the status quo, in contrast to effective reflection on practice where assumptions are challenged, leading to learning and change. Therefore, guidance or coaching may be influential in facilitating reflection about experiences (Boud & Walker, 1990; Gelter, 2003; Schon, 1987). Additionally, dispositions and skills for reflection and critical inquiry are more likely to develop when guided reflective writing is used in combination with dialogue between

peers or a mentor (Alger, 2006; Cochran-Smith, 1991; Macdonald & Hills, 2005). Evidence of whether a reflective process has occurred is often sought through examining the written material produced by practitioners, and there is much research in this area (e.g., Donaghy, & Morss, 2000; Hatton & Smith, 1995; Jay & Johnson, 2002; Korthagen & Vasalos, 2005; Stiller & Philleo, 2003).


As demonstrated by Stiller and Philleo (2003) when using blogs with pre-service teachers, digital technologies have brought changes to the way reflection is documented. More digital methods are being used than previously, introducing other perspectives about how the reflective process may be facilitated (Santora & Morris, 2004). For example, Falls (2001) claims reflection can occur as digital portfolio material is assembled, because the practitioner must reflect to collect and select material, and deliberate on whether the portfolio captures the true intentions of the work presented. The preparation of actual reflective evidence can be “more elusive”, however, and requires time to do; meaning reflection may be compromised in favour of learning how to use the technology associated with an electronic portfolio (Falls, 2001, p. 73). In contrast, the emphasis in this research is on investigating strategies to support and encourage reflective writing. Even so, the findings are timely, because the reflective writing examined in this research was produced for an electronic design portfolio, and research in this area was at a relatively early stage when the study commenced.

Regardless of whether written evidence is prepared for journals or portfolios or blogs, or whether it is digital or in paper form, the act of writing, in itself, can be a barrier to reflection (Pedro, 2005). The demands of journal writing in higher education courses, a dislike of writing, mandated activities, and the time involved for reflection are cited as reasons reflective writing is a challenge (Pedro, 2005). Hence, achievable methods of inquiry and recording of reflective practice need to be used to help student teachers develop an understanding about reflection for practice (Pedro, 2005). She also believes further direction, in the form of writing activities, is needed to teach critical reflection (Pedro, 2005). This view is similar to Hatton and Smith (1995), who claim critical reflection is challenging for novice teachers even when strategies are put in place to

scaffold this type of reflection. Experience and knowledge, and an understanding about the requirements of reflective practice are regarded as precursors for critical reflection (Hatton & Smith, 1995). Also important, for critically reflective practice, is the ability to consider multiple perspectives, and as a result be able to change one's assumptions about practice (Mezirow, 2000). Hatton and Smith (1995), and Pedro (2005) suggest student teachers need to have an understanding about reflection, from the literature, and the opportunity to engage in dialogue with 'significant others' to develop their ability for reflective practice, critical or otherwise. Although, reflective practice does not necessarily include critical reflection, it does involve much exploration and dismantling of one's practice (Boud et al., 1985; Hatton & Smith, 1995). Even so, there are advocates of critical reflection who insist that reflective practice must include documentation, demonstrating critical reflection and self-assessment (Fook & Gardner, 2007).

Documentation of reflective practice, using electronic portfolios, is increasingly being sought by professional bodies as evidence of competency (Beetham, 2005). The preparation of portfolios not only needs to demonstrate competency for professional bodies, but also evidence of professional learning and development (Alsop, 2001). Consequently, many educational organisations are beginning to utilise electronic portfolios in vocational programmes alongside education for reflective practice (Batson, 2006). For example, the oral health professions are introducing professional ePortfolios to students, using custom-made platforms, as well as teaching students about the benefits of using portfolios for reflective practice (Kardos, Chrzan & Butson, 2007). Although, there may be challenges for practitioners when using unfamiliar technologies, priority needs to be given to supporting reflective processes, otherwise the preparation of evidence to demonstrate reflective practice may be compromised (Kardos et al., 2007). Even so, the best way to document evidence of practice remains unsolved.

1.3 Significance of the research

The findings from this research study are an important addition to the body of knowledge related to reflection, reflective learning, professional learning, reflective
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practice, and the scaffolding of reflective writing for practice, specifically in the field of education. Despite many empirical studies about these areas, there is still debate about the necessity for guidance and support to encourage reflection, and the form it should take (refer to, for example, Allan et al., 2003; Alterio & McDrury, 2003; Falls, 2001; Hatton & Smith, 1995; McCollum, 2002; McCoy, 2005; Tsangidarou, 2005; Valli, 1997). Whether this support should take the form of a framework, template, portfolio, or feedback from an expert or mentor, or a combination of all these supports is still unclear. Also, the way in which professionals write reflectively, including the influence of a structured approach on the depth of reflection in their writing, is another area requiring investigation. Much of the research where frameworks have been used is discipline-specific for health, in particular nursing and physiotherapy (e.g., Bulman, 2004b; Donaghy & Morss, 2000; McCollum, 2002; Tsangaridou, 2005), and also teacher education (please refer to work by: Boud et al., 1985; Hatton & Smith, 1995; Parsons & Stephenson, 2005; Rodgers, 2002b; Sparks-Langer et al., 1990; Valli, 1997; Ward & Cotter, 2004). Research about reflective writing for ePortfolios when used for reflective practice was in the early stages when this research study commenced. This is an important area because it is known that preparing written evidence can develop reflective practice, especially when preparing a professional portfolio (Doig, Illsley, McLuckie & Parsons, 2006; Levin & Camp, 2002; Mansvelder-Longayroux et al., 2007), and much has been written about reflection and coaching (e.g., Driscoll, 2007; Moon, 2007). Since reflective practice is strongly linked to reflection and reflective learning, the influence of using reflective strategies for professional learning and the impact on practice, is also an area requiring investigation.

A number of frameworks have been used to measure the quality of reflective writing, which is claimed to be associated with both the depth of reflection and evidence of critical reflection (e.g., Hatton & Smith, 1995; McCollum, 2002; Sparks-Langer et al., 1990; Ward & Cotter, 2004). With the advent of electronic portfolios, some research has focused on this format, and indicates (like the research about traditional portfolios) that assembling evidence has been shown to assist in learning about practice (Fall, 2002). Although reflection may occur naturally during this process of developing an

electronic portfolio, it is not always demonstrated to any degree unless specific scaffolding is provided, preferably as a separate activity (Doig et al., 2006; Mansvelder-Longayroux et al., 2007). Also, agreement exists that reflective thinking and writing require practice, direction and support (e.g., Donaghy & Morss, 2000; Freese, 2006; Hatton & Smith, 1995; Levin & Camp, 2002; Mansvelder-Longayroux et al., 2007; Valli, 1997). More information about the work of all these researchers mentioned here can be found in the literature review. There is an argument that “writing is thinking” (Menary, 2007, p. 361), and because writing also enables thoughts to be re-structured and manipulated, having adequate skills and direction to write reflectively is key to reflective practice (Levin & Camp, 2002). Therefore, investigating a further approach for developing professional practice in education, such as that provided by the intervention in this study, is expected to broaden the scope of knowledge about using writing for reflective practice, and therefore, aims to extend the field of knowledge about reflection.

In this research project, as part of their study in the multimedia design subject, participants were required to construct an electronic design portfolio for all the tasks which were assessed. The participants submitted pieces of work in electronic format, at different times during the subject, thus gradually compiling an ePortfolio containing three different kinds of artefacts: multimedia learning objects, supporting statements, and written reflections. Therefore, participants were occupied with constructing a design portfolio which contained not only evidence of their practical work, but also reflection on it. Written reflections were included to encourage learning about practice in the subject. The process of reflective writing was scaffolded, in an attempt to move participants from basic description to deeper levels of reflection (based on the work by Hatton & Smith, 1995). In this research study, the framework used to guide the reflective writing process, and the subsequent quality of the reflections, was more important than the process of putting together a portfolio, electronic or otherwise. Therefore, the written evidence which participants developed as part of their design portfolio was the main focus of the study.

The purpose of the development of the electronic design portfolio in the subject was to demonstrate learning on which participants were assessed, and as such could be described as “improving student/professional learning” (Bennett & Lockyer, 2007, p. 7011). Specific scaffolding for reflective writing was provided separately to support construction of the electronic components of the portfolio. In this study, participants were able to focus on the process of reflection, something which is generally regarded as more important than the structure of the portfolio itself (Calderon & Buentello, 2006; Doig et al., 2006).

1.4 Purpose of the research

The primary purpose of the research was to investigate how an intervention, the Three-Step Reflective Framework, used for written reflection assignments, influenced the reflective writing approaches taken by *postgraduate education students*. The outcomes of using the reflective learning strategy on reflective practice were also investigated. Participants were scaffolded during the reflective process by using the framework, which included a writing template, and also by written feedback from the subject lecturer. The effects of this support were examined.

The intervention used in the research study is underpinned by a theoretical framework described in Section 2.2.2.1, namely the work of researchers such as Boud and Walker, (1990), Boud et al. (1985), Rodgers (2002b), and Tremmel (1993). Analysis of the levels of reflection in participants’ writing is informed by the theories of Hatton and Smith (1995), McCollum (2002), Rodgers (2002b), Sparks-Langer et al. (1990), and Ward and Cotter (2004). These theories were used to develop the Levels of Reflection taxonomy, and are described and compared in Section 2.2.2.2, and presented together in Table 38 in Appendix 10. The theoretical framework used for the study supports a hierarchal approach to reflective writing, whereby the quality of reflection increases with each level. For example, critical reflection is regarded as the highest level of reflection, and description as either non-reflective or at a low level (Hatton & Smith, 1995). It was expected that participants’ writing would demonstrate changes in the levels of reflection with each step of the Reflective Framework.

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1.5 Research Design

To address the exploratory nature of the research questions, a qualitative approach using a case study design was adopted. This approach was based on work by Yin (2003) to ensure robustness of the research given the small sample size. He advocates the use of an intervention in a naturalistic setting to offset the small sample sizes often associated with qualitative research (Yin, 2003) (see Section 3.6 for a detailed explanation about the measures of quality including generalizability). Therefore, the single case, comprised of seven students and the subject lecturer, was situated in the participants' usual educational setting. The intervention (Three-Step Reflective Framework) designed and developed by the researcher was used to investigate use of the framework in a real-life context. The framework was used to support the reflective writing of participants. Qualitative methods were used for gathering, analysing and interpreting data. By using a range of data collection methods, a holistic picture of the case was obtained. Also triangulation of data was ensured, providing a measure of credibility (also known as internal validity) of the data, as a check for quality of the research (Mertens, 1998). There were several phases involved in this study. Two research activities were carried out initially.

1. Design and development of the Three-Step Reflective Framework for integration into the multimedia design subject assessments.
2. Implementation of an introductory workshop for students in the subject, to introduce them to the research and give them practice using the Three-Step Reflective Framework.

This was followed by three phases of data collection.

1. Survey of participants at the beginning of the study to collect information about their previous experiences with reflection.
2. Collection and analysis of written data (in the form of assignments and feedback).

3. Interviews with participants and the subject lecturer, at the end of the subject.

The main study was informed by the findings of a preliminary study. The effects of a range of reflective strategies for developing electronic portfolios were trialled in the preliminary study. The outcomes of this preliminary study were used to define the research questions for the main study and led to the development of the Three-Step Reflective Framework. This was the intervention used in the main study to scaffold reflective writing. Details about the preliminary study, and the recommendations arising from it, can be found in Section 3.3.

1.5.1 Research questions

Three research questions guided the investigation.

1. How do educational practitioners reflect when writing about their experiences?
2. What do educational practitioners focus on when writing reflectively about their learning and practice?
3. How does scaffolding support reflection on professional learning and practice?

The approach taken to investigate each research question is described more fully in the following paragraphs.

1. How do educational practitioners reflect when writing about their experiences?

How the approaches taken by participants in their reflective writing contributed to the quality of the reflections, was an area of interest. Participants' writing was examined by analysing several areas:

- the levels of reflection (*how* participants reflected, i.e., Descriptive, Explanatory, Supported, Contextual, and Critical) - based on Hatton and Smith's (1995) work;
- the way they reflected (the aspects they emphasized, e.g., feelings, decisions, personal, professional, learning, and actions); and
- the professional focus (*what* was written about practice, e.g., skills, capability, learning, pedagogy and technology).

There is more detail in Chapter Three about the manner in which the participants' writing was analysed. Higher levels of reflection in writing are known to be difficult to achieve (Hatton & Smith, 1995). The levels of reflection demonstrated in participants' writing are a key focus of the outcomes of implementing the Reflective Framework.

2. What do educational practitioners focus on when writing reflectively about their learning and practice?

This aspect of the study investigated the content of the reflective writing produced by participants, to ascertain what they had written, regardless of the level of reflection at which they wrote. Reflections on professional learning and professional practice were sought. Participants' reflections about their professional backgrounds and future intentions for practice, as well as the directions of their present professional practice, were examined. There was an expectation that the prompts in the Three-Step Reflective Framework would encourage writing about specific areas of learning and practice.

3. How does scaffolding support reflection on professional learning and practice?

There were two forms of scaffolding used in this study: the Three-Step Reflective Framework and the written feedback provided on participants' writing by the subject

lecturer. The ways in which the headings and prompts in the framework influenced participants' reflective writing was analysed. Also, attention was paid to the association between the steps of the framework and the levels of reflection in participants' writing. For example, the writing was analysed to determine whether participants exhibited a particular level of reflection at a specific step in the framework. For example, it was expected that at Step 1 in the framework, participants would demonstrate mostly Descriptive reflection, with mainly Explanatory reflection at Step 2. The written feedback provided by the subject lecturer was examined to determine its effect on scaffolding reflection.

1.5.2 Context

The seven participants in the study were post-graduate education students taking a multimedia design subject. They were required to produce digital material for a design portfolio, which was assessed. The writing that participants produced, in this academic context, was examined for evidence of reflection. The participants were asked (not required) to use the Three-Step Reflective Framework when preparing four written reflection assignments. Therefore, the ways participants used the framework, and the impact it had on the levels of reflection in their work, were important parts of the study. The feedback, which the subject lecturer provided to the students on each of their assignments, was also scrutinized to determine how this along with the framework might have assisted them to write reflectively.

1.6 Definitions used in the study

Definitions of reflection, professional learning, and reflective practice were put together to guide this research study and are based on a range of theoretical models, the details of which can be found in Chapter Two.

1.6.1 Reflection

In this study, reflection is defined as deliberate and mindful thinking about one's experiences and the self-evaluation of feelings, decisions, understandings and actions, which may lead to development of professional learning for professional practice (based on: Boud & Walker, 1990; Boud et al., 1985; Rodgers, 2002b; Tremmel, 1993). Reflection which demonstrates these attributes is regarded, in this research, as 'effective reflection' and is associated with reflective practice.

1.6.2 Professional learning

Professional learning is defined as any learning which has relevance to professional practice and occurs when new knowledge and understanding, skills and insights are gained and may lead to the achievement of professional goals (based on: Kwakman, 2003; Parsons & Stephenson, 2005).

1.6.3 Reflective practice

Reflective practice is defined as a process associated with professional learning, which includes effective reflection and the development of metacognition, and leads to decisions for action, learning, achievement of goals and changes to immediate and future practice (based on: Hatton & Smith, 1995; Parsons & Stephenson, 2005).

1.7 Limitations of the study

The main limitation of the study was the use of the intervention as an optional strategy in the multimedia design subject. Participants were asked, rather than required, to use the Three-Step Reflective Framework to assist them to prepare written reflections. Therefore, there were no guarantees that the reflective writing of participants would be consistently prepared within the structure of the framework. Also, participants received feedback on their written reflections once they were submitted, and this may have influenced the reflective writing process. It was not possible to separate the benefits of combining the Reflective Framework with feedback from the subject lecturer.

Use of the intervention was untested prior to the study although the Reflective Framework was underpinned by a strong theoretical framework (see Section 2.2.2.1 and Section 3.4.2), and the intention was to trial the framework with a specific group within a specific setting so that a unique case could be developed. Hence, this was an exploratory study with a small sample size and was not expected to produce broadly applicable findings. The initial expectation by the researcher that it was possible to develop a ‘generic’ framework for use across multiple disciplines was unrealistic as only participants from one discipline took part in the research.

The size of the study and the specific nature of the group being researched may be regarded by some researchers as a limitation; however, this approach was suitable for case study research since conditions for developing a case from what Stake (2003) describes as a *bounded system* were in place. Even though, qualitative research is believed to have restrictions for “statistical generalization” and predictability of the outcomes, when findings are generalized to theory and tested by others under similar conditions (specifically in case study research), “analytical generalization” is possible (Yin, 2003, p. 38). Further explanation about how the quality of the study was assessed can be found in Section 3.6.

A limited opportunity existed to pilot test the survey because it was designed for a specific group within the specific context of the subject which was only offered annually. To prevent confusion about the intent and the wording of the survey, it was administered to the majority of participants during the workshop following an explanation by the researcher. That provided the participants with an opportunity to ask questions about anything they were unsure about regarding the survey.

Also, the effect of verbal dialogue and mentoring, as reflective strategies for practice, were not able to be tested in this study, because the focus was on the influence of the reflective framework and the support provided by the subject lecturer in the form of written feedback. Therefore, the contribution of any interactions in the class (e.g., student to student, or student to lecturer) to the reflective process could not be measured.

A further limitation is that the experiences that participants recorded in their written reflections were associated with a study environment rather than real world events. Therefore, participants' use of the Reflective Framework and their actions for reflective practice would not necessarily transfer to authentic practice situations.

1.8 Structure of the chapters

In Chapter Two, the literature review for the research is presented, wherein various definitions of reflection, professional learning, and reflective practice are discussed. In Chapter Three, the methodology used in the research is explained, including the research design, the design of the intervention and the preliminary study, the context of the study, the theoretical framework, and the strategies used for gathering, analysing and interpreting data. In Chapter Four, the results describing the single case, together with a description of the patterns and themes which emerged, are provided. In Chapter Five, case studies for the seven participants illustrate the development of their reflective writing and professional learning in the subject. In Chapter Six, the final chapter, the findings from the study are discussed in response to the research questions. Also, the implications for professional practice of using the reflective framework to scaffold reflective writing are outlined. The significance of this research study in the field of reflection, professional learning and reflective practice is considered, and suggestions for further research are made.

A discussion of the literature, relevant to this research study, is presented in the following chapter and will provide more detail about the dimensions of reflection, professional learning and reflective practice which underpinned the investigation.

2 CHAPTER TWO: LITERATURE REVIEW

2.1 Introduction

This review of the literature provides a foundation for both the theoretical and the practical underpinnings of the research. To begin, definitions of reflection and the association of reflection with learning are presented and discussed. Next, the theoretical frameworks on which the study is based, including the manner in which reflection is defined for the frameworks is covered. Reflective writing as an expression of reflection and reflective practice is discussed. Evidence is introduced to describe how practitioners write reflectively (e.g., feelings, emotion, self-questioning, setting goals, and decision-making).

Also, the research on support strategies that can be used to improve reflection is explored. This section includes the concept of scaffolding, strategies for facilitating reflection, self-questioning as a strategy and the use of dialogue and feedback. Examples of interventions used for scaffolding reflection in the form of models and frameworks are investigated here. Information on supporting the development of reflective dispositions is outlined along with support for critical reflection and the use of portfolios to support reflection. Research around professional learning is reviewed, and also studies on reflective practice are consolidated to summarise the trends. Additionally, how professional portfolios are used in reflective practice is reviewed. The meaning of reflective practice and the links to reflection and professional learning are also explored. This chapter includes an explanation about how the current study will address gaps found in the literature, and ends with a summary of the main points made in the review.

2.2 Reflection - some definitions, theories and models

The definitions of reflection which developed in the literature over the years evolved from views put forward by several theorists and researchers. The concept of reflection arose from seminal works of Dewey (1933) and van Manen (1977). Initially, the whole

concept of thinking was critiqued, and reflection was described as more than just thinking or the sequencing of ideas, being regarded as more of a process by which thoughts were organised into a system with specific outcomes and a finite conclusion (Dewey, 1933). For example, Dewey (1933) described “five phases or aspects of reflective thought” (p. 107). He regarded these phases as non-sequential, and with varying degrees of influence on the reflective process. The five phases of reflective thinking include:

1. Suggestion - thinking of an immediate solution - impulsive thought;
2. Intellectualization - changing the experience or situation into a problem for solving - considered thought;
3. Guiding idea or hypothesis - working through the problem to find solutions - controlled thought;
4. Reasoning - examining the problem from different angles or perspectives - elaborative thought; and
5. Testing the hypothesis by action - verifying possible solutions - conclusive thought (Taken from: Dewey, 1933, p. 107).

The first phase may not be regarded as particularly reflective, as an immediate outcome is achieved without due process. Once reflection was accepted as a staged process of thinking, research and debate about the process of reflection per se led to the development of a diverse terminology, and also understanding about the nature of reflection. In general, according to other theorists in the field, reflection is a prolonged process used by practitioners to make sense of experiences and events which have occurred over a period of time, often in retrospect, so the practitioner can learn from them (e.g., Boud & Walker, 1998; Boyd & Fayles, 1983; Moon, 2004).

Whether reflection occurs in the “immediate and short term”, or needs to be “extended and systematic” is debated by Hatton and Smith (1995, p. 34). They also consider other issues concerning the nature of reflection, which originated in Dewey’s (1933) and Schon’s (1983, 1987) work, to confirm and gather evidence for the existence of reflection in teacher education. For example, the dilemma of whether reflection is a

“thought process about action”, or is “bound up in action”, and the orientation of reflection with problem solving and a practitioner’s ability to examine wider historic, cultural or political contexts (known as critical reflection) (Hatton & Smith, 1995, p. 34).

Therefore, the debate about the process of reflection concerns not only the timeframes over which the specific type of thinking occurs, but also the links it has with practice, the reasons it is used, and the context in which it is situated. Differences in definition appear to exist mainly in relation to whether the emphasis is on the cognitive processes, for example, technical versus practical or critical (as described by van Manen, 1977), or on the outcomes of reflection, for example, learning. However, within the realm of reflective practice, process and outcomes are often inseparable since reflection as part of inquiry becomes an active and cognisant process enabling beliefs to be integrated with practitioners’ knowledge and experiences, resulting in learning about practice (van Manen, 1977).

According to van Manen (1977), practitioners move through three levels of reflectivity - application, interpretation and critique, when linking “ways of knowing with ways of being practical” (van Manen, 1977, p. 205). Level One is the “technical application of knowledge” for a pre-determined outcome; Level Two also has a practical aspect and involves “interpretative understanding of the nature and quality of the educational experience” and functional choices within it; and Level Three is where the practitioner regularly critiques power relationships - between individuals and within organisations and other “repressive forms of authority” (van Manen, 1977, p. 226-227). These levels represent the ‘deliberative rationality’ that van Manen (1977) believes educators are faced with when making choices about their practice, and each level requires a deepening reflectivity. At the first level, practitioners are claimed to respond by using existing technical knowledge, whereas at the second level they engage in analysis of their experiences, views, assumptions and beliefs before acting. At the third level, regarded as the highest form of reflectivity, practitioners are able to scrutinize their

knowledge and practice within a broader socio-political and ethical context (van Manen, 1977).

Technical skills and reflection, as part of professional action, are also mentioned in the five types of reflection defined by Valli (1997) who focuses on the quality of reflection and the professional contexts of teaching. The five types of reflection become increasingly complex, starting with technical skills and ending with critical reflection, which is similar to the definition proposed by van Manen (1977), and also Hatton and Smith (1995). Five types of reflection are defined by Valli (1997):

1. Technical (skills and criteria);
2. Reflection-in and on-action (intuitive decisions and retrospective thinking, based on Schon, 1983);
3. Deliberative (decision-making based on multiple perspectives);
4. Personalistic (linking personal and professional aspects of teaching); and
5. Critical reflection (emphasis on social justice).

The first type, technical reflection, is considered by Valli (1997) to sit within the context of skill-based teaching behaviours and the way in which they align with prescribed standards, research, and established methods of teaching. The second level of reflection-in-action and reflection-on-action types of reflection, based on Schon (1983, 1987), moves active thinking into the personal dimension of experience and performance, and this relies on the unique encounters which practitioners may have in the field. It appears that each type of reflection becomes increasingly complex in Valli's model. For example, the third type of reflection, deliberative, as described by Valli (1997) "emphasizes decision-making based on a variety of sources: research, experience, the advice of other teachers, personal beliefs and values, and so forth. No one voice dominates. Multiple voices and perspectives are heard" (Valli, 1997, p. 77). This level of complexity in the reflective process is similar to the concept of dialogic reflection, which is described by Hatton and Smith (1995), and previously put forward by Dewey (1933) as the reasoning aspect of reflective thought.

The fourth and fifth levels of personalistic and critical types of reflection, according to Valli (1997), lead practitioners towards broader ways of thinking about their practice and their place in the profession, as well as raising awareness about socio-political aspects of teaching. However, both personalistic and critical types of reflection are claimed by Valli (1997) to have limited scope. The reason is, although they can be used to attend to issues in either a personal or social and political context, they tend to ignore the practical skills of teaching. Therefore, a range of approaches are suggested by Valli (1997) to guide the reflective process through the various levels, and these may include, journaling and writing assignments, case studies, and supervision so that practitioners are supported to become reflective teachers. Reflective teaching is regarded as essential at all stages whether it occurs during student training or professional practice. She believes that reflection allows teachers to move from being merely skilled instructors to become autonomous professionals with the ability to facilitate high quality learning experiences for their students (Valli, 1997). Therefore, engagement in reflective practice is regarded as professionally more beneficial for development and growth.

However, reflective practice, according to Hatton and Smith, (1995) does not necessarily mean deeper and more multifarious types of reflection occur. They believe that three specific types of reflection can develop as teachers learn the skills of teaching, and gain experience as professionals: technical rationality; reflection-on-action; and reflection-in-action (Hatton & Smith, 1995). Technical reflection, defined as a beginning form of reflection, is regarded by Hatton and Smith (1995) as associated with “decision-making about immediate behaviours or skills”, and they allege that this occurs in the beginning stages of preparation for the teaching profession (p. 45). This form of reflection is also described by other researchers (e.g., Valli, 1997; van Manen, 1977), and also Habermas (1968) who originally described the term technical reflection to denote the mechanism used to create reality through the control of rule-governed or objective behaviours. Colton and Sparks-Langer (1993) claim technical proficiency is not sufficient because morals and democratic principles must also guide the reflective teacher’s actions. Also, it is only when practitioners develop a range of reflective approaches (e.g., technical, descriptive, dialogic, and critical) to examine their practice

(reflection-on-action) that they are considered able to contextualize multiple viewpoints, and develop the capacity for reflection-in-action, regarded as the “most demanding type of reflecting upon one’s own practice” (Hatton & Smith, 1995, p. 46). This type of reflection is considered to be the domain of the experienced practitioner, not the novice (Hatton & Smith, 1995).

Specific evidence of reflection in teachers’ writing about practice experiences was initially identified by Hatton and Smith (1995), and this led to the development of a reflective framework for subsequent use, both for structuring reflective writing, and in the measurement of reflection. In the research conducted by Hatton and Smith (1995), 60 teacher education students were exposed to a range of strategies to encourage them to reflect. They took the form of a written report, self-evaluation, videos of teaching, and interviews with a critical friend. The written reports contained the bulk of reflective evidence and were the primary data source analysed for the study. However, the students found that the interactions they each had with the critical friend also helped to promote reflection. Analysis of the different forms of writing led the researchers to the conclusion that in the case of the teacher education students involved in their study, descriptive, dialogic and critical forms of reflection were used, and they described these collectively as reflection-on-action (Hatton & Smith, 1995). The following definitions of the three different levels of reflection have helped to illustrate the importance of context in teacher education, and the way in which the reflective process expands with experience. Their work led to a better understanding in the field about the importance of context for reflection because it linked specific forms of reflection with practice. For example:

Descriptive reflection – reflective, not only a description of events but some attempt to provide reason justification for events or actions but in a reportive or descriptive way;

Dialogic reflection – demonstrates a "stepping back" from the events/ actions leading to a different level of mulling about, discourse with self and

exploring the experience, events, and actions using qualities of judgments and possible alternatives for explaining and hypothesizing;

Critical reflection – demonstrates awareness that actions and events are not only located in, and explicable by, reference to multiple perspectives but are located in, and influenced by multiple historical, and socio-political contexts (Hatton & Smith, 1995, p. 48-49).

They regard reflection as a prolonged and planned process of reflection with specific outcomes, and that the quality can be measured by the different types of reflection which have occurred as exhibited in practitioners' reflective writing (Hatton & Smith, 1995). For example, according to Hatton and Smith (1995), when a practitioner descriptively justifies *how* an event or decision came about a process of descriptive reflection is used, and low level reflection is evident. Alternatively, if the practitioner undertakes an exploration of the reasons for the event (i.e., *why* the event occurred), this is defined as a process of dialogic reflection, and is regarded as higher level reflection. Likewise, an exploration of wider issues may result in critical reflection, which is regarded as more effective for practice (Hatton & Smith, 1995). The researchers regard reflection as developmental, beginning at a technical level with “decision-making about immediate behavior or skills” (defined as descriptive writing), and moving readily to descriptive reflection once professionals are able to provide reasons for their actions (Hatton & Smith, 1995, p. 46). Dialogic reflection is regarded by Hatton and Smith (1995) as less common as it requires the “problematic nature of professional action” to be acknowledged, and takes some exploration of professional experience to achieve (p. 46). Reflection of a critical nature, including the ability to contextualize multiple viewpoints, is also regarded as rare because it is reliant on the use of metacognitive skills which take time to develop as they are unlikely to occur naturally (Hatton & Smith, 1995).

So far, it is evident that reflection has more elements and dimensions to it than simply thinking. This is also illustrated by Moon's (2004) “common-sense view” of reflection, which she describes as a complex, cognitive process used for both “obvious solutions”,

and to examine “complicated ill-structured ideas” (p. 82). However, in contrast to Dewey (1933) who believes in the use of controlled thought for verification of anticipated outcomes, Moon (2004) suggests that although some outcomes are expected they can also be unexpected. Moon (2004) believes reflection is built on existing expertise and insights. A more recent definition of reflection from Moon (2007) expresses these aspects.

Reflection is a form of mental processing- like a form of thinking - that we may use to fulfill a purpose or to achieve some anticipated outcome, or we may simply ‘be reflective’ when an outcome may be unexpected. Reflection is applied to relatively complicated, ill-structured ideas for which there is not an obvious solution and is largely based on the further processing of knowledge and understanding that we already possess (Moon, 2007, p. 192).

She believes that the reflective process and the context (e.g., personal, professional or theoretical) influences the outcomes, as all these factors impact on the quality of the reflection (Moon, 2007). The input-outcome model of reflection (see Figure 1) developed by Moon (2001) suggests that reflection is stimulated by such things as: “thoughts, theories, constructed knowledge, experience and feelings”, leading to a range of outcomes as part of the reflective process (p. 100).

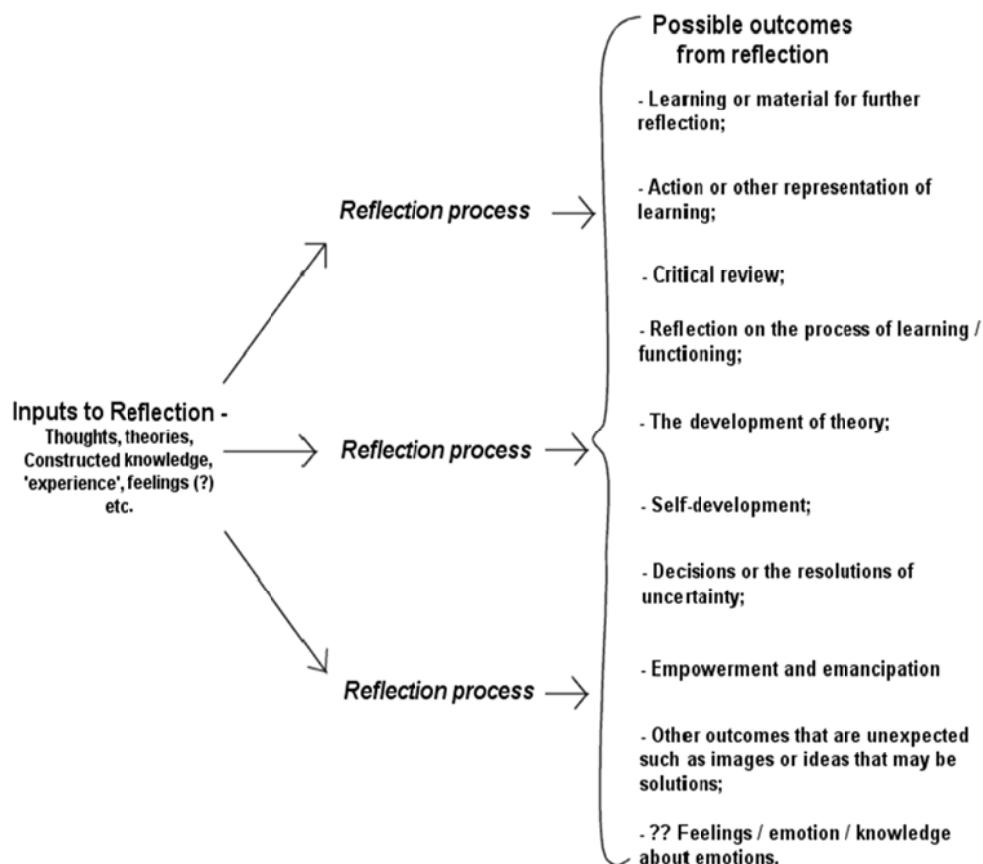


Figure 1: An input/outcome model of reflection (Moon, 2001).

Although, Moon's (2001) input/outcome model of reflection is a simple representation of what is understood about the outcomes of the process of reflection, it does not provide any detail about the actual process. Other researchers, as already discussed have developed models of reflection to describe the processes and the types of reflection which may occur. Even so, the outcomes of reflection are considered important because they depend on the reflective process engaged in by the practitioner. Therefore, Moon (2007) has compiled several commonly cited outcomes of reflection from the literature that are integrated with some of the processes which may be incurred. For example:

1. learning, knowledge and understanding;
2. some form of action;

3. a process of critical review;
4. personal and continuing professional development;
5. reflection on the process of learning or personal functioning (metacognition);
6. the building of theory from observations in practice situations;
7. the making of decisions/resolution of uncertainty;
8. the solving of problems; empowerment and emancipation;
9. unexpected outcomes (e.g., images, ideas that could be solutions to dilemmas or seen as creative activity);
10. emotion (that can be an outcome or can be part of the process);
11. clarification and the recognition that there is a need for further reflection and so on (Moon, 2007, p. 193).

These outcomes along with the input/outcome model of reflection developed by Moon (2001) show that “reflection is part of learning” (p. 101). Also, Moon (2004) claims that the key for learning when using reflection is to use it as a process for understanding new material while also making connections to existing knowledge; a concept also supported by Boud et al. (1985) in the third stage of their model of reflection when a practitioner re-evaluates an experience. The meaning of reflective learning and the links to other models and definitions of reflection are discussed in the next section.

2.2.1 Reflective learning

Reflective learning is claimed by Boyd and Fales (1983) to be a specific process of reflection that is linked to the self. They define reflective learning as:

The process of creating and clarifying the meaning of experience (present and past) in terms of self (self in relation to self and self in relation to the world). The outcome of the process is changed conceptual perspective. The experience that is explored and examined to create meaning focuses around or embodies a concern of central importance to self (Boyd & Fayles, 1983, p. 101).

Their definition indicates that reflective learning has a role in changing perspectives. After using interviewing techniques to explore and raise awareness about reflection and learning, they ascertained that practitioners were “cognitively or affectively changed”, and as such changed their perspective about the experience on which they were reflecting (Boyd & Fayles, 1983, p. 100). However, the process of reflection and learning was found to vary between individuals, as it depended on a number of factors (Boyd & Fayles, 1983). For example: the strategies which were used to support learning, the original stimulus for reflection, and the reflective awareness and abilities of the proponents of reflective learning (Boyd & Fayles, 1983).

The researchers describe six components in the reflective learning process. Firstly, there is a stimulus of “inner discomfort” (critical incident), and this is followed by some awareness of the critical incident and feelings about it (recognition) (Boyd & Fayles, 1983, p. 109). Thirdly, individuals become open to the new information or experience by sitting back from it and examining a range of perspectives. Then there is a process of “resolution”, that is, insight or ‘connecting the dots’ to increase understanding about the situation and their role in it (Boyd & Fayles, 1983, p. 109). In other words, there is a change of perspective which “represents a small shift in relation of self-to-self or self-to-world” (Boyd & Fayles, 1983, p. 111). In stages five and six of the process, individuals examine the new perspective in relation to past experiences and their present situation, and compare this to how they might act in future. In addition, they decide whether to take action, how to do it, and how to use the new information (Boyd & Fayles, 1983). Therefore, it is not until the last stage of the process that analysis of the new perspective(s) occurs to determine how it might be applied in practice. The use of interventions, to assist individuals in recording or fixing information, is suggested by Boyd and Fayles (1983) as appropriate for the third stage. In conclusion, their work illustrates the view that reflective thinking is regarded as an activity which can be taught or facilitated so it becomes more effective as a professional learning tool (Boyd & Fayles, 1983).

Deeper learning is claimed to occur when reflection on the experience is enabled, as other meanings may be found (Schon, 1987). This is in contrast to the ‘act of doing’, which may be task-driven and involve the copying of what others are doing without understanding what they are doing (Schon, 1987). The reflective process, described by Schon (1987), uses the rungs of a ladder (moving from the bottom rung to the top) to describe how reflection can be used. For example:

1. Reflection on reflection on description of professional activities;
2. Reflection on the description of professional activities [action];
3. Description of professional activities [knowing-in-action];
4. Professional activities [reflection-in-action] (based on Schon, 1987).

The process of “demonstrating and observing, imitating and criticizing”, described by Schon (1987), which occurs between a ‘coach’ and a ‘student’ who enter into reflective conversation, is a two-way, interchangeable mechanism where the action of one person causes the other to reflect and vice versa (p. 114).

Another way of conceptualizing reflection which focuses on developing the capacity to learn from the experience and interpret and think critically about practice is described by Rodgers (2002b). In contrast to van Manen (1977), Boyd and Fales (1983), Schon (1987) and Hatton and Smith (1995) who use a hierarchical approach, Rodgers (2002b) describes reflection as a cyclical process, and has based her work on Dewey’s non-sequential principles of reflection to develop the “Reflective Cycle” (2002b, p. 231). Rodgers (2002b) describes four cyclical phases of reflection, believing it is possible to move back and forth between them, particularly phases two and three, rather than to move linearly through the phases. The four phases are:

Phase one - Presence in experience: Learning to see - ability to perceive and respond intelligently;

Phase two – Description: Learning to describe and differentiate - “look and see the variety and nuance present in .moments” and not interpret;

Phase three - Analysis of experience: Learning to think critically and create theory; and

Phase four – Experimentation: Learning to take intelligent action (Rodgers, 2002b, p.235).

The cycle developed by Kolb (1984) is also mentioned here because like Rodger's cycle (2002b) it demonstrates connections between reflection and learning and illustrates a different emphasis on these concepts. Although Kolb's (1984) model is not regarded as a strictly reflective one, it establishes the place that reflection may have in the learning process, that is, reflection generally occurs before learning takes place (Moon, 2001). The four stages of Kolb's (1984) experiential cycle involve the experience encountered by the practitioner (concrete experience), reflection on the experience (reflective observation), learning from the experience (abstract conceptualization), and the action taken as a result of what was learned (active experimentation). In contrast to Kolb's model, the four phases of Rodger's (2002b) model have reflection more explicitly integrated with learning throughout the cycle.

Regardless of whether reflection is described as an hierarchal, a developmental or a cyclical process, there is agreement that reflection involves the cognitive processing of information. Additionally, when practitioners learn to heed or notice their interactions with the environment or *learning milieu* in which they are situated, it is believed that they can learn from their experiences (Boud & Walker, 1998), particularly if they revisit them. "Returning to the experience", and "Attending to feelings" as described in Boud et al.'s (1985) model of reflection is when practitioners revisit experiences and describe them objectively, helping them to notice the event more clearly, and discover the feelings which prompted them to act (p. 26). These stages are regarded as necessary for removing any barriers caused by emotions surrounding challenging events, and the authors advise practitioners to work through these phases of the reflective process, before analysing and interpreting what happened during the experience (Boud et al., 1985).

Similarly, in the first two phases of Rodger's (2002b) cycle it is suggested that the understanding of an experience occurs when perceptions are heightened and practitioners can describe and distinguish the important components of the experience. The third stage of Boud et al.'s (1985) model is called: "Re-evaluating experience", and involves the transformation of how a person acts and thinks as a result of working with new forms of knowledge in light of existing knowledge (Boud et al., 1985). This stage in the model has similarities to Phase Four in Rodger's (2002b) reflective cycle, 'Learning to take intelligent action'. The process of interaction and learning from revisiting experiences, described by Boud et al. (1985), is regarded as preparation for learning how to be more open to new situations (Boud et al., 1985). Clearly, knowledge, understanding and learning is considered to be developed through the reflective process, and may include emotional involvement of some kind leading to decision-making, and changes to practice through the actions taken by practitioners. The definition of reflection for this research study also integrates learning and deliberate and mindful thinking about experiences in a process of self-evaluation

The research about reflection and learning demonstrates that the phenomenon of reflective learning exists, and also that the reflective process can be stimulated by specific conditions, and in general leads to a broad range of outcomes which can impact on practice. The methods that could be used to guide the reflective process to obtain specific outcomes were foremost when establishing the theoretical foundations for this research study.

2.2.2 Theoretical frameworks used in the study

Theoretical frameworks informed both the development of the Three-Step Reflective Framework, and the taxonomy developed for use in analysis of the writing that participants produced when using the framework.

2.2.2.1 Theoretical framework informing the Three-Step Reflective Framework

Definitions of reflection, described previously, as well as a number of frameworks and models were considered when developing the Three-Step Reflective Framework. The main requirement was their propensity for guiding reflective processes such as noticing, describing the experience, interpreting or analysing the experience, examining other perspectives, and learning from the experience in order to act or make changes to practice. Sequencing the development of skills for reflection within the structure of a hierarchal framework is recommended by Hatton and Smith (1995). They recommend “starting the beginner with the relatively simplistic or partial technical type [of reflection], then working through different forms of reflection-on-action [including critical reflection] to the desired end-point of a professional able to undertake reflection-in-action” (Hatton & Smith, 1995, p. 45). The three steps of the Reflective Framework also intended to follow a sequence, from a description of experience, through analysis of the experience, ending with awareness about what was learned and how the new knowledge would be used.

Structure for beginning the process of reflection in the Reflective Framework is based on Robert Tremmel’s work. He encouraged teacher education students to pay attention and “reveal the working of their minds” inward, a concept described as being mindful of the self (1993, p. 451). He asserted that through noticing thoughts and feelings, and ‘seeing’ what is actually happening in any given situation, a practitioner can be “mindful” and focus attention on “the moment” (Tremmel, 1993, p. 450). Informal and detailed writing, termed “slices of life”, were used by Tremmel to guide reflection through exploration of thoughts and feelings, which helped his students to disclose what the experiences meant for their practice (p. 451). The method, used by Tremmel (1993) to encourage students to pay attention to their experiences in the classroom, has similarities to the written reflections employed in the subject where this research takes place. The concept of noticing also resonates with the first phase of Rodger’s Reflective Cycle which she defines as, “in the moment and from moment to moment” to explain the necessity of paying attention to what is happening in the classroom (2002b,

p. 235). When a teacher is able to notice, according to Rodgers (2002b), a reflective process is initiated, allowing meaning to be taken from the experience and an appropriate response to be made. The ‘slices of life’ approach used by Tremmel also has similarities to the second phase of Rodgers’ cycle when practitioners engage in “telling the story of an experience” so they can learn from it by really ‘seeing’ what occurred (2002b, p. 235). This phase is regarded, by Rodgers, as the most difficult, because practitioners must “withhold interpretation of events” and focus on exploring and describing the event from different angles (2002b, p. 235).

Additionally, noticing what takes place in a past experience is defined by Boud and Walker (1990) as “retrospective noticing”, and they claim: “Noticing is essential to the initiation of the reflective process and can provide further evidence on which to reflect” (p. 68). Four kinds of noticing are defined by them, to describe the interactions which learners may have with the “learning milieu” (defined as any potential learning situation), as a means of learning from experience (Boud & Walker, 1990, p. 62). For example, “Noticing and the learning milieu” involves the learner attending to inner thoughts and feelings when exploring the nature of the experience, a process regarded as useful for addressing ingrained assumptions (Boud & Walker, 1990). Also, when learners are able to “examine their assumptions about what they notice and attempt to view events from other perspectives”, being able to record the event is alleged to extend the benefits of the process, and is regarded as an important skill (Boud & Walker, 1990, p. 71). ‘Noticing’ in this study, is described more generally to mean, paying attention to experiences by examining feelings, thoughts and knowledge, rather than being broken down into several components as Boud and Walker (1990) have done.

The process of “thinking from multiple perspectives and from multiple explanations” is described by Rodgers (2002b) in the third phase of her model so that different explanations about the experience are generated and assumptions are revealed (p. 235). Consequently, in line with the work described by Tremmel (1993), and by Rodgers (2002b), both the process of noticing the experience, the description of it, and analysis of the experience are regarded as necessary for learning about it so that changes to

practice can be made. For this change to occur the learner needs to be able to intervene or act, that is, engage in a process described as taking “deliberate actions” (Boud & Walker, 1990, p. 73). Rodgers (2002b) regards the taking of action as the fourth phase of reflection, and this occurs as a result of “well thought out and mutually constructed theory” (p. 249). Furthermore, the stage of noticing an experience is addressed by the first two stages of Boud et al.’s (1985) model of reflection and has previously been discussed.

The models presented, thus far (Boud & Walker, 1990; Boud et al., 1985; Hatton & Smith, 1995; Rodgers, 2002b; Tremmel, 1993), describe the different processes professionals may need to undertake if they are to reflect effectively on their experiences in preparation for taking action, that is, to proceed in practice as informed and reflective practitioners. Together, these models and theories informed the structure of the Reflective Framework for this research. It is clear from these that intervening or engaging in an experience, generally involves awareness about the decisions associated with the actions, and these aspects along with noticing thoughts and feelings, as well as ‘seeing’ and ‘knowing’, and being able to describe the event and analyse the experience before acting, is incorporated in the Reflective Framework.

2.2.2.2 Theoretical framework informing the Levels of Reflection taxonomy

The outcomes of the reflective process scaffolded by the Reflective Framework also needed investigation. Therefore, a number of frameworks used to examine reflective writing for evidence of reflection were explored. Foremost, are the hierarchical frameworks developed by Hatton and Smith (1995), and by Sparks-Langer et al. (1990) who used them to measure the depth and complexity of reflective writing, and to ascertain what was written about teaching practice. These frameworks provided a foundation from which the levels and types of reflection in participants’ writing could be analysed, because they described discrete levels of reflection and writing. For comparison, the frameworks are listed in brief alongside each other in Table 1.

Table 1: Comparison of two theoretical frameworks.

Framework for Reflective Pedagogical Thinking - Sparks-Langer et al. (1990, p. 27).	Criteria for the recognition of evidence for different types of reflective writing (Hatton & Smith, 1995, p. 48).
1 No descriptive language.	Descriptive writing - not reflective, description of events.
2 Simple lay person description.	Descriptive reflection- reflective description of an event and justification for actions.
3 Events labelled with appropriate terms.	
4 Tradition or personal preference as rationale.	Dialogic reflection - demonstrates a "stepping back" and "mulling over" of judgements and viewpoints.
5 Principle or theory explained.	Critical reflection - demonstrates awareness about multiple historical and socio-political contexts.
6 Context is considered plus principle or theory.	
7 Ethical, moral, political issues are included.	

A four part framework of criteria is recommended by Hatton and Smith (1995) for measuring reflective writing. In comparison, Sparks-Langer et al. (1990) describe seven levels in their "Framework for Reflective Pedagogical Thinking" (p. 27). Originally Sparks-Langer et al. (1990) classified seven different "types of language and thinking" about pedagogy believing that "analysis of students' language [could] shed light on their ability to use concepts and principles to explain classroom events" (p. 27). As such, they expected a linear progression through each level until the most complex level was reached. Even so, they concluded that reflective thinking was a non-linear process, and modified the scoring criteria of the framework accordingly (Sparks-Langer et al., 1990). This change to the framework acknowledges that some practitioners are unable to move past technical thinking, whereas others are able to demonstrate ethical and moral thinking immediately, and do not move linearly through each level of thinking (Sparks-Langer et al., 1990).

In contrast, Hatton and Smith (1995) name four stages of writing and reflection, which a practitioner is expected to demonstrate when revisiting experiences. These have been described previously in Section 2.2. In both frameworks, practitioners are expected to demonstrate increasingly deeper reflection in their writing as they move through each stage. The similarities between the frameworks lie in the expectation that writing at the lowest level is non-reflective, and that critical reflection is included in the criteria

(Hatton & Smith, 1995; Sparks-Langer et al., 1990). Both Hatton and Smith (1995), and Sparks-Langer et al. (1990) found that the type of reflection practiced depends on whether a teacher is a novice or an experienced professional, with higher levels of reflection associated with greater professional experience, and therefore, they believe context is paramount. This also fits with Valli's (1997) position on the five types of reflection she describes (technical, reflection-in and on-action, deliberative, personalistic, and critical reflection), and how they are likely to be used by practitioners. Although, Valli (1997) does not consider technical rationality (technical decision making and technical behaviour) to be a component of reflective practice, she does consider it is very important to develop reflection in trainee teachers, rather than leaving it in the domain of experienced teachers.

Two other models of reflection, the Reflective Framework for Teaching in Physical Education (RFTPE) (McCollum, 2002), and the Reflection Rubric (Ward & Cotter, 2004) informed the theoretical framework for this research study (see Table 2). Similarly, these models take a progressive approach to reflection. Originally, the models were used to evaluate the quality of reflection in students' work. McCollum (2002) used a three part framework (originally developed by Tsangaridou & O'Sullivan, 1994) to facilitate and assess the depth and quality in physical education teachers' reflective analysis. She also found the framework useful for guiding the teachers in their reflective writing, and described it as "an effective pedagogical tool for providing opportunities for connecting theory to practice, enhancing the level/depth of ... reflective thinking, and broadening the scope of reflection to multiple aspects of teaching" (McCollum, 2002, p. 41).

Table 2: Comparison of a reflective framework and a reflection rubric.

Reflective Framework for Teaching in Physical Education (RFTPE) (McCollum 2002, p. 40).	Reflection rubric (Ward & McCotter, 2004, p. 250).
Level 1 - Description – an event is described in detail (i.e., what happened).	Routine reflection – self-disengaged from change.
Level 2 - Justification – rationale of an action and why an event was important.	Technical reflection – instrumental response to specific situations without changing perspective.
Level 3 - Critique – an explanation and evaluation of an action. What was learned or felt about an event.	Dialogic reflection – inquiry part of a process involving cycles of situated questions and action, consideration for others’ perspectives, new insights.
	Transformative - fundamental questions and change.

In contrast, Ward and Cotter (2004) developed their reflection rubric after they analysed the reflective writing of pre-service teachers, and did not use it to guide the students’ reflections. During their research and assessments of reflective writing, Ward and Cotter (2004) investigated the process of inquiry (Inquiry), and also “how inquiry changed practice and perspective” (Change) (p. 250). When McCollum (2002) examined the focus of teachers’ reflections in her research, three principle perspectives were taken into account: technical (instructional or managerial), situational (contextual), and sensitizing (social, moral, ethical, and political). Levels of reflection for each perspective or category were assessed.

A comparison of the levels of reflection as outlined in Table 2 shows that McCollum’s (2002) framework has three levels, whereas Ward and Cotter (2004) have developed a rubric with four levels. Findings from Ward and Cotter (2004), following analysis of pre-service teachers’ writing with the rubric, indicate it is “unusual and difficult” for teachers to reach the higher transformative level of reflection (p. 255). Nevertheless Ward and Cotter (2004) suggest that by consistently using the rubric teachers can be supported to reach the level of dialogic reflection. When Tsangaridou and O’Sullivan (1994) originally used the RFTPE with two groups of students, the group who were provided with questions in the framework wrote more frequently at all three levels of

reflection. In comparison, the other group, who were not provided with questions, wrote mainly at the level of description. When McCollum (2002) used the RFTPE in her research, the questions were included, and the framework was effective in supporting the higher levels of reflection.

The two frameworks provide a structure for the development of reflective writing, which moves from a basic level of description to a level where inquiry is expected to be deeper and more complex. Although, the levels of writing are hierarchal the researchers have not labeled the highest level as critical reflection. This is in contrast to other hierarchal frameworks which suggest that critical reflection or its equivalent is the highest, and therefore, the most important level of reflection to which practitioners should aspire. It appears that McCollum's (2002) framework and Ward and Cotter's rubric match the approach used by Valli (1997) who emphasizes "complexity of thought", as opposed to "dualistic thought" (p. 74), as the indicator of a deeper level of reflection which is not necessarily critical. Reflection is known to occur at different degrees of quality, and this impacts on whether professionals are able to move from a technical and skills-based model of practice to one where they are able to make critically informed decisions and thus engage in reflective practice (Valli, 1997).

So far, definitions of reflection and reflective learning have been considered. Next it is important to discuss reflective writing as this is a technique that is commonly used as an expression of reflection.

2.3 Reflective writing

For this research study, reflection as expressed by reflective writing was investigated. When reflection is associated with learning, it can change from being a concept associated with abstract thought to one where a specific technique, such as reflective writing, may be employed, leading to a range of outcomes (Moon, 2001; Nsibande, 2007). For example, in educational environments, the use of structured reflection (through the use of learning journals or essays) with pre-determined outcomes can have a strong influence on learning and actions, and also on the quality of the reflection,

particularly if it is assessed (Loughran & Corrigan, 1995; Moon, 2001). If practitioners are expected to demonstrate reflection in the form of reflective writing, this can influence the quality of the reflection, since they are not necessarily adept at expressing their thoughts in this way (Moon, 2001). For instance, in an academic context the reflective process may be more directed and “the process and outcome of reflective work is most likely to be represented in a form (e.g., written), to be seen by others and to be assessed. ... factors [that] can influence its nature and quality” (Moon, 2007, p. 192). The quality of the reflection, which eventuates in an academic context, can be dependent on whether practitioners or students are encouraged or inhibited from reflecting critically (Moon, 2001). For example, if they are expected to write reflectively at a level which is more than descriptive, perhaps about their professional practice, Moon (2001) claims they are more likely to extend themselves. On the other hand, if they are constrained by confidentiality requirements related to practice situations, or stringent guidelines are imposed by academic criteria, they may feel unable to reflect adequately, even when there are plenty of fertile examples to ponder (Moon, 2001).

Also, when reflection occurs in an academic context, the expectations of educators and the design of curricula, including assessments, tend to colour the process for learners, whether they are in teacher education, health or other disciplines (Parsons & Stephenson, 2005; Schutz et al., 2004;). However, other researchers have not found assessment inhibiting for reflection, claiming it can provide an opportunity for comprehensive feedback on reflective writing which then enhances the quality of the reflections (Bain et al, 2002). Where evidence of the outcomes of reflection is sought, criteria are regarded as necessary for measuring whether reflection has occurred, and consequently, several researchers have developed frameworks to estimate the quality of reflective writing (e.g., Hatton & Smith, 1995; McCollum 2002; Tsangaridou & O’Sullivan, 2004). As a result, the quality of reflection in a practitioner’s written work is more likely to be measured in a consistent manner. According to the theories and models of reflection considered thus far in this review, the level of reflection (e.g., descriptive, dialogic or critical) demonstrated in practitioners’ writing is an indicator of

the quality of reflection. For example, Hatton and Smith (1995) regard the presence of critical reflection, in a practitioner's writing, as a higher level of reflection than descriptive reflection. They believe that to achieve a critical level of reflection, a deeper examination of practice experiences must occur through the consideration of a range of perspectives and contexts. These researchers claim that practitioners need support to guide their reflective writing if they are to achieve higher levels of reflection (Hatton & Smith, 1995). Support is also considered necessary if practitioners are to develop as reflective practitioners. This includes the concept of scaffolding the reflective process and support for developing the dispositions or characteristics associated with reflection.

2.4 Support for improving reflection

Practitioners are known to reflect in different ways depending on the support to which they have access, and their existing skills and predispositions for reflection (Rodgers, 2000a). Historically, the need for facilitation of reflection has been recognised for some time, and Schon (1987) has stated it can be used to bridge the gap between theory and practice, and to encourage reflection-in-action and reflection on reflection-in-action. He acknowledges the dilemma for practitioners whom he believes are working within a complex and ill-defined range of factors (referred to as the “swampy-low ground that is practice”) and the pull between them and their professional knowledge (which he describes as the “high-ground”) (Schon, 1987, p. 3).

Structured frameworks as well as dialogue are claimed to provide an opportunity for practitioners to extend their reflective processing of experiences (Donaghy & Morss, 2000; Hatton & Smith, 1999). Specific characteristics are associated with the capacity to reflect on experiences (Rodgers, 2000a). In this section, support for enhancing reflection is discussed, including the concept of scaffolding, strategies to facilitate reflection, support for developing reflective dispositions, support for critical reflection and the use of portfolios to support reflection. Some further examples of research using frameworks to support reflection are presented. Firstly, the concept of scaffolding reflection is outlined.

2.4.1 Scaffolding reflection

As established previously, the achievement of learning is generally regarded as an integral part of the reflective process. Reflection is not regarded as an intuitive skill, and therefore, guidance and often instruction is required if a professional is to write reflectively, or explore their practice at a level regarded as beneficial for gaining new knowledge or changing practice (Gelter, 2003; Hatton & Smith, 1995; Moon, 2001). Scaffolding is defined by Lajoie (2005) as: “A temporary entity that is used to reach one’s potential and then is removed when learners demonstrate their learning. Support is calibrated for the learner and task and alters as a learner appropriates control and encounters new challenges” (p. 542). Therefore, scaffolding can be used to “help a learner undertake a task or goal that is beyond the present level of the learner’s capacity” (Bean & Stevens, 2002, p. 208). Bean and Stevens (2002) discovered that, “scaffolding help[ed] to focus students’ reflections and provide[d] explicit support in modeling the role of reflection” (p. 216). In their study, different methods of scaffolding were used with two groups of teachers (25 undergraduates – preservice, and 28 experienced graduates - inservice) to encourage them to reflect while learning. The teachers in the preservice class were asked to post weekly reflections to an online bulletin board in response to the classroom teacher’s prompts. The teacher encouraged reflection about theoretical concepts in their course textbook, students’ field experiences, and the online discussions. As scaffolding, suggestions of appropriate responses to the prompts were provided by the teacher who also highlighted fitting examples provided by the students. In contrast, the inservice group was asked to reflect weekly in an individual journal about concepts from each chapter of their course text. For this group, the teacher scaffolded reflection differently. He asked them to write about how the concepts in the textbook related to their classroom teaching, and provided examples of journal entries for the chapters. The teacher also facilitated face-to-face discussion with the group about their reflections. As a result of the research, Bean and Stevens (2002) concluded that although the scaffolding resulted in reflective outputs, it was variable between the groups.

The level of discourse in the teachers' reflections was found to be inter-related to the level of teaching experience. Three levels of discourse (categorised as local, institutional and social) were analysed. Local discourse occurred when the teachers reflected about their classroom experiences, institutional discourse was apparent when schools and school systems were mentioned, and when the teachers mentioned issues concerning beliefs and practices in education this was defined as social discourse. The researchers found that the preservice teachers tended to reflect on their personal belief systems, the information in their course texts and societal issues in education (social discourse) although they did not critique them. They did not tend to reflect about their practice (local discourse). In contrast, the experienced inservice teachers reflected mainly about their classroom practice but showed no evidence of institutional or social discourse (Bean & Stevens, 2002).

A further example of scaffolding reflection occurred in an innovative approach used by Korthagen and Vasalos (2005) when they used a professional development exercise to assist teachers to learn from their experiences. A mix of reflective questions, reflective writing and discussion was used. They used the ALACT-model of reflection, structured with five phases of reflection, organised in a cyclical fashion to support reflection

- (a) action, (b) looking back on the action, (c) awareness of essential aspects,
- (d) creating alternative methods of action, and (e) trial (Korthagen, 1985, p. 12).

During the research, "supervisor interventions" were used in conjunction with the model to "concretize" specific areas of practice, such as what the student teacher was thinking and what the students were thinking (Korthagen & Vasalos, 2005, p. 50). It was expected that questions posed by the supervisor would "help the teacher discover how to address [areas of practice] more systematically, and only then would they be ... truly learning how to reflect" (Korthagen & Vasalos, 2005, p. 50). The student teachers were assisted to develop their skills of reflection to a stage where they demonstrated "core reflection" as they became more aware of themselves as practitioners, and were able to critically analyse problem situations (Korthagen & Vasalos, 2005, p. 55). In this model, student teachers were taught how to reflect in preparation for reflective practice.

Learning and reflection were interwoven with the action of practice, looking back on the action, awareness, and the development of alternative actions which the student teachers then tried out in a cycle of continuous learning (Korthagen & Vasalos, 2005).

Essentially, it can be argued that through scaffolding practitioners can be ‘eased’ into using reflective processes that help them learn and reflect on their practice experiences. The scaffolding provided during a course of study can be viewed as specifically supporting and developing skills for the type of reflection (albeit reflective writing) that the teacher is trying to encourage during particular activities. It does not necessarily mean that the same scaffolds can be used in other circumstances. For example, scaffolding may include the deliberate facilitation of activities designed to promote reflection such as blog posting and online discussions where the teacher role models reflective writing. Facilitation is therefore, a way to deliver the scaffolding or structure needed to promote reflection. In this way, Stiler and Philleo (2003) used focused questions to promote deeper reflection in the writing produced by undergraduate student teachers. They introduced the strategy of reflective writing on blogs in an attempt to find a solution for the lack of insightful or in-depth reflective writing practiced by many professionals, using traditional types of journaling (paper-based, workbooks, journals and diaries). The focused questions used by Stiler and Philleo (2003) were combined with activities in facilitated online discussions and therefore used to scaffold reflection. The reflective writing produced by the students, in the research, changed when compared to the writing produced by students in previous classes where blogs and facilitation was not used. Stiler and Philleo (2003) claimed “the breadth and depth of student reflectivity appeared to be positively affected”, and they reported an increase in analytic and evaluative forms of writing, and less descriptive writing (p. 795). Therefore, they recommended the use of facilitation, and different tools for recording reflections as a means of supporting reflective processes as it was essential to help (scaffold) practitioners to reflect deeply and effectively. They also concluded that it was necessary to allow sufficient time for writing so teachers could reflect well (Stiler & Philleo, 2003). However, they did not report on whether the student teachers intended to continue using blogs for reflective practice.

The examples described so far, highlight that the scaffolding of reflection requires a variety of strategies and tools including facilitation. Also, Moon (2001) claims that a variety of written processes of reflection are needed for “personal development planning (PDP)” such as: journals, logs, diaries, portfolios, reflection on work experience, reflection in work-based learning, reflection on placement learning, and reflective exercises can be used by educators to facilitate the integration of learning and reflection (p. 8).

2.4.2 Strategies to facilitate reflection

The belief that guidance is usually needed to assist practitioners to deepen reflective activity is also held by Donaghy and Morss (2000). They claim that merely keeping a journal is not sufficient to promote critical analysis and problem-solving, and believe that guided reflection in the form of a framework with prompting questions is needed to do this. These researchers took physiotherapy students through three phases of guided reflection. Students in the study had to write an account of a client case using prompting questions to describe what occurred at a clinical level, and explain their decisions in light of technical evidence; plus they were asked to examine their knowledge about the case using clinical reasoning and dialogue (Donaghy & Morss, 2000). Only the initial effectiveness of the approach was measured at first, and later on, in a 2007 study by the same authors, other findings surfaced when a framework incorporating self-questioning was used, and this study is described in Section 2.4.2.1.

As previously mentioned, the use of frameworks and guiding questions are known to both encourage and deepen the level of reflection (Donaghy & Morss, 2000; Hatton & Smith, 1995; McCollum, 2002; Sparks-Langer et al., 1990; Tsangaridou, 2005). A strategy known as self-questioning has also been used to support reflection. The intention of using frameworks to encourage reflective practice appears to be associated with steering practitioners away from mere reflection on values, beliefs and attitudes, and more strongly towards critical analysis of clinical problems to change pre-

determined assumptions (Donaghy & Morss, 2000). Self-questioning has also been demonstrated to be effective in doing this.

2.4.2.1 Self-questioning as a strategy

The use of self-questioning has been shown to contribute to the development of dispositions for effective reflection (e.g., willingness to change thinking patterns, openness to new perspectives, acknowledgement of emotions, and the ability to self-regulate learning). In some situations, questions for self-assessment are provided by facilitators, and in others, practitioners are encouraged to create their own questions. For example, Samuels and Betts (2007) assisted students to evaluate their practice by providing questions they could use in a written self-assessment exercise. The questions helped students to deepen their reflection, that is, to “encourage a development of reflection from descriptive to analytical, evaluative and critical levels” (Samuels & Betts, 2007, p. 272). By challenging students to reflect more deeply through “feedback, dialogue, new experiences or structured questions to stimulate reflection on reflection”, students could be assisted to “deconstruct and analyse current thinking and reconstruct new patterns of thinking” (Samuels & Betts, 2007, p. 272). So although, a process of self-assessment was encouraged during their research, it was done in a structured and pre-determined manner as opposed to leaving students to seek their own methods.

In another example, an investigation was undertaken by Lemon (2007) to find out how self-generated questions could aid reflection. This was done through constructing a personal, visual narrative around photographs which she took about her teaching practice and used as a stimulus to reflective inquiry. She created questions to help herself interpret the photographs and to remember what occurred at the time. For example: “When looking at the photos what do I see? What was the story?” (Lemon, 2007, p. 186). When she wrote down what she was seeing in the photographs, and responded to the questions she had asked herself, she ended up generating a series of further questions which helped her to continually examine her practice from different angles. Through a process of asking questions of herself and then answering them, she

was able to engage in goal-setting, self-assessment, and subsequently became more open to new ideas. It was also a process of self-monitoring and reinforcement of her understanding. Consequently, the process helped Lemon (2007) to view her practice from a different perspective, and led to reflective action where she changed and reaffirmed her behaviors, set new goals and learned from the experience.

The previous two examples are embedded in teacher education. Self-questioning has also been shown to be effective in medical education in situations where it was essential to reduce clinical errors by encouraging habits of “emotional self-awareness and self-regulation” (Borrell-Carrió & Epstein, 2004, p. 310). Methods to support “cognitive activation” through instilling habitual self-questioning into medical practitioners’ clinical work were investigated (p. 313). Through the use of a set of pre-determined reflective questions and simulated clinical scenarios, physicians were cognitively trained to reframe clinical situations and approach their decision-making in a more emotionally-open manner. As a result they became more aware of conflicting factors which might impact on their making safe clinical decisions (Borrell-Carrió & Epstein, 2004). These researchers like Lemon (2007) used pre-determined and structured questions, whereas others have either investigated the presence of self-questioning, or used approaches which instigated the technique.

Such an investigation was carried out by Teekman (2000) who used the step-by-step Sense-Making method to investigate whether self-questioning was occurring through “micro-moment time-line interviews” about clinical events (p. 1128). This was done to explore the processes used during reflective thinking, and also to find out the focus of the participants’ reflections. In the research, 10 registered nurses were found to engage in self-questioning (“discourse with self”) as part of a reflective thinking process (Teekman, 2000, p. 1130). Participants were asked to recall and explore clinical experiences by examining their pre-perceptions of personal and professional knowing, and their emotions and feelings in each situation. As part of this, the interviewers asked the participants about the questions they asked themselves whilst situated in the experience. Teekman (2000) reported that self-questioning was used mainly to solve

“here and now” problems, so the nurses could act (p. 1131). For example: “self-questioning served mainly to prepare for action and to a lesser degree to monitor and evaluate one's own performance and knowledge base” (Teekman, 2000, p. 1131). He identified a process of reflective thinking which occurred consecutively and mainly for action, to a lesser extent for evaluation, and for some the process stimulated critical inquiry.

Although, self-questioning was found to assist respondents to structure their thought processes and make sense of a situation, Teekman was adamant that self-questioning was no replacement for professional dialogue or feedback in situations where a person was inexperienced or lacked “propositional knowledge” (p. 1132). He also found that the reflective cycle in which participants engaged, during his research, stirred up emotional conflicts as they re-examined their practice. As a result, he recommended a safe environment and psychological support to encourage meaningful reflective practice (Teekman, 2000).

Another example of using self-questioning for practice was found to be effective in facilitating the reflective practices of physiotherapy students (Donaghy & Morss, 2007). Their three stage framework was used to promote self-questioning, and in doing so was able to link reflection to “higher order cognitive processes such as gaining new insights and understandings, facilitation of systematic enquiry, problem solving, and decision making” (Donaghy & Morss, 2007, p. 92). In particular, the students placed value on the way in which they were “guided to question themselves” (p. 83). During three stages they had to steadily deepen their reflection of a clinical incident by doing the following:

- describe a clinical case of their choosing with the aid of prompting questions, and critically self-assess their performance;
- undergo a process of structured dialogue with a lecturer to analyse their “actions, reactions, thoughts, and decisions”;

- engage in writing an assessed report where they were expected to “reflect critically on the cognitive and affective processes that informed their decisions and actions”; and
- refer to evidence which supported their reflection (Donaghy & Morss, 2007, p. 84).

The researchers expected that their reflective framework would elicit an emotional component in the form of reflective writing about an event from practice. This aspect, and the use of self-questioning, is similar to the expectations and findings which other researchers have reported. The review of the research about self-questioning confirms and highlights the importance of stimulating emotional responses during the reflective process. It is clear that when feelings and emotions are acknowledged and explored, some of the barriers to professional learning (such as negative feelings) can be removed, opening the way for new perspectives to be formulated and expressed (Boud & Walker, 1991; McDrury & Alterio, 2002). Research findings associated with self-questioning and reflective questioning illustrate the value of using strategies which facilitate and deepen reflection, whether they are user-generated or in the form of structured techniques which practitioners can apply. Consequently, prompting questions were designed for the Reflective Framework to stimulate self-questioning. In addition to self-questioning, the use of strategies such as the use of dialogue and feedback was known to stimulate reflection.

2.4.2.2 Dialogue and feedback as strategies

Using a different approach, Nsibande (2007) found that a combination of “professional dialogue” and a guided task (with a series of questions), where a lesson was videoed and discussed with the practitioner, raised awareness about teaching practice and ‘teased out’ tacit knowledge associated with actions (p. 3). Although the strategy resulted in reflection, Nsibande (2007) claimed that more effective interaction and reflection would have occurred if her research participants had been able to engage in dialogue with practitioners in the same discipline as themselves. Therefore, collegial understanding of

the issues was an important factor needed to deepen reflection and aid professional learning (Nsibande, 2007).

In addition to dialogue, the combined strategies of discussion and reflective logs, journals or assignments are regarded as valuable because they help practitioners to reach deeper or more complex levels of reflection in both their thinking and their writing about practice (Alger, 2006; Macdonald & Hills, 2005). The influence of feedback when these strategies are used is reported by researchers who have studied the impact of interactions, including mentoring, on reflective practice. Some of the approaches where feedback is used include observations, conversations, and a dialogue journal between the mentor/researcher and teacher practitioner, analysis of videoed sessions, reflective assignments and action research. In fact, a “variety of activities are [needed] to foster reflection”, and the process is as important for the mentor as for the practitioner being mentored (Freese, 2006, p. 116).

In general, the benefits of using facilitation to promote reflection are well recognised as key for helping practitioners through a process of metamorphosis in their professional learning and practice. Furthermore, facilitation in the form of feedback on journal writing is claimed to be an effective means of supporting reflective writing for practice (Bain et al., 2002). Feedback, which focuses on “the reflective writing process giving guidelines and a suggested framework for moving into higher levels of cognitive activity”, is regarded as more useful in getting students to reflect deeply than “feedback focusing on the teaching issues raised by students” (Bain et al., 2002, p. 193). Even so, as long as “high challenge feedback” is used, feedback on teaching issues is known to make a difference and lead to reflective writing (as opposed to descriptive writing) (Bain et al., 2002, p. 193). For this to happen, questions, “challenging assumptions and suggesting alternative perspectives” need to be posed (Bain et al., 2002, p. 193).

The weekly journal writing of 35 second year student teachers was investigated, during a six week practicum, using “four journal feedback conditions” where the type of feedback given and the level of challenge (using high or low level questions) were varied between groups (Bain et al., 2002, p. 173). Feedback either focused on the

“process of reflection demonstrated in the writing” (reasoning or the level of reflection) “or on the ‘teaching issues’ that the entry addressed” (Bain et al., 2002, p. 173). Journal writing was scaffolded with instructions informing students about reflective journal writing, exemplars of previous students’ work, and self-analysis *pro formas*. The *pro formas* were used to guide the students in either reflective writing or writing about teaching practice depending on the group to which they were assigned. Overall, feedback was considered valuable in supporting journal writing for the development of reflection on practice (Bain et al., 2002). Therefore, this research demonstrates it is necessary to coach skills for reflection, particularly if reflective capabilities are to develop and deepen, in which case appropriately focused feedback and the use of questions is advised (Bain et al., 2002).

Others have come to similar conclusions. For example, Ottesen (2007) used another form of mediated reflection to help student teachers to change their practice. Mentoring and social interaction occurred between student teachers and mentors, creating a collaborative environment with peers. The use of reflective conversations between these groups was found to be an effective strategy in assisting the participants’ professional learning. The feedback they received, assisted in “unveiling and verbalizing tacit practical and theoretical assumptions”, and the questions the mentors used during feedback sessions encouraged the student teachers to think about and expand their practice (Ottesen, 2007, p. 41). The importance of social interactions for extending learning and reflection is reiterated by Moon (2004) who suggests using strategies such as a critical friend to provide peer critique on writing, and also group activities with prompts and questions used to deepen reflection.

In another study, van den Boom, Paas and van Merriënboera (2007) investigated the use of “reflective prompts” to initiate reflection in peer groups of university students. The exchanges were conducted through the use of electronic messages in a newsgroup. The reflective process was intensified when peer feedback was combined with feedback from tutors because it led to “reflective dialogue”; however, this did not appear to occur with peer feedback alone (van den Boom et al., 2007, p. 544). Reflective dialogue

refers to a process where “the reflection [is] elaborated on in a successive series of exchanges ... between the student and the feedback provider”, and enables the tutor to gauge the understanding of the student (van den Boom et al., 2007, p. 536). Reflective dialogue is claimed to be an important contributing factor in the development of skills and motivation for self-regulated learning (van den Boom et al., 2007). Electronic feedback as a form of written feedback on assignments was planned in this research study.

A further approach involving using a mentor was used by Freese (2006). She regards mentoring as critical in helping practitioners engage in the reflective process to develop the capacity to comprehend multiple perspectives. This conclusion is also echoed by the work of others (e.g., Moon, 2004; Valli, 1997). Freese (2006) used a range of strategies when mentoring a student teacher during his time studying a reflective action research paper, and did this as a means of developing reflection in herself and the student. The strategies included a dialogue journal log (where the researcher, a mentor teacher and the student reflected about the process and provided feedback to each other), observation notes, journal reflections, conversations, videotaped analyses of teaching, prompting questions, and individual assignments). Feedback was an important component of the mentor relationship and was provided to the student about his teaching, and also his reflections about practice. However, although the researcher used questions to “probe his thinking and his reasons behind his decision-making” and “to encourage him to think more broadly about the implications of his teaching and his students’ learning”, she was unable at first to get him to divulge his feelings about his teaching practice (Freese, 2006, p. 106). It was not until the student was able to ‘see’ other perspectives (after obtaining feedback from the researcher during a video taped observation session) that the student was able to “re-frame his thinking” and change his “rigidly held beliefs and assumptions”, and make changes to his practice (p. 109). The importance of acknowledging different viewpoints is illustrated by Freese (2006).

As teacher educators we need to explore our preservice teachers’ thinking and “give reason” to their actions, since the preservice teachers’ knowledge or

view of teaching may be quite different from the mentor's or supervisor's views of teaching and learning (p. 116).

She also states that an open attitude and taking responsibility for one's actions are vital dispositions for reflection and for the type of professional learning where discovery and inquiry is used (Freese, 2006). Further discussion about how to support the development of reflective dispositions follows.

2.4.3 Support to develop reflective dispositions

If practitioners are to improve their ability to reflect, support is considered necessary for practitioners to acquire the dispositions they need for engaging with the reflective process (Alger, 2006). A reflective disposition, in simplest terms, is the willingness to engage in reflection and learn from experiences. Early on, Dewey (1933) regarded attitudes such as wholeheartedness, open mindedness, and responsibility as important attributes for the reflective practitioner. Rodgers (2000a) has critiqued these concepts and refers to them as a "set of attitudes" necessary for reflection (p. 858). Wholeheartedness is regarded as the passion that teachers have about the subjects they teach, and is considered an important disposition for stimulating reflective thinking (Rodgers, 2000a). Open mindedness describes not only the willingness a practitioner has to consider others' perspectives, but also "acknowledgement of the limitations of one's own perspective" (p. 861). Rodgers (2000a) also refers to directness (previously introduced by Dewey and then dropped) as the practitioner's confidence and self-belief, and awareness of his or her performance. When combined, these three attributes are claimed to lead to responsibility, described as practitioners' awareness of their place in the world, and the impact of their actions on themselves and others. When all four attributes (wholeheartedness, open mindedness, responsibility and directness) are present, the practitioner is considered 'ready' to reflect (Rodgers, 2000a). These attributes are no longer commonly used to describe reflective dispositions. Other terms are generally used and these are described in the rest of this section (e.g., sharing

practice experiences, acknowledging and noticing feelings, and the ability to see multiple perspectives).

Already in this chapter, a number of characteristics associated with reflective practice have been highlighted. For example, the willingness of a practitioner to pay attention to experiences, to notice interactions in practice, to set goals, to revisit past experiences, to self-evaluate and self-regulate, to ‘stand back’ from experiences and look at others’ perspectives, to cope with uncertainty and problem solve, to change beliefs, assumptions and actions, and to engage in critical analysis of experiences with a view to changing practice (see Boud & Walker, 1990; Boud et al., 1985; Fisher, 2003; Hatton & Smith, 1995; Rodgers, 2002b; Tremmel, 1993; van den Boom et al., 2007). A predisposition to acknowledge feelings and be mindful of what has occurred in practice is known to influence reflection. There is compelling evidence to indicate that reflection is effective when feelings are acknowledged and analysed. For example, Boud (2001) supports this view: “Reflection following events has been discussed in the literature for many years, but it is important to emphasize that it is not simply a process of thinking, but a process that also involves feelings, emotions, and decision making” (p. 4). Emotion is regarded as pivotal in the reflective process for the amalgamation of the self with new knowledge and action (Brockbank & McGill, 2007). Also, it is unclear whether emotion in reflection relates to knowledge of how one feels, or the feeling itself, and different views are held (Moon, 2001). For example: “[they] all seem to fit experiences of reflection and there is no clear answer in the literature” (Moon, 2001, p. 4). Certainly, if a reflector has the ability to be mindful of what occurred in an event or incident, both aspects may be applicable.

Also, an aptitude for sharing practice experiences with others through dialogue, and being able to accept the feedback that is offered is another important disposition for reflective practice (Alger, 2006). It is evident in the literature that a willingness for social interaction with peers or mentors or teachers does have a role to play in reflective practice, because feedback from others, whether as part of a conversation, or as

feedback on reflective writing, encourages practitioners to develop a predisposition for critically evaluating their performance (Alger, 2006; Freese, 2006; Nsibande, 2007).

Both reflective dialogue and support in a social and collaborative setting were instrumental in Alger's research (2006), and assisted student teachers to develop the skills and dispositions they needed to be reflective practitioners. As a result of interactions with peers and mentors, student teachers were able to reach dialogic and critical levels of reflection, in both their reflective writing and in conversations with mentors (Alger, 2006). It became clear in this research that the development of dispositions for reflective practice required additional strategies to those commonly used for developing skills for reflection (Alger, 2006). Another important disposition, according to Alger (2006), is the ability to step back and look at the self before conducting an exploration of alternatives, and this is also regarded as a pre-requisite for dialogic reflection by Hatton and Smith (1995). Alger (2006) also adheres to Hatton and Smith's (1995) definition of critical reflection when describing a further characteristic of the reflective practitioner, that is, the ability to see multiple perspectives and acknowledge the influence of "socio-cultural and political realities" (Alger, 2006, p. 294).

So far, it is evident that dialogue and feedback are important strategies for developing practitioners' reflective dispositions. Overall, there is agreement in the literature that certain dispositions are necessary for successful reflective practice, and support to develop these is regarded as necessary. Even so, in terms of support for reflection in general, it appears there is a fine line between too much and too little scaffolding and facilitation. Too much structure in the form of frameworks and templates is claimed to inhibit the reflective process, and guidance through the use of feedback may be all that is needed to help learners to reflect (Bolton, 2001; Calderon & Buentello, 2006). It is regarded as more beneficial if practitioners are guided to formulate their own inquiry, rather following a rigid and structured approach (Bolton, 2001). The *through the looking-glass model* of reflective practice, recommended by Bolton (2001), encourages practitioners to examine the situations they experience (reflection), and to critique

themselves from different social, political and psychological standpoints (reflexive). The model involves “certain uncertainty” (acting when unsure how to act), “serious playfulness” (“looking for something when you don’t know what it is”), and “unquestioning questioning” (a process of continual questioning) (Bolton, 2001, p. 33). It is also clear that Bolton (2001) is an advocate of peer and group dialogue, and facilitated rather than guided reflection, and she believes that “writing [is] the vehicle for reflection” because practitioners tend to think as they write, rather than beforehand (p. 135). Similarly, Menary (2007) regards the act of writing as thinking. This view is similar to the idea that strategies such as recording what is noticed could promote learning through full engagement with the experience, as it helps practitioners to become more aware of their actions and the implications of their decisions (Boud & Walker, 1990). However, Boud and Walker (1990), in contrast to Bolton (2001), recommend the use of prompts to help students analyse incidents which are significant to them, and like Bolton they suggest a facilitator can help the learner to take more notice of an event or situation.

However, according to Hatton and Smith (1995), too little support may result in reflective writing which is mainly descriptive and falls short of dialectic or critical levels of reflection. As described earlier, recent work confirms the need for providing structure to initiate reflection and scaffold reflective practice. A combination of approaches is recommended:

- interactions which are social, collaborative, peer-driven or part of a mentoring or coaching relationship;
- structured reflective writing in the form of journals or portfolios or assignments; and
- frameworks or models and prompting questions.

It is also apparent through reviewing the literature that the facilitation of reflective writing relies not only on the development of particular skills, but as recognised by Moon (2004), on a “number of qualities” or dispositions associated with reflective learners and practitioners (p. 163). Other researchers have taken a similar stance,

claiming that reflective skills such as self-awareness (motivation, values, beliefs, strengths, limitations and open-ness), and the ability to express oneself descriptively, and engage in critical analysis of a situation are key to reflective practice (Jasper, 2004; Johns, 2005; Parsons & Stephenson, 2005; Rodgers, 2002a). Therefore, their work helps to consolidate the belief put forward by others (e.g., Boud & Walker, 1991; Hatton & Smith, 1995; Schon, 1987) that such skills are not always innate and need to be learned. Another aspect of reflection that is believed to require additional attention is support for the development of skills for critical reflection.

2.4.4 Supporting critical reflection

So far in this literature review, an argument has been established that support of various kinds is helpful in developing skills for reflection. Prompts and structured processes are regarded as essential to stimulate reflective practice and to assist practitioners to “learn from their experiences by constructing knowledge from them” (Zepke, 2003, p. 32). He differentiates between simple reflection and critical reflection by referring to them respectively as “inward-looking” or “outward-looking” (p. 32). Others describe a “process approach” whereby learners are encouraged to engage in designing critically reflective activities and assessments leading to transformation in their learning (Leach et al., 2003, p. 173). Overall, agreement about the challenges of getting practitioners to engage in critical reflection is evident, as are the benefits for practice if they do (see Fook & Gardner, 2006; Hatton & Smith, 1995).

One way in which critical reflection for reflective practice can be supported is to use critically reflective questions, particularly when the questions are set in the practitioner’s context and used in conjunction with writing journals (Fook & Gardner, 2007). However, “the danger of using a list of questions [can be] that they are seen as definitive rather than [stimulating thinking about the] possibilities” (Fook & Gardner, 2007, p. 178). A model of critical reflection was used where practitioners were “learning how to develop actions from awareness and to keep dynamically connecting them” (Fook & Gardner, 2007, p. 175). These researchers prefer to give practitioners

tools and a process so they can reflect in a way which is “emotionally and intellectually satisfying” because it helps them to examine their feelings and analyse their thoughts (Fook & Gardner, 2007, p. 15). However, they also believe that practitioners may need to take it further and relate their reflections to their practice context. Critical reflection, for the authors, is a way to help practitioners ‘shake up the assumptions’ which each individual carries, so their belief structures can be altered, and so develop “changed awareness” and change their practice (Fook & Gardner, 2007, p. 16).

Similarly, Fisher (2003) also regards the examination of “assumptions and beliefs” as an important component of critical reflection, and necessary to demystify the process of emancipation (p. 316). Fisher’s earlier PhD research in 2000 illustrates how challenging it is to develop criteria for assessing capacity for critical reflection. In an attempt to define critical reflection, she developed a framework to measure the capability of social sciences students for this type of reflection (Fisher, 2000). The framework which Fisher developed captured the views of a range of other researchers in the field of critical reflection (e.g., Barnett, 1997; Brockbank & McGill, 1998; Brookfield, 2000; Fook & Gardner, 2007; Mezirow, 1981). Fisher (2003) claims that “important indicators of a capacity for critical reflection in the social sciences include being able to:

- articulate a contextual awareness of one’s own position, through identifying the impact of one’s own influences and background;
 - identify one’s own values, beliefs and assumptions;
 - consider other perspectives or alternative ways of viewing the world, i.e. being able to identify what perspectives are missing from one’s own account;
 - identify how one’s own views can have a particular bias that privileges one view over another;
 - perceive contradictions and inconsistencies in one’s own story or account of events; and imagine other possibilities, i.e. a capacity to envision alternatives.
- (p. 317.)

In her research, Fisher (2003) discovered that the use of specific critical questions improved students' capacity to reflect critically. She also recommended that teachers modeled critical reflection as well as offering "clear guidelines" for the process and feedback for improving capability (Fisher, 2003, p. 324).

Certainly, analysis and critical reflection on a significant incident, in relation to broader societal contexts, is an approach often taught in the health professions (Schutz, Angove & Sharp, 2004). Practitioners are encouraged to view critical incidents as significant and meaningful events which can be positive as well as negative (Fook et al., 2006; Schutz et al., 2004). Therefore, practitioners in health environments are expected to engage in critical reflection within a professional context, and skills for this type of reflection are frequently taught during training (Schutz et al., 2004). Likewise, in teacher education critical reflection is encouraged, but is not easily achieved, and the need to facilitate and teach this type of reflection is acknowledged (Hatton & Smith, 1995; Kay & Jonson, 2002).

Even though reflection may be taught by using step-wise frameworks or models, the process of reflection is claimed to be holistic with the different dimensions of reflection "intertwined to compose a composite concept" (Kay & Johnson, 2002, p. 80). A typology with "three dimensions of reflective thought: descriptive, comparative, and critical" was designed for a programme of teacher education to "teach reflective practice to preservice teachers" (Kay & Johnson, 2002, p. 76). These researchers regarded critical reflection as a dimension where consideration of "the implications of the matter" led to alternative perspectives (Kay & Johnson, 2002, p. 77). The typology included guiding questions to encourage the three different dimensions of reflection, so the students could describe their feelings within the context of the situation, think about others' feelings and perspectives, and make sense of the situation in a broader educational setting. The researchers found that the framework provided the basis for "discussion and action", and resulted in "deep levels of reflection" (Kay & Johnson, 2002, p. 82). They claimed that critical reflection came naturally to the students when they were exposed to "opportunities for deconstructing a dilemma, feeling, or teaching

practice” (Kay & Johnson, 2002, p. 82). The typology was used during reflective discussions, and also to help the student teachers to prepare portfolios to articulate their reflective practice (Kay & Johnson, 2002). This research sets the scene for a discussion about the association that reflection is known to have with portfolio development.

2.4.5 Using portfolios to support reflection

Consensus exists in the literature for supporting reflective practice through the act of journaling or compiling a portfolio, because it is claimed that the processes involved in documentation and recording contribute to learning and reflection (e.g., Ellsworth, 2002; Falls, 2001; Loughran & Corrigan, 1995). Teaching portfolios were used by Loughran and Corrigan (1995) with preservice teachers to encourage them to reflect on their learning, to gain insights about teaching practice, and to reflect on and articulate what it means to be a science teacher. They believe that “In pre-service teacher education programs the teaching portfolio offers opportunities for student teachers’ experiences, thoughts, actions and subsequent learning about teaching to be documented” (p. 565), and “the portfolio as a process hinges on student teachers thinking about their teaching and learning” (p. 568). However, the researchers found that the student teachers needed more information about the purpose of the portfolio and more direction to help them reflect in writing on their learning, and to discuss their ideas and views about practice with others. The authors also report that the use of dialogue helped student teachers to make links with their practice. This research further illustrates the importance of using dialogue to enhance reflection and how the written reflective process can be extended during portfolio development.

Other researchers also found that the development and use of portfolios, in this case electronic ones, assisted teachers to look much more closely at their practice, and form better understandings about theirs and others’ learning (Woodward & Nanlohy, 2004). In other words, the process of critical inquiry is regarded as instrumental in enabling transformative learning and professional growth (Ellsworth, 2002; Santora & Morris, 2004). Certainly, portfolios can benefit individual teachers by fostering professional

development, and “skills such as independent learning, self-evaluation, reflective practice, organisation and metacognition” (Klenowski, 2000, p. 233). Klenowski (2000) recommends a framework be provided to assist student teachers to develop portfolios, with guidance incorporated for both the self-evaluation process and the preparation of reflective statements. In contrast, Woodward and Nanlohy (2002) claim that support occurs naturally without any specific framework in place. They regard the portfolio process itself as providing opportunities for teacher students to reflect about the artefacts they choose for their portfolios when they discuss them with their instructors and peers (Woodward & Nanlohy, 2002).


An intervention in the form of an ePortfolio template was used by Calderon and Buentello (2006) to show that students could be guided to focus and reflect on what they were learning rather than on the grades they wanted to achieve. The authors referred to the ePortfolio template as *reflection spaces*, and the intention of the spaces was to help students “build new knowledge and be receptive to the transcendence of this way of thinking” (Calderon & Buentello, 2006, p. 491). However, they found no evidence which suggested their students knew how to write reflectively when using the template. The ePortfolio project, described by Calderon and Buentello (2006), originated as part of the organisation’s mission to educate “upright and ethical persons with a humanistic vision” (p. 490). In three phases, an open source template was developed in collaboration with staff and students using a social constructivist model of learning so that students could be assisted to develop their full potential. The approach for the ePortfolio was grounded in reflection to assist students in three areas: 1. personal - values, feelings, and attitudes; 2. academic - life plan and goals for their study; and 3. future careers - how students constructed competencies. As a result of the ePortfolio project, Calderon and Buentello (2006) observed that the process of developing an ePortfolio helped students to set goals, and to achieve them in an organised manner. The portfolio also enabled students to “recognise their deficiencies in the future”, and to prepare a professional profile for prospective employers (Calderon & Buentello, 2006, p. 494). Just as the manner in which a portfolio is constructed of importance, so is the development of the personal side of practice, and the articulation of professional

learning. Apparent from the literature reviewed so far, reflection is clearly an important component of professional learning. Professional learning when integrated with reflection provides not only access to new information and the acquisition of new knowledge and skills to enhance practice, but also new insights and acknowledgement of “professional goals” (Kwakman, 2003, p. 152). Professional learning as such is closely connected to reflective practice.

2.5 Professional learning

There is no doubt that reflection is an important learning strategy in the professions, and is a view is endorsed by the work of many researchers. As well as the concept of reflective learning, another term in common use is ‘professional learning’. Professional learning, in this study, involves learning relevant to practice where the achievement of professional goals is linked to the development of new knowledge, understanding, skills and insights (based on research by Kwakman, 2003; Parsons & Stephenson, 2005). However, reflection can be just one of many activities in which practitioners engage to develop professionally. In this research study, participants were engaged in studying for a formal qualification in education as part of their professional development. The subject they studied while participating in the research was closely linked to their activities and experience in the workplace. According to the research underpinning the concept of professional learning in this study (Kwakman, 2003; Parsons & Stephenson, 2005), the participants were engaged in professional learning while studying the multimedia design subject because they were gaining new knowledge and understanding, skills and insights about topics relevant to their professional work. Also, the manner in which professional learning manifested as a result of their formal study, and was linked to reflective practice, was investigated. Professional learning which included reflection and the effect of scaffolding this learning was of interest to the researcher.

Components of professional learning were highlighted in the research carried out by Kwakman (2003) when investigating the activities of 16 secondary school teachers who were learning ‘on the job’. She found that teachers mostly engaged in activities such as:

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“professional reading, sharing ideas with colleagues or improving lessons”, and that individual reflection and reflection in action were the most frequent forms of reflection (Kwakman, 2003, p. 166). Even so, the teachers did not respond to “explicit feedback from colleagues or students” as a result of their reflections, indicating that they probably did not reflect to the degree required to change practice (Kwakman, 2003, p. 167).

A definition of professional learning emerged from Kwakman’s (2003). For example:

Learning at the workplace is conceptualized as participation in professional learning activities, which can be divided into individual activities addressing the categories of reading, experimenting, and reflecting and into collaborative activities taking place within the school (p. 153).


Conversely, in the research carried out by Parsons and Stephenson (2005) the focus was on the effect that reflective professional development activities had on 22 primary school student teachers’ reflective practice. In this case, the emphasis was on assisting the students to gain insights into their professional learning through their reflective interactions with a critical partner. The researchers examined how skills in learning to reflect about practice developed when they were scaffolded by teachers and the critical partner. To promote this, they devised a “framework of weekly tasks” that relied on dialogue between each student teacher and their critical partner. This approach was intended to provide focus and to encourage learning about experiences from practice (Parsons & Stephenson, 2005, p. 104). Deeper thinking about practice was facilitated as a result, and the students also felt that they gained a “deeper understanding of their own professional development” (Parsons & Stephenson, 2005, p. 110).

Professional learning, from another perspective, is described as an interconnected system incorporating practice, new knowledge, social interaction and participation in activities within real life contexts related to practice (Hoban, 2002). Such a system, according to Hoban (2002), is stimulated and driven by a multitude of complex processes and leads to reflection on practice. However, he states professional learning is unlikely to occur unless teachers perceive the need to change (Hoban, 2002).

Similarly, the definition of professional learning in this study connects learning to professional practice and recognises that new knowledge is gained. One of the processes within Hoban's conception of a professional learning system involves the development of a structure to support professionals to examine their practice. The structure develops through sharing practice experiences with peers and facilitators or mentors who provide feedback within a safe environment (Hoban, 2002). Therefore, in Hoban's (2002) model of professional learning, reflection about practice is facilitated through the use of dialogue, as it was in the approach used by Parsons and Stephenson (2005).

The achievement of new insights is strongly connected to reflection and professional learning in a number of ways. For example: through the emotional reconstruction of experiences; through reflective learning and developing awareness of professional goals; through the reflective process itself, and as part of dialogic reflection where alternative views are considered (Boud, 2001; Hatton & Smith, 1995; Kwakman, 2003). However, the activities which teachers favour for professional learning do not always include reflection, and other means of professional development are often favoured (Kwakman, 2003). Therefore, support and encouragement to use reflection for learning is necessary if professional learning is to turn into reflective practice.

2.6 Reflective practice

Expertise for practice is considered to encompass the whole person and develop regardless of the situation (Dreyfus & Dreyfus, 2005). Therefore, when evolving from a novice to an expert, a practitioner is considered to naturally develop dispositions and increasingly acquire skills which can be transferred (Dreyfus & Dreyfus, 2005). This process enables the expert to examine experiences from different perspectives, and within a range of contexts using "deliberative rationality" also "reasoned observation of one's intuitive, practice-based behaviour" (Dreyfus & Dreyfus, 2005, p. 789). This view contradicts the evidence considered previously in this chapter about the need to support and facilitate the development of skills and dispositions for reflection. Although, it does confirm the view held by Hatton and Smith (1995), and Sparks-Bronwyn Hegarty 

Langer et al. (1990) that advanced levels of reflection are more likely to be demonstrated by experienced practitioners. They also advocate the use of frameworks to support the development of reflection, and others consider it necessary to provide strategies, particularly if spontaneous reflection during practice is the desired end point (e.g., Clouder, 2000; Donaghy & Morss, 2000).

Several perspectives were considered when developing a definition of reflective practice for this study. For example, the process referred to by Schon (1983) as “a reflective conversation with the situation” (p. 295) was regarded as a necessary aspect of reflective practice in this study. Also, the stance taken by Hatton and Smith (1995) was considered. They refer to reflective action as a keystone to “persistent and careful consideration of practice in the light of knowledge and beliefs” (Hatton & Smith, 1995, p. 34). Also, they view reflection-in-action as the ‘high point’ of reflecting upon practice, and a time when multiple perspectives are examined (Hatton & Smith, 1995). Metacognition and its link to reflective practice were also explored. For example, Parsons and Stephenson (2005) consider that metacognition is “an important element of reflection” and it has influenced their definition of reflection (p. 97). They believe that awareness of and the ability to monitor how learning develops and can be applied to practice is “a feature of the reflective practitioner” (p. 97). Others claim that practitioners with awareness of their learning who are able to monitor their progress are more likely to critique their performance and achieve their goals (Biggs, 1988; Livingston, 1997). For this aspect of metacognition, the reflective component of professional learning is considered essential (Kwakman, 2003). As such, the link between practice and professional learning is associated with the need for teachers to “strive for continuous improvement”, if they are to achieve their “professional goals” (Kwakman, 2003, p. 152). However, reflection is not always a priority, and non-reflective activities may take precedence when striving to achieve targets for professional development (Kwakman, 2003).

Even though reflection is considered to be the “cornerstone of professional development” if professionals are to change their practice, those who engage in

reflection do not necessarily demonstrate reflective practice (meaning the ability to make changes to their practice as a result of reflection) (Kwakman, 2003, p. 153). Change depends on whether practitioners are able to self-evaluate and reconstruct their beliefs, in response to the practical problems which arise (Parsons & Stephenson, 2005). The definition of reflective practice held by Clouder (2000) also acknowledges the importance of professional development. For example:

... reflective practice involves the critical analysis of everyday working practices in order to improve competence and promote professional development (Clouder, 2000, p. 211).

This definition is reliant on faulty practice, for example, when a practitioner makes decisions that are based on “faulty assumptions” (Clouder, 2000, p. 211). In this study with physiotherapy practitioners (clinicians), managers and students, the perceptions of the participants and their use of reflection was investigated using conversations held via interviews and workshop sessions. The views about reflective practice were different for each group. The clinicians believed that they ‘thought on their feet’ naturally and continually while making decisions in practice, and reflected on their practice during conversations with colleagues. Their view was that reflection was time consuming, and sometimes a problem. Note taking about practice was sometimes used as a reflective process but practitioners tended not to maintain a journal or portfolio. In contrast, the students were given structured activities such as engaging in reflective writing in a journal, and preparing case studies in a portfolio. For this group, reflection on practice was the main approach used. The group of managers did not prioritise professional development to encourage reflective practice since for them the demonstration of standardised competencies and the achievement of outcomes were more important. They also considered the development of critical reflection in junior physiotherapists to be unnecessary. Even though, they favoured the use of portfolios for keeping a record of professional development, this was not regarded as a reflective tool. Clouder (2000) recognises as an outcome of this research that reflective practice is not a ‘one size fits all’ approach for improving professional practice because certainty about how reflection

impacts on practice is still unproven. She regards the connections between reflection and professional proficiency as unsubstantiated (Clouder, 2000).

Reflective practice also depends on the circumstances which stimulate reflection, and the context in which practitioners are situated (Boyd & Fales, 1983; Valli, 1997). For example, supporters of Schon's (1983, 1987) model of reflective practice regard spontaneous and critical analysis during the action of practice as the benchmark of reflective practice, and view the dissection of an experience as a more passive form of reflection (Clouder, 2000). Similarly, Hatton and Smith (1995) also aspire to the concept of reflection-in-action, and regard it as "the most demanding type of reflecting upon one's own practice" (p. 46). The stance taken by Clouder (2000) highlights that reflective practice is the "critical analysis of everyday working practices", and likely to lead to improved competence and engagement in professional development; thus addressing practice built on flawed beliefs and perceptions (p. 211).

Reflective practice, in this study, is defined as a process associated with professional learning, which includes effective reflection and the development of metacognition, and leads to decisions for action, learning, achievement of goals and changes to immediate and future practice (based on Hatton & Smith, 1995; Parsons & Stephenson, 2005). Reflection is regarded as effective, in this study, when it is deliberate and involves mindful thinking about one's experiences and the self-evaluation of feelings, decisions, understandings and actions, which may lead to development of professional learning for professional practice (based on Boud & Walker, 1990; Boud et al., 1985; Rodgers, 2002b; Tremmel, 1993). Also, analysis of the experience is an important component. However, 'critical analysis' is not differentiated from basic analysis or self-evaluation, and as such was not explored in this study. As mentioned previously, the definition for reflective practice is based on an examination of the meaning of reflection, reflective processes for learning and the outcomes for practice.

To complete the review about reflective practice, it is necessary to explore the benefits of using portfolios for stimulating and supporting reflective practice as they are much discussed in the literature. Some of this work is outlined in the next section.

2.6.1 Professional practice portfolios

Historically, the use of professional portfolios for reflective practice has been the domain of both education (teachers - pre-service and in-service) and health disciplines (e.g., nursing, social work and medicine) (Fook et al., 2006; Moon, 2004; Pee, Woodman, Fry & Davenport, 2002; Wong, Kember, Chung, & Yan, 1995). Other disciplines, for example, management and human resources, marketing and business and dental therapy have taken up the tradition more recently (Fook et al., 2006; Kardos et al., 2007; Peltier et al., 2005). Practitioners in all these disciplines are often required to maintain a portfolio for their professional body, and are often introduced to both the portfolio concept and reflective learning strategies during their training (Allan et al., 2003). According to Kilbane and Milman (2003), the construction of teaching portfolios has been “increasing in popularity since the early 1990s” (p. 7), not only as a requirement of professional bodies, but also because practitioners have recognised the personal as well as the professional benefits of the process. Several researchers have recognised and written about the benefits of using teaching portfolios in pre-service teacher education (e.g., Allan et al., 2003; Kilbane & Milman, 2003; Loughran & Corrigan, 1995; Mansvelder-Longayroux et al., 2007; Walker, 1985).

The use of portfolios is supported in principle because they give teachers the opportunity to document their “experiences, thoughts, actions and ... learning...” (Kilbane & Milman, 2003, p. 565). The portfolio process is known to assist teachers to reflect on their practice, and demonstrate their professional learning (Loughran & Corrigan, 1995; Mansvelder-Longayroux et al., 2007). Portfolios may be used to prepare evidence of professional skills, work history, assessments, scholarly initiatives, professional development, journals and much more (Barrett & Wilkerson, 2004; Falls, 2001; Mansvelder-Longayroux et al., 2007). When portfolios are required by a statutory body as evidence of ongoing professional development and currency, they generally represent a longitudinal collection of activity (Schutz et al., 2004). However, there are tensions between portfolios which are created for licensure, and those developed to demonstrate personal growth and reflective practice (Barrett & Wilkerson,

2004). The scope of each is different, with one demonstrating standards-based competencies, and the other capable of showcasing exemplary and imaginative practitioner capacity. However, according to Barrett and Wilkerson (2004), in the case of ePortfolios, if the portfolio purpose is confused practitioners might not produce the results intended, and therefore, they advocate for “matching the philosophical orientation with ePortfolio tools [to] reduce the cognitive dissonance and conflicting goals between learners' needs and institutional requirements. They claim “the result should be support for deep, sustainable, self-directed, [and] lifelong learning” (Barrett & Wilkerson, 2004, p. 12).

One of the main reasons for implementing portfolios appears to be the increased capacity for reflection, which practitioners demonstrate when they engage in the process of developing a portfolio (Doig et al., 2006; Loughran & Corrigan, 1995; Mansvelder-Longayroux et al., 2007). Reflection, known as “the mental process”, is believed to be stimulated during the development of a portfolio because experiences have to be analysed and interpreted in order to create the portfolio (Mansvelder-Longayroux et al., 2007, p. 49). Also, “the portfolio help[s] [practitioners] learn about [themselves]” (Walker, 1985, p. 60). In other words, professional learning is an outcome of portfolio development (and the format - digital or paper - does not appear to be a factor) (Allan et al., 2003; Doig et al., 2006; Falls, 2001; Kilbane & Milman, 2003; Loughran & Corrigan, 1995). Although, the format of a portfolio is less important than the opportunity for professional learning which is provided, the use of digital teaching portfolios has increased functionality. This is because a wider range of material, such as multimedia can be included, and the finished product is more accessible to a wider audience, making it possible for practitioners to engage in professional debate (Kilbane & Milman, 2003). However, there are claims that mandatory requirements, and the use of organisational control over the portfolio development process, may deter learners from taking ownership of the content, purpose and process of their portfolios, and this may cause them to lose motivation (Barrett & Wilkerson, 2004). Also, there is evidence that it is important to ensure learner-centric approaches are used in the development of

electronic portfolios, and the purpose is understood by the users so they can collate and prepare relevant material (Barrett & Wilkerson, 2004).

In support of the notion that portfolios are a stimulus for reflection, following a review of the use of portfolios in student teacher classrooms, Falls (2001) also concluded that regardless of the format of a portfolio and the type and purpose, reflection is an activity which occurs throughout the development of a portfolio. Although, portfolios encourage reflective and collaborative processes for learning, they can be problematic if technology is used due to factors such as time constraints, curriculum requirements, and lack of technical support (Falls, 2001). The use of electronic portfolios was also found by Allen et al. (2003) to not only help students to reflect but also assisted them to organise evidence suitable for showing to prospective employers. The target group involved students in two life science undergraduate programs as opposed to student teachers. They found that ePortfolios can be used to promote effective strategies for enhancing learning, as an assessment strategy, and as a way for students to demonstrate evidence of competency for a professional body (Allan et al., 2003). Although researchers such as Allan et al. (2003) and Falls (2001) promote electronic portfolios as effective learning tools, the emphasis is on the structure and development of the portfolios, not on the processes of reflection.

Another endeavor, involving the construction of ePortfolios, has demonstrated positive outcomes for using portfolios to support reflective practice (Kardos et al., 2007). Dental health students and lecturers were involved in designing a template which was used both for storing artefacts of evidence for professional practice, and for encouraging reflection. The researchers' aim for the project was to integrate the ePortfolio concept into the curriculum to promote reflective thinking. Initial results indicated that students were not in favour of, or skilled in either reflective writing, or in the use of digital tools for creating evidence for the portfolio (Kardos et al., 2007). However, the researchers believe that use of such an ePortfolio system would be beneficial in the long term for professionals and their reflective practice because it provides a way to showcase professional evidence over time (Kardos et al., 2007).

Although, variation is present in approaches to portfolio development, common ground has been reached regarding the benefits for reflective practice. The use of journals or blogs for reflective writing, and the influence of peer or mentor conversations on reflective dialogue, is also well documented, and reflective journals where dialogue or feedback is used have regularly been reported as a learning strategy in the professions (Bain et al., 2002; Baker, 1996; Moon, 1999, 2006). Generally, preparation of the reflective component is only one aspect of portfolio development with the focus is on the selection of material for inclusion, the design and layout of the artefacts, and presentation of the finished product (Barrett & Wilkerson, 2004; Falls, 2001). Much energy has been spent in recent years trying to find the ideal platform to serve as a portfolio space for users, and many different kinds of project exist in an effort to find optimal solutions (Batson, 2006; Emmett, Harper & Hauville, 2005; Kardos et al., 2007). Increasing interest in the use of portfolios for professional development and the containment of reflective evidence is now recognised as an important component of reflective practice. For example, Ellsworth (2002) witnessed “professional growth in four areas” when student teachers used portfolios for “reflective practice and critical inquiry” (p. 347). The student teachers gained knowledge about how to use portfolios effectively, their understanding of students improved, they changed their “instructional practice” through informed choice, and realised the kind of “professional support” which was necessary if the process was to succeed (Ellsworth, 2002, p.347).

As with any portfolio, digital or otherwise, scaffolding and feedback is acknowledged as essential if students are to develop the reflective learning skills they need to transfer knowledge into different contexts (Doig et al., 2002). However, the added challenges of learning new technology for the construction of ePortfolios sometimes becomes a higher priority than preparing adequate reflective evidence, and therefore, it is important to keep the two activities separate (Doig et al., 2002). Hence, it is essential that practitioners are able to record their thoughts and experiences associated with an event or incident as easily as possible, without being hampered by complex technologies. One reason for recording reflections is to afford permanence to the experience, to secure an opportunity for reflection later on, and to aid learning (Boud & Walker, 1991;

Walker, 1985). In this research, the emphasis has been on the facilitation of reflective writing for the specific purpose of inclusion in an electronic portfolio of work, and this was assessed.

In the following section, a number of areas are identified where further research is needed to investigate various areas of reflection, reflective writing, professional learning and reflective practice.

2.7 Gaps in the literature

From the review it is apparent that this research study may address a number of gaps found in the literature. These relate to reflection, reflective writing, professional learning and reflective practice, including the support needed to develop reflective dispositions and skills for reflection and reflective writing.

This research study contributes to the expanding body of knowledge about reflective learning and professional learning, and also the type of learning required for reflective practice, and the means of supporting this. Definitions of reflection, professional learning and reflective practice were developed specifically for this study because existing definitions were often lacking components regarded as important by the researcher. For example, definitions of reflection do not generally emphasize the act of noticing or being mindful when reflecting about practice, and attention to feelings is not always advocated. These dimensions of reflection are considered essential by the researcher if practitioners are to engage meaningfully with their experiences and learn from them.

It is also challenging to find research where the effectiveness of reflection is clearly defined, and this is considered necessary if reflective practice is to be more fully understood. Also, it is very difficult to extricate a definition of reflective practice from the volume of definitions and discussion about reflection in others' research. Additionally, the researcher feels that the links between reflection and learning for professional practice are not always clearly explained or obvious (e.g. Clouder, 2000).

The outcomes of engaging in a reflective process that leads not only to learning but also changed practice, both immediate and in the future, is also of interest as researchers tend not to report how the methods they use to facilitate reflection can impact on future practice. Therefore, in this study the researcher intends to address these aspects.

The researcher is also very interested in how facilitation of the reflective process, manifesting as reflective writing, can influence the deepening of reflection. However, the research is not conclusive about the type of support required including the design of frameworks that are adequate for an educational setting. Frameworks in use for prompting reflective writing tend to be used mainly to assess the outcomes of reflection (Moon, 2007). Therefore, further evidence is needed to measure the effects of using a framework to influence not only the actual process of reflection, but also reflective learning and action for practice. Frameworks tend to be discipline-specific, and are often complex. For example, there is a broad choice available to nursing practitioners and nursing students engaged in training programmes (Bulman, 2004b). Therefore, confirmation that reflection and reflective writing, that is assessed, can be encouraged in an educational discipline by using a step-wise and simple to use framework and template with prompts (the Three-Step Reflective Framework) is needed.

The type of support required for enhancing the reflective process is not always clear, and the strategies reported as useful for supporting reflection are diverse. Since evidence about the effect of using a framework and written feedback on individual reflective ability is not conclusive, this is an area that can be addressed by this research. The actual outcomes of using a framework on the level of reflection in practitioners' writing can provide evidence about the nature of reflection, and broaden the definitions of reflection, professional learning and reflective practice. There is debate about whether the process of reflective writing requires support in the form of a structured framework or other forms of guidance such as dialogue, with or without a framework, and written or verbal feedback and this needs clarification.

Conflicting views exist about critical reflection, for example, the importance for this type of reflection for changing practice, and therefore the connection to reflective

practice. Also support for critical reflection through, for example, the use of critically reflective prompts to stimulate this level of reflection is unclear, and clarification is needed.

It is also not conclusive how the context in which a practitioner reflects can influence the stages of writing about practice, and the impact on reflective practice. For example, if practitioners learn the skills of reflection and reflective writing during a course of study, the effects of this learning do not necessarily transfer to the workplace. Finding a use for a framework that encourages practitioners to continue to reflect as part of reflective practice when outside an academic context is worthy of attention. Perhaps, if practitioners are required to record their experiences using description and reflective writing about what happened when involved in academic study, and are taught the skills they need to reflect on the experience at a deep level and how to consider the wider context of their profession, this may lead to more effective professional practice. Therefore, the impact of using a reflective framework for professional learning and reflective practice is an area requiring further research.

Additionally, the influence of structured frameworks tends to be on the development of skills for reflection rather than on the investigation of their effect on the development of reflective dispositions. The connection between supporting the development of reflective dispositions and developing skills for reflective writing is not particularly clear in the literature. Therefore, more research is needed in this area. Additionally, the research associated with self-questioning, regarded as a reflective disposition as well as a reflective strategy, is relatively early stage. Hence, this is another area requiring further investigation. Finally, research studies examining the use of frameworks to support the development of reflective evidence for ePortfolios were relatively inconclusive at the time this research was conducted. The outcomes of the research are also expected to contribute generally to the body of knowledge relating to reflection, professional learning and reflective practice.

2.8 Summary

The areas critiqued in this chapter are described briefly in this section. Reflection and the processes and outcomes associated with it have been investigated by a number of researchers over many years. The definitions of reflection explored in this review of the literature are underpinned by the work of Dewey (1933) and van Manen (1977) about reflective thinking. Clearly, in the literature is acceptance that reflection is more than just thinking, and is regarded as a specific process of thinking used by practitioners to make sense of their experiences. Theorists discussed in this review regard reflection as a prolonged process during which practitioners deconstruct and reconstruct experiences or events (e.g., Boud et al., 1985; Hatton & Smith, 1995; Valli, 1997). The work of Schon (1983, 1987) is acknowledged as important for informing reflection on and in the midst of practice. For this research study, specific attention has been accorded to the types of reflection which are associated with reflection-on-action, for example, descriptive reflection, dialogic reflection and critical reflection, and is based on the work by Hatton and Smith (1995).

It is evident that the type of reflection engaged in by practitioners is generally dependent on, not only how the practitioner is situated at the time and the environment in which they are operating, but also on their skills and dispositions. For example, if they are reflecting whilst in the midst of practice (in-action), higher order reflective skills and specific dispositions are operating for reflection to be instantaneous (Clouder, 2000; Hatton & Smith, 1995; Rodgers, 2000a). In contrast, reflection on an experience after an event has occurred (on-action) is a different process, and may more commonly begin with lower level skills and possibly less reflective dispositions, and may not advance unless supported by expert practitioners (Hatton & Smith, 1995).

On one side of the debate, reflection-in-action is the ‘holy grail’ of reflection (Clouder, 2002; Hatton & Smith, 1995; Schon, 1987), and critical reflection is regarded as something to strive towards for meaningful reflection on practice (Fook et al., 2006; Hatton & Smith, 1995). However, according to Valli (1997) both reflection in-action and on-action are intuitive, and related to the practitioner’s ability to personalise

practice experiences. There is agreement in the research that technical forms of reflection about skill-based behaviours are linked to rule-governed criteria and behaviours, and are more likely to be adopted by novice practitioners who are inexperienced in reflection (Habermas, 1987; Hatton & Smith, 1995; Valli, 1997; van Manen, 1977). In comparison, practitioners who are able to critique their practice, and provide reasons for their decisions and actions, taking in a range of perspectives and evidence, are likely to be more experienced, both in a practice sense and with regard to reflection, because they can engage in metacognition and critical thinking (Hatton & Smith, 1995).

Several models, theories and definitions of reflection which focus on the reflective process and describe the levels and nature of reflection are presented (e.g., Boud & Walker, 1990; Boud et al., 1985; Dewey, 1933; Hatton & Smith, 1995; McCollum, 2002; Rodgers, 2000b; Sparks-Langer et al., 1990; Tremmel, 1993; Valli, 1997; van Manen, 1977; Ward & Cotter, 2004). All these models have informed the theoretical framework for this research study. Inherent in these models and theories, and definitions of reflection is the expectation that practitioners who move through the reflective process can gain new insights and change their practice in some way. Others, such as Moon (1999, 2001), and Brockbank and McGill (2007), place more emphasis on the outputs of reflection, for example, learning, and also the concept of reflective learning for transforming practice (Brockbank & McGill, 2007; Leach et al., 2003). There is a growing body of knowledge about reflective learning, and consensus that reflection is essential because it leads to the type of learning required for reflective practice. Consequently, the definition of reflection referred to in this study incorporates learning. The researcher acknowledges the complexity of the concepts associated with reflection and the variety of definitions and interpretations of reflection and reflective practice. One finite definition is not offered.

Also, consensus exists to support the view that the quality of reflection is influenced by the context in which reflection takes place, and that scaffolding and support is essential for effective reflection as it leads to learning about practice (e.g., Bean & Stevens, 2002;

Chirema, 2007; Hatton & Smith, 1995; Tsangaridou & O'Sullivan, 1994; Valli, 1997; van Manen, 1977). The use of reflective writing as a method for recording reflection is claimed to be commonly used in academic settings, with the quality dependent not only on the skills of the students, but also on the expectations of the instructors. A range of strategies are discussed for supporting and improving reflection – scaffolding, strategies to facilitate reflection, for example, guiding questions, frameworks, self-questioning, dialogue and feedback, and the preparation of professional portfolios. A technique increasingly being used by researchers to assist practitioners to reflect on their practice is self-questioning, and evidence about the success of this approach is gradually emerging (e.g., Borrell-Carrió & Epstein, 2004; Donaghy & Morss, 2007; Lemon, 2007; Samuels & Betts, 2007). However, more research is needed in this area. Some support strategies include the use of dialogue and social interaction between peers and mentors. Some evidence is presented to illustrate that the development of a professional portfolio can influence the reflective process and support reflective practice (e.g., Allan et al., 2003; Falls, 2001; Mansvelder-Longayroux et al., 2007; Walker, 1985; Wright et al., 2002). It is widely claimed that scaffolding is required to develop skills for reflective writing at a higher level of reflection, for example, dialogic and critical (Bean & Stevens, 2002; Donaghy & Morss, 2000; Hatton & Smith, 1995; Korthagen, 1985; Sparks-Langer et al., 1990). Also, reflective dispositions (e.g., self-managing learning, open mindedness, 'stepping back', critiquing self, accepting peer feedback, and acknowledging feelings) have also been found by several researchers to influence the process of reflection (e.g., Alger, 2006; Freese, 2006; Macdonald & Hills, 2005; McDrury & Alterio, 2002; Nsibande, 2007; Ottesen, 2007; Rodgers, 2000a; Valli, 1997). Therefore, all this was considered when choosing an approach to nurture reflection and reflective writing in this research along with considering the meaning of reflective practice.

Reflective practice, according to the literature reviewed, requires specific skills and dispositions for engaging in reflective processes which lead to changes in practice. However, there is debate by supporters of Schon regarding the dismantling and reconstruction of experiences, and whether this process is a passive form of reflection in

comparison to more spontaneous and critical reflection which takes place during the 'action of practice' (Clouder, 2000). Therefore, engagement in reflective practice is considered dependent on factors such as the stimuli for reflection, and the context in which practitioners are situated as well as skills and dispositions for reflection, and expert scaffolding of the process (Boyd & Fayles, 1983; Hatton & Smith, 1995; Valli, 1997).

The framework used in this research study was expected to scaffold the process of reflection and reflective writing by providing structure and guidance through reflective processes such as noticing, describing the experience, interpreting or analysing the experience, examining other perspectives, and learning from the experience in order to act or make changes to practice. The researcher anticipated that by using the Reflective Framework during their academic study (whilst participating in the research) the participants would be scaffolded to engage in reflection on practice and reflection for practice, thus developing their reflective skills. Prompting questions in the framework acknowledged the support that practitioners may need to use self-questioning an ability claimed to be associated with reflective practice. The design of the framework was also expected to encourage and support links between reflection, learning and professional practice, concepts that are connected to reflective practice.

3 CHAPTER THREE: METHODOLOGY

3.1 Introduction

In this chapter, details of the research approaches undertaken are presented. A preliminary study was conducted initially to investigate the effects of a range of reflective strategies used by professionals, when developing electronic portfolios for practice. The outcomes of this preliminary study were used to define the research questions for the main study. The effects of an intervention (the Three-Step Reflective Framework) for structuring reflective writing provided the focus for the research in the main study. Participants in the study were postgraduate students from a variety of professional areas in education. The framework provided structure for them when reflecting on and writing about their practice during an educational subject that they were studying for professional development. The reflective writing was prepared and assessed as part of an electronic design portfolio.

3.2 Research Design

A case study approach, using qualitative methods, and the implementation of an intervention, was chosen to investigate and interpret the actions of participants in a *naturalistic setting* (Mertens, 1998; Yin, 2003). This research investigated the actions of participants engaged in a course of study, rather than during actual professional practice. Despite this, the practical work that the participants reflected on in the subject was closely connected to their practice in the workplace, and as such their experiences were professionally relevant. The research questions for the main research were developed as a result of recommendations from the preliminary study (located in Section 3.3.1). Integration of the research approach with assessment processes, within a specific subject of study, provided fitting conditions for exploration of the research questions within a realistic learning environment (according to Mertens, 1998). A “real-life” approach is claimed to instill credibility to the process under study, and is endorsed by Yin (2003, p. 15). The research questions in the main study are:

1. How do educational practitioners reflect when writing about their experiences?
2. What do educational practitioners focus on when writing reflectively about their learning and practice?
3. How does scaffolding support reflection on professional learning and practice?

The Three-Step Reflective Framework includes a diagram illustrating the steps, and an accompanying template for writing, which the subject lecturer suggested participants use to structure their reflective writing. This intervention, along with feedback from the subject lecturer, was used to scaffold reflective writing, which was assessed. As such, the intervention was used as a strategy within a programme of study where reflective practice was endorsed. Therefore, the intervention designed for use in the research study was expected to influence the manner in which participants reflected and wrote about their experiences. Primarily, the intervention was designed to help answer the research questions which were guiding the inquiry. A full description of the design of the Reflective Framework, and its intended use, can be found in Section 3.4.1.

Case study research is commonly used for qualitative inquiry, according to Stake (2003). Case study as a qualitative research approach is also recognised by several other authors (e.g., Cresswell, 2007; Gall, Borg & Gall, 1996; Gillham, 2000; Merriam, 1998; Mertens, 1998; Yin 2003), but they have differing opinions about its definition. Yin's (2003) case study method is in contrast to the more commonly accepted approach of using case study research to study an existing phenomenon, contained within a specific system (the case). Furthermore, Yin (2003) regards case study research as a process, claiming it can be used, if looking for answers to how and why questions, during an investigation of situations outside the influence of the researcher, or from a real-life perspective. Case study research can be applied in five ways, according to Yin (2003), which changes the reliance many researchers have on case study as an investigation of a phenomenon, over which they have no control. For example:

1. explanation of the “causal links in real-life interventions”;

2. description of an intervention, and the “real-life context” where it is used;
3. description used to illustrate specific issues under investigation;
4. exploration of the circumstances surrounding an intervention with unknown consequences; and
5. meta-evaluation where a research study is evaluated (Yin, 2003, p. 15).

This research study fits the second method described by Yin (2003). When an intervention is used in a realistic context, variation in the intended outcomes of the research is expected, whether evidence is sought to support a hypothesis, or used to make generalizations as part of developing a case (Yin, 2003). In contrast, Gall et al. (1996) describe case study as a methodology where the researcher plans to shed light on a phenomenon, and has a case for intensive study. As well as the differences associated with whether a phenomenon is under study or whether an intervention is used, researchers also differ in their views of whether a case study approach is a method or a research design. For example, Cresswell (2007) refers to case study as a method which facilitates the “study of an issue” (p. 73), through the exploration of a case or cases, within what is described by Stake (2003) as a particular context (a *bounded system*). As such, Stake (2003) prefers to categorise case study research by the object under study (a case within a bounded system), rather than basing it on the specific strategies used to collect data, the interventions in use, or by the research design. Stake (2003) also believes that the determining features of a case, that is, the uniqueness, specificity, and parameters surrounding the object under study, help the researcher to assess whether it is sufficiently contained to fit the requirements of a case study (i.e., whether it is a bounded system). Merriam (1998) also views case study research as the end point, the case, rather than the methodologies used to obtain information about a particular phenomenon. In contrast, Mertens (1998) regards the case study as one of many strategies used to gather data within a qualitative research design, rather than an actual research construct.

In this case study research, the intention was to present evidence of a single case, in response to the research questions, without the need to make ‘a priori generalizations’.

The intervention (Three-Step Reflective Framework), designed by the researcher, was used to learn about the real-life context associated with the case. The context (described in Section 3.4), comprised two types of participants in a Master's of Education programme of study - seven professionals studying one subject in this programme, and the subject lecturer. The seven postgraduate education students who participated were enrolled in a subject when the research was carried out, and Penny, their subject lecturer, taught them over one semester. This containment of the research participants, within a specific and unique group with clear parameters, ensured both a bounded system (Stake, 2003), and also what is defined by Mertens (1998) as a "unit of analysis" (p. 167). Whereas, this group of participants would be regarded as a case by Mertens (1998), and by Stake (2003), in this study, it was not the so-called bounded system, but the outcomes of the intervention which provided the right conditions for developing a case (Yin, 2003). For the purposes of this research, the outcomes of the process where the intervention was used have formed the case.

3.2.1 Summary

Overall, there is agreement among several researchers, regarding the benefits of using a case study approach, as part of qualitative research to investigate complex situations where there is a specific target under study. The benefits of using a case study approach in this research are multifaceted. Different types of qualitative data could be collected using a process of triangulation, and a flexible design was permitted. The design allowed the way in which data was collected, to change and evolve with the findings as the study progressed. For example, the patterns which emerged in participants' reflective writing determined the development of several coding systems to analyse the data. This approach is supported by Yin (2003) who recommends that professional judgment is used to develop criteria for investigating patterns in the data. Therefore, the case study approach used in this study incorporated a number of strategies to leverage a broad range of data from the population under investigation, and these are discussed in Sections 3.5 and 3.7. However, prior to the development of a methodology for the main study, a preliminary study was carried out.

3.3. Preliminary study

A preliminary study was conducted in 2005, to investigate the types of reflective strategies that support practitioners when they develop and present an electronic portfolio. This concept was of interest when the initial research began, and the outcome of the project was intended to provide recommendations for the main study. The letter for ethics approval for this study can be found in Appendix 2. A qualitative case study method was chosen as it enabled the researcher to learn about a particular case (the participants who were four Flexible Learning Leaders in New Zealand - FLLinNZ) and report on it (Stake, 2003). A number of strategies, developed by the researcher, were trialed with the participants to support the development of a professional electronic portfolio (ePortfolio) that they could use as evidence of leadership and learning. (See the strategies: Portfolio Preparation Document (PPD - Appendix 4; and a Journal Log of Progress - Appendix 5.) The theoretical framework for the research was guided by the relationship between professional learning and reflection (based on Schon, 1987) and the development of portfolio evidence about practice (based on Borko, Michalec, Timmons & Siddle, 1997; and Falls, 2001). The completion of tasks by participants, and reflection on them, as modeled (scaffolded) by the researcher in an online discussion forum, was regarded as necessary for developing skills in reflection (based on Ottesen, 2007). The reflective strategies in the preliminary study were designed to encourage four stages of ePortfolio preparation and reflective practice, based on Barrett's (2000) model. For example, feedback from the researcher during online discussion was designed to deepen reflection, participants were asked to set goals for the portfolio and monitor their achievements, and artefacts were prepared for inclusion in the electronic portfolio. Therefore, the untested interventions were based on a theoretical framework. Since it was a preliminary study and a qualitative investigation with a small number of participants designed to inform the main study, the researcher was using this opportunity to test the suitability of the interventions.

Qualitative data was collected using three methods: interviews, content prepared by participants – portfolio preparation evidence, and online discussions; which took part

during portfolio construction. Interviews were conducted at the beginning and end of the portfolio development process. (Both sets of interview questions can be found in Appendix 7.) The process of portfolio development was guided through four stages (see Appendix 6 for full instructions for each stage). Prior to the final interview, participants were asked to complete a learning styles questionnaire designed by Felder and Solomon (1991). (See: <http://www.engr.ncsu.edu/learningstyles/ilsweb.html>). This was used to assist participants to become more aware of their approach to learning.

Therefore, a number of approaches were used by the researcher to provide support to the participants, and thus, assist their development of reflective techniques. The ultimate goal for each of the participants was to present an electronic portfolio of evidence that reflected on their practice as a Flexible Learning Leader in New Zealand.

Data was analysed for three participants since one person did not complete the final interview. An initial examination of the data indicated that during the portfolio development process participants made use of some of the reflective strategies, and were aware of how they learned. All participants responded on the discussion board to questioning strategies used by the researcher to get them to plan their portfolio (i.e., set goals, aim and purpose). However, once they got to the stage of producing evidence about their practice, for inclusion in the portfolio, it was challenging to get them to reflect on it as they felt that the act of describing practice was sufficiently reflective because they had critiqued their practice already. None of the participants were able to complete portfolio development within the seven months that the research study was conducted. Progress of participants through the research stages are shown in Table 3. Two participants demonstrated reflection-on-practice during the online discussions forums and one also in the evidence she submitted.

Table 3: Research stages completed by preliminary study participants (n = 4).

Participant	Stages Completed	Initial Interview	Final Interview	Reflection on practice	Evidence Submitted
A	Stage 1 & part of Stage 2.	Yes	No	No	No
B	Stages 1 – 3.	Yes	Yes	Yes	Yes
C	Stages 1 – 3.	Yes	No	Yes	No
D	Stage 1 & part of Stage 2.	Yes	Yes	No	No

Two matrices depict a summary of outcomes from the different processes used in the project, and the strategies used by participants, and these are shown in Table 34, Table 35, and Table 36 (Appendix 8). The researcher through discussions with a critical friend concluded that participants may have moved through three stages of metacognition as defined by Wilson (1999): awareness, regulation, and evaluation. For example, participants in the preliminary research project were required to think about the type of portfolio structure they would use and the evidence to be included. They were also asked to consider their goals, and the purpose and audience for their portfolio, all of which required an element of problem-solving. The initial interview established some foundation information about the ability of participants to reflect, and their experience in developing portfolios (awareness). The interaction on the discussion board also indicated participants' awareness of where they were positioned in the learning process and the strategies they were using. Also, aspects of regulation were apparent, in particular, how they were modifying their thinking around the portfolio development. In the final interview, the researcher ascertained that the participants had been evaluating their roles during the process of developing an electronic portfolio, as well as evaluating strategies which worked and didn't work. The results of the preliminary study and advice from a 'critical friend' have contributed to the interpretation of the findings and the recommendations for the main study.

3.3.1 Recommendations for the main research study

1. The focus of the research needs to be changed from: *Using metacognitive strategies to develop an electronic portfolio to: Using strategies to reflect on evidence to be included in an ePortfolio, or something similar.*
 - Rationale: the emphasis on developing reflective capability overall appears more necessary than increasing skills for developing an ePortfolio.
2. The strategies for guiding reflection need to be much simpler and easier to follow.
 - Rationale: practitioners are more likely to complete tasks if they can understand what is required.
3. A Reflective Framework may be helpful for guiding reflective learning, and reflective writing about practice.
 - Rationale: the literature on reflection and reflective writing is well established, and frameworks are recommended for supporting reflective practice. This recommendation was developed in discussion with the critical friend and is based on his many years of experience in the field.
4. A process of reflection to help participants prepare evidence for an electronic portfolio needs to be part of a real subject, particularly the assessment.
 - Rationale: participants are more likely to adhere to timelines and guidelines when preparing reflective evidence.
5. Examples of strategies which promote reflection would be helpful.
 - Rationale: scaffolding reflection and reflective writing is advised in the literature.
6. Questions about learning styles would be better at the beginning of the research if they are used at all.
 - Rationale: this information can be used to inform the support needed to develop reflective capacity.
7. A survey, rather than an initial interview, would obtain relevant information.

- Rationale: data can be obtained in a more efficient format and is likely to be easier to analyse.

Therefore, the focus for the main study became the development of a reflective framework, instead of investigating the development of metacognition in participants' learning. The Three-Step Reflective Framework was developed to include strategies to guide participants' thinking and to create a simple and effective approach to reflective practice. In the remainder of this Chapter, the methodology used for the main study is described, beginning with the context in which the study was situated.

3.4 Context of the research

A group of seven postgraduate education students enrolled in an interactive multimedia design subject (EDG1931), in the Master of Education in Information Technology programme at the University of Wollongong, was chosen to trial the intervention for the main research study. This occurred over one semester. This group was ideal for the research because the lecturer was very interested in trialing a strategy with them to encourage reflective writing in the subject. In previous classes, the lecturer had found it difficult to get students to practice reflection, and regarded it as an important skill they needed to learn for their practice; therefore, she was interested in finding a practical solution (Subject lecturer interview, 2007). The Three-Step Reflective Framework was developed to provide structure for students' reflective writing which was then assessed.

3.4.1 Participants

The seven postgraduate education students who agreed to take part in the research were each required to design and create three learning objects, using multimedia design principles. Therefore, the tasks associated with this activity constituted their main area of practice during the research. Table 4 contains information obtained from the survey about the characteristics of the participants. Pseudonyms are used to protect the participants' identities. Four participants had teaching roles, and one of these was also a multimedia developer. Two participants designed educational materials in their

professional role, and one participant looked after the Information Technology needs of schools, and had previously been a teacher. There were three on-campus students and four distance students. All participants had Bachelor degrees or graduate qualifications. One participant had a post-graduate qualification.

Participants' roles in the workplace were associated with the use of multimedia material. For the majority of participants, this material was to be used for their own teaching. In contrast, Teresa and Ruth were designing multimedia resources for colleagues to use for teaching. Participants' years of work in their roles, ranged from one month to 15 years. Interestingly, one participant (Marie) described her current role or occupation as "personal study" (Marie, survey). This was because she was taking a break from teaching when she started studying the subject; she mentioned this in the face-to-face workshop. Marie provided a detailed description of her previous teaching role in the first written reflection, and detail about this role is mentioned in her case in Chapter Five, and further detail about the other participants can also be found there.

Table 4: Participant survey responses - gender, occupation and role, and tertiary qualifications (n = 7).

Name & gender		Current occupation and role	Yr	Description of role or occupation	Tertiary qualifications
Qadir	M	Lecturer – teachers' college.	3	Learning Resources Centre and instructional design and educational technology for teaching purposes.	Bachelor maths teaching.
Marie	F	Teacher – Yr 7-12 science & maths.	15	Personal study.	BEd 1992.
Nicholas	M	Multimedia developer/teacher eLearning support.	4	Training teachers in eLearning strategies & technical skills, creating material for teachers.	BEd 1993; Grad Dip IT 2002.
Teresa	F	Instructional designer. I design and develop online learning courses and subjects.	5	My current position involves applying ID to short, online, knowledge update subjects for those working in the ... industry.	1991 - BA (Psych & Ed), 1992- G Dip Ed (Primary method), 1997 - G Dip TESOL.
Yonten	M	IT program coordinator, look after IT program in schools.	3	Computer supply to schools, IT training for teachers.	BEd 1998; PG Cert in teaching IT – 2002.
Ruth	F	Educational designer.	1/1.5	Support and design for academics.	Dip Teach 2002; Masters HE eLearning
Nabil	M	Teacher; teaching assistant in the uni.	3	Teaching.	Bachelor 2002.

The five participants who completed a skills and resources checklist in the initial workshop for the subject mainly rated themselves at a beginner level in the creation and use of media. They all felt competent in creating text forms of media. Marie rated herself as a beginner in all media types apart from text. Qadir, Yonten, and Nicholas rated themselves as competent with creating and using graphics. Qadir and Nicholas described themselves as competent in using video and web authoring software, and Nicholas also mentioned he was competent with audio production and animation software. Even the competent users indicated a number of multimedia skills they wished to develop. For example, Flash for animation, graphics design, video and game building software, and audio production software. Multimedia skills, which participants required to complete their projects, needed to be self-taught as instruction was not included in the subject. Therefore, participants were presented with practical challenges

on which they had the opportunity to reflect, as well as the chance to learn new knowledge and theory, a process which may have been difficult for participants with basic technology skills and little experience in reflective writing. It is known that when problems and challenges are present in practice, professionals are more likely to be stimulated to reflect on their actions (Dewey, 1933; Ward & Cotter, 2004). Also, reflection on practice generally emanates from the desire to improve (Hatton & Smith, 1995). Therefore, in this group under investigation conditions were optimal for reflection on practice.

The intervention used to structure reflection on practice for the research study was the Three-Step Reflective Framework and is described next. The framework was embedded within the assessment requirements for the multimedia design subject (See Section 3.4.3).

3.4.2 The intervention – the Three-Step Reflective Framework

The design of the Reflective Framework evolved from the findings of the preliminary study, and is based on the theoretical framework described in the Literature Review, Chapter Two. The design of the intervention and the manner in which each step of the framework aligns with the underpinning theoretical framework is outlined in this section. The three steps of the framework are depicted in Figure 2. Integrated within the Reflective Framework are prompting questions and tips specifically designed to scaffold reflective writing. Participants in the multimedia design subject were asked to use the framework only when preparing their written reflection assignments, and to use the accompanying template which was provided. (See the template in Appendix 1.)

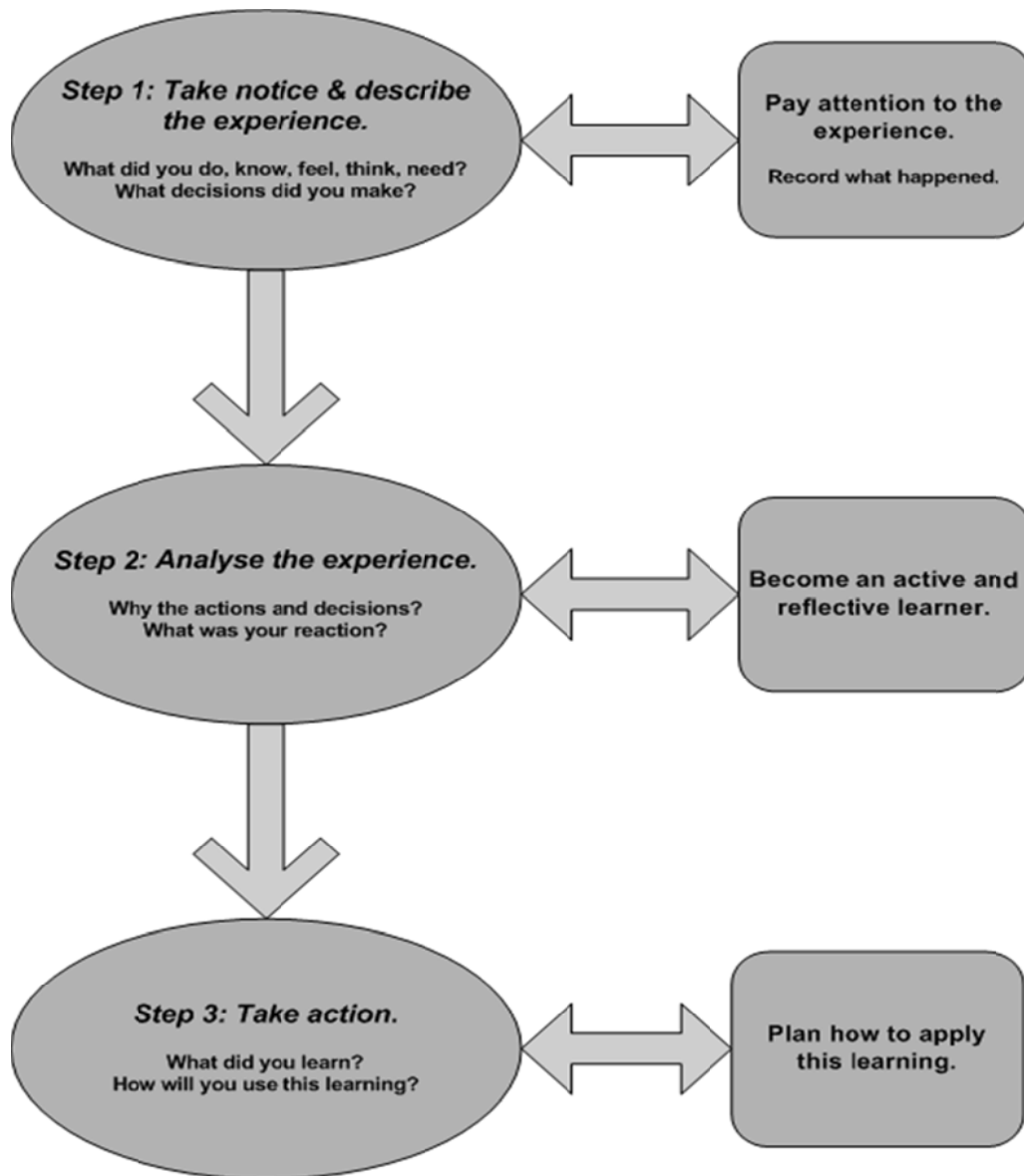


Figure 2: Three-Step Reflective Framework.

The three-steps of the Reflective framework are designed to promote and support writing which becomes increasingly reflective over three steps. At each step of the framework, participants were provided with a structure to guide their reflective writing, as shown in Figure 2. In the accompanying template, this took the form of headings written as questions, also *prompts* about what to write, and *tips* to encourage the use of a variety of methods for preparing the written reflections. The Reflective Framework is outlined in brief here, and the full framework is available in Appendix 1.

Step 1 – Take notice and describe the experience

In the first step of the framework, headings were posed as questions to guide basic description of recent activities. For example: *What do you do, know, feel, think, need? What decisions did you make? What steps or actions did you take, and decisions did you make to get to your current level of ability/knowledge?*

Six *prompts* were used to guide the descriptions about experiences.

- Comment on what you have been doing, feeling, thinking.
- Comment on what you know, need.
- Consider how this topic relates to your professional career.
- Comment on whether what you already know helped you.
- Comment on initial reactions, ideas from your reading, researching, teaching experiences or simulations.
- Indicate what helped you to progress.

Tips were included to encourage use of a variety of methods. For example, formats such as descriptive text, audio, pictures, bullet points, and diagrams were suggested (see further *tips* in Appendix 1).

Step 2 - Analyse the experience

For Step 2, participants were asked to write about the implications of their decisions, actions, or reactions. The following questions were used: *Why these decisions and actions? What was your reaction?* For the first question, they were asked to think about why their decisions and actions were useful, and how they helped and informed the process of becoming a more active learner and a more effective practitioner. A suggestion for the second question (*What was your reaction?*) was that they make brief notes on their intellectual, emotional and physical responses to help them better understand the way they learned and practiced. Also, they were informed that the process would help them, in the future, to choose strategies which suited them. The *prompts* were more extensive at this step.

- Think about what happened and why.
- Outline what you could have done better or differently.
- Indicate some strategies which may help next time.
- Did it cause you to rethink your ideas about teaching and learning?
- Comment on what worked and what did not.
- Think about how your actions and decisions may help your practice.
- Consider the links between learning theory and your teaching practice.
- Think about what you learned.

Different *tips* were provided at this step. For example: be honest with yourself and use the information to get a clearer picture of how you learn. Use as many different ways as you can to illustrate your points, for example, audio, video, diagrams, and pictures.

Step 3 - Take Action

In the third step, participants were required to reflect on what they learned, and how the knowledge would be used. Again there were two questions: *What did you learn?* and *How will you use this experience?* There were instructions to record what was learned from the process. This step was designed to increase self-awareness about any gaps in understanding and knowledge, and to stimulate thinking about how to apply the learning. Participants were also asked to plan how they could apply what they had learned or deduced because it was expected that the process would help them to reinforce what they had learned. Four *prompts* accompanied Step 3.

- Indicate what you learned.
- How will this change or affect your future practice?
- Indicate what helped you to learn.
- Identify what you need to explore further or seek help with.

The following *tips* were provided: be prepared to ask for help and spend extra time to fill in the gaps in your knowledge. Set yourself realistic goals, and indicate when you will achieve them.

Full detail for all steps can be seen in Appendix 1. By using the Reflective Framework, participants were expected to demonstrate reflective writing in three steps, using the headings, questions, prompts and tips provided to guide them. There was an expectation that the participants would write under the headings for each of the three steps using the online word processed document with which they were provided.

3.4.2.1 Alignment of the Three-Step Reflective Framework to theory

In the first step of the framework, participants are asked to pay attention to the experience, and record what happens in practice. They are also asked about their feelings and thoughts, and what they know and need, and their decisions, associated with the experience. Therefore, the intent of Step 1 of the framework is to motivate participants to really engage with their experiences so they can respond to them, and as such begin to reflect.

Noticing the “action of the moment” is a quality which Tremmel (1993) recommends for his teacher education students (p. 440). He claims mindfulness enables his students to describe events from practice in more detail, because “it reveals the practice of teaching” in ways the technical and theoretical mind cannot (Tremmel, 1993, p. 451). Noticing is also a term used by Boud and Walker (1990) who believe that learning from an experience can fully emerge when inner feelings and thoughts are acknowledged, along with the details about an event. They describe four kinds of noticing and link it to a reflective process involving the actions a learner takes as a result of the experience. More detail about their model, and the concept of learning as a result of reflecting on experience is discussed in Chapter Two.

“Presence in experience” and “Learning to see”, as well as, “Description of experience”, from Rodger’s Reflective Cycle, also resonates with the intention of Step 1 of the Reflective Framework (2002b, p. 235). To notice what occurs, when recalling the experience, is regarded by the researcher as important, and is guided at Step 1 because it begins the reflective process through raising awareness of the self and one’s understanding about practice. This has similarities to Schon’s (1983) descriptions of

“knowing-in-action”, and “reflection-in-action” (p. 49), where seeing, knowing, and acknowledging feelings is regarded as important, although, according to Schon (1983), and Hatton and Smith (1995), this is expected to occur in the midst of practice rather than when recalling the experience.

Even so, ‘knowing’ and ‘feeling’ is included at Step 1 of the framework to assist participants to articulate what they “know but cannot say” about practice, that is, their intuitive or tacit knowledge, and also their emotions (Tremmel, 1993, p. 435). Furthermore, expression and evaluation of feelings is claimed to open the way for more meaningful interpretation of a situation through reflection, otherwise the practitioner may become “frozen by ... intense feelings” (Colton & Sparks-Langer, 1993, p. 48), or inhibited by “obstructing feelings” (Boud et al., 1985, p. 26). Therefore, Step 1 of the framework is designed to stimulate reflective activity which is based on the experiences a practitioner has, being the “total response of the person to a situation or event – what he or she thinks, feels, does and concludes at the time and immediately thereafter” (Boud et al., 1985, p. 18). By placing emphasis on noticing feelings etc., and being mindful, and prompting the practitioner to describe objectively what happens, the first step in the Reflective Framework, is intended to guide the practitioner to reflect through, what is described by Boud et al. (1985) as “Returning to the experience” and “Attending to feelings”; the first two stages in their reflective process (p. 26).

The second step of the Reflective Framework intends to take reflective activity further, by guiding analysis of the experience, and reasons for the actions, decisions and feelings described at Step 1. This step, links to “Analysis of experience” described by Rodgers (2002b), where the practitioner learns “to think from multiple perspectives and form multiple explanations” (p. 235). Furthermore, Step 2 of the framework also connects to Hatton and Smith’s (1995) descriptive stage of reflection, which involves “Analysing one’s performance in the professional role ..., giving reasons for the actions taken” (p. 45), which in their framework follows writing about the experience. This sequencing is similar to that suggested by Boud et al. (1985) who believe that prior to analysing and interpreting the experience from different perspectives, a check that no biased

judgments have been made about the experience is made, through the process of recall and description of the event, and attention to feelings. As can be seen, the sequencing of the first two steps of the Reflective Framework is underpinned by a number of theories.

Likewise, Step 3 of the Reflective Framework has similarities to others' models of reflection. For example, there are parallels between Step 3, and Boud et al.'s (1985) model, which describes the outcomes of the reflective process. In the outcomes phase of the model, "New perspectives on experience", "Change in behaviour", "Readiness for application, and Commitment to action" are expected. Therefore, Step 3, when practitioners are guided to: *Take Action* and prompted to reveal what they learned, and how the learning from the experience will be applied, sits alongside the outcomes of Boud et al.'s (1985) reflective process. In contrast, Steps 1 and 2 of the Reflective Framework parallel three stages of Boud et al.'s (1985) model – Returning to experience, Attending to feelings, and Re-evaluating experience. Additionally, Step 3 of the framework connects closely to Rodger's (2002b) reflective process of: "Experimentation: Learning to take intelligent action" (p. 235). Step 3 of the Reflective Framework is anticipated to continue the written reflective process stimulated at Steps 1 and 2, and once Step 3 is completed this reflective process is expected to end. Outcomes of the reflective process are not stipulated in the Reflective Framework, in contrast to Boud et al.'s model, although action and learning are expected to occur as a result of using the framework.

Learning and action is also alluded to in McCollum's (2002) Reflective Framework for Teaching in Physical Education (RFTPE), which takes practitioners through three levels of reflection: "(description, justification, and critique) ... used to facilitate depth and quality in [physical educator's] reflective analysis" (p. 40) (see Table 2 for more detail). At the first level, an event is described in detail (i.e., what happened); at the second level, rationale for the action, the importance of the event, and why the practitioner reacted in a particular manner is prompted; and finally a critique of the action is requested, including – an evaluation of actions, the associated feelings, what was

learned, and plans for following up the event McCollum (2002). These three levels informed the Reflective Framework, except that a description of feelings is requested at Step 1, rather than waiting until later as suggested in McCollum's (2002) framework.

The steps of the Reflective Framework also fit alongside dimensions of Kolb's (1984) experiential learning cycle, and to some extent with Moon's Map of Learning (1999). For example, Step 1 incorporates two dimensions from Kolb's (1984) cycle: concrete experience, and reflective observation, where the practitioner is expected to actively experience an event or situation, and to reflect on it. In Step 2, where analysis of the experience occurs, the act of conceptualising and theorising the experience as a means of learning from it (called abstract conceptualization in Kolb's cycle) is likely. Finally, at Step 3 of the framework, taking action and planning to use the learning aligns with active experimentation from Kolb (1984). Two stages from Moon's Map of Learning (1999), that is, "working with meaning" and the final stage (known as "transformative learning") support reflection about new learning and subsequent changes to practice, which is similar to the reflective learning guided by the framework in this research (p. 138).

In summary, the expectation that the Reflective Framework would guide participants through three steps of reflective writing was informed by several theories associated with the reflective process and reflective learning, and these are discussed in Section 2.2.2. Additional theories were used to inform the development of the taxonomy used to measure the levels of reflection in participants' writing. The taxonomy used in analysis is outlined in Section 3.7.1.1. Therefore, the intervention was expected to improve the way in which students in the subject reflected, as part of a case study method to examine the process and outcomes of reflective writing. The research study was kept contained as a bounded system by five measures:

1. only students enrolled in the autumn session of the subject were sampled;
2. the subject lecturer was included;
3. particular assessments (e.g., written reflections and supporting statements) were analysed;

4. one semester was the time limit for the study; and
5. a strategy was designed especially for the subject.

3.4.3 Assessment requirements

Several assessment requirements were integrated in the semester-long subject. Students were each required to design and create three learning objects using multimedia design principles; this was for an electronic design portfolio. As part of the subject requirements, they also had two other assessment tasks to complete. For example:

- a supporting statement for each learning object – they were asked to reflect on the learning object, why they designed it in the way they did and how they developed it. This assignment had an overall weighting of 30%, a little less than the written reflection assignments;
- reflections on their design process – students were asked to prepare four written reflections to help “raise [their] awareness of how [they were] approaching and working through the design tasks” (Subject Outline, University of Wollongong, 2007, p. 6, Appendix 3). A weighting of 10% per reflection assignment was assigned, to a total of 40%.

Overall, the components of the electronic design portfolio (three learning objects, three supporting statements, and four written reflections) comprised a 100% weighting. The written evidence that participants prepared for the portfolio was utilised in the research, not the learning objects. Students were informed in the Subject Outline (University of Wollongong, 2007) that the written reflection assignments would help them to link concepts from the literature with their design ideas for the learning objects, and also help them to connect their learning in the subject with their professional practice. The intention of the reflective writing task was to assist participants to “take the opportunity to stop, take stock of what [they were] doing and why, and plan for what [they needed] to do next” (Subject Outline, University of Wollongong, 2007, p. 6, Appendix 3). The subject lecturer wanted to help her students make connections around the learning

objects they were designing, that is, to link ideas and concepts, from their reading and learning, to their professional work.

When preparing the written reflections they were asked to use the Three-Step Reflective Framework developed by the researcher. However, use of the Reflective Framework was optional. The framework was integrated into the subject, but it was not appropriate to force students to use the framework (e.g. by deducting marks) because it would contravene the philosophy of a student-centred pedagogy adhered to by the Education Faculty. Additionally, the implantation of a compulsory framework for reflection would be particularly inappropriate at a postgraduate level of study since this learning strategy may not have suited the participants' learning preferences or learning style. Furthermore it would make the intervention even less 'authentic' because in the real world participants who were offered the use of a reflective framework could not be forced to use it. An example of how to write a written reflection, using the three steps, was prepared for use in the subject, and was provided to the students at the outset (see Appendix 9). There was an expectation that the Reflective Framework would influence not only the students' reflective writing for the written reflection assignments, but also indirectly affect the quality of reflection in the supporting statements. As such, the main reflective writing strategy (Three-Step Reflective Framework) used in the research was linked into two assessments for the subject.

A template for preparing the supporting statements, designed by the subject lecturer and previously used in other classes with students, was provided to the students to assist them in describing features of the learning objects they constructed. The supporting statement template was not part of the intervention used in this research because it was not used as a strategy to directly assist reflective writing, which was the intention of the research. It was already in place as an assessment strategy in the subject. The Three-Step Reflective Framework, in comparison, was developed by the researcher, specifically for the research project, and had not been used previously in the multimedia design subject. Supporting statements were collected and analysed as part of the research to provide additional information about context, specifically they provided

information about how the activities in the subject related to the participants' professional practice.

Even though students in the subject were expected to work on individual projects to create three learning objects for the subject, they were encouraged to interact with each other and to share ideas and skills. However, these interactions were not considered part of this research study. The characteristics of the student group who were sampled are outlined in Section 3.4.1. The roles of the subject lecturer and the researcher in the study follow next.

3.4.4 Role of the subject lecturer

The subject lecturer, known by the pseudonym of Penny, played a very important role in the research. Penny re-designed the subject to incorporate the research activities and intervention, and also provided feedback to support students' reflective writing in the subject. The reason the subject was re-designed by the lecturer was so the Three-Step Reflective Framework, the reflective writing strategy, could be used and included in the subject's assessments. The assignments, where participants were asked to use the framework to guide their reflective writing, were new to the subject. Also instructions for the supporting statement assignments were re-written to encourage reflection. For example: "Each learning object must be accompanied by a supporting statement that reflects on your learning object, why you designed it in the way you did and how you developed it" (Subject Outline, University of Wollongong, 2007, p. 6, Appendix 3).

As well as integrating the research intervention into the subject, the lecturer was required to provide guidance to the students for all the assessments in the subject (learning objects, supporting statements and written reflections). Penny provided specific feedback to each of the students on their written reflections and supporting statements, after they were submitted. Students were required to upload their written assignments via the Janison learning management system, and feedback was added online once the assessments were marked. Penny was also available for assistance on email and via the telephone; however, these methods of support were not measured in

the research. Penny's perceptions about the use of written feedback to support the reflective process were investigated through an interview at the end of the subject. Additionally, Penny offered and facilitated an optional face-to-face workshop at the start of the subject. The workshop was offered on campus, and this was the first time Penny had run this type of session in the subject. The workshop provided a vehicle for the initial phase of the research, and the procedures conducted in the workshop are detailed in Section 3.4.6.

3.4.5 Role of the researcher

The researcher worked with the subject lecturer to develop the intervention. As a result, the Three-Step Reflective Framework was designed to provide structure for written reflection. The researcher also attended the face-to-face workshop, on-campus at the start of the subject, and prepared support materials (e.g., a slide presentation about reflection) for students. The Reflective Framework was demonstrated by the researcher to the students who attended the workshop, and used in a reflective writing exercise. This exercise assisted participants to start preparing the first written reflection. Although, the researcher interacted with some participants at the workshop, during the subject no interaction occurred. Access to the students' assignments, once they were submitted on the Janison learning management system, was made possible by the subject lecturer who enabled access for the researcher to download them, so they could be analysed. The materials, which were downloaded, comprised the written reflections, the supporting statements, and all written feedback from Penny. The researcher began analysis on this material as it was submitted, and continued after the subject was finished. The most important contribution by the researcher was the design of the Three-Step Reflective Framework as a strategy for reflective writing.

The beginning of this process, during the on-campus workshop offered to students enrolled in the subject, is described next.

3.4.6 On-campus workshop

A workshop was conducted at the main campus at the University of Wollongong. This session was organised by the subject lecturer to introduce the class to the subject. The five postgraduate education students who attended the workshop were asked to complete a skills and resources checklist to rate their skills and experience in creating different media and software, and to gauge the range of skills they needed to develop. Information about their access to computer equipment at home or work, and access to software for multimedia development was also sought. The lecturer spoke to the class about different kinds of multimedia and demonstrated some digital learning objects. Time was allocated to informing the students about the Three-Step Reflective Framework and the research project. Five out of the ten people enrolled in the subject at that time attended the workshop session. The five students at the workshop agreed to join the research, signed consent forms following an explanation about the project, and then completed a survey. By administering the survey during the workshop, the researcher was able to explain the content of the survey to the participants, prior to them filling it out.

When participants were given the opportunity to practice writing using the Reflective Framework, they were asked to write something about a significant event which occurred in their recent experience while on holiday. They did this after they were given a verbal example of personal reflection by the researcher, using the framework. Participants were given the opportunity to share their examples, and this situation was used by the researcher to illustrate how the three steps of the framework could help with their reflective writing. Later on in the session, participants were asked to use the framework to write about why they were doing the subject, what their existing professional skills were at that time, what they hoped to learn in the subject, and how they wanted to apply their learning to their practice. The ‘practice run’, in using the Reflective Framework, gave them the opportunity to prepare some ideas for their first written reflection assignment.

Some of the processes in the workshop were recorded for other students who were unable to attend, so they could access them online following the workshop. Material was uploaded to the learning management system (Janison) for the subject. This included presentations and explanations by the researcher, examples of reflective writing, and an explanation about the Three-Step Reflective Framework. Later on, two more participants who were enrolled in the subject agreed to take part in the research. Three other participants (who did not attend the workshop) did not continue with the subject, and therefore, the total number of participants was seven.

The reflective writing that participants practiced during the workshop provided them with a basis for preparing written reflections for assessment. The workshop also provided an opportunity for the collection of data with five of the seven participants. This took the form of a skills checklist which provided information about the participants (Section 3.4.1) and a survey, and this method is described in Section 3.5.2. The processes involved in collecting data are described next.

3.5 Data collection

Before any data was collected, an application was submitted to the University of Wollongong Human Research Ethics Committee. In March 2006, a request was made to the ethics committee regarding approval for changes to the application (originally submitted for the preliminary study), so that the main study could be conducted; this was approved in April 2006. (See the approval letter in Appendix 11.)

When the research began with the on-campus workshop, participants were provided with an information sheet about the research, and also a consent form. All five students who attended the workshop gave their consent, and were administered a paper-based survey. Two participants, who were unable to attend the workshop, were sent the information and survey via email. The survey was designed to obtain descriptive data for building participant profiles and individual case studies. Several forms of qualitative data were collected during, and at the end of the subject: written reflection assignments, supporting statements, written feedback from the subject lecturer, and

interview responses. The various forms of data contributed to learning about the case which was developed, and the effect of the intervention on reflective writing and reflective practice.

3.5.1 Overview and critique of data collection methodologies

This case study was conducted in a small postgraduate subject and involved the full class of seven students. Although this limited the number of participants, the selection an appropriate context for the case was the first priority, rather than recruiting a large number of participants, a common strategy in case study research (Merriam (1998). This has implications for the scope of the data collected and the data analysis process, and these limitations are acknowledged.

For the data collection phase, a decision was made to use technologies and processes with which participants were familiar because constraints of time and technology have been demonstrated by others as factors which can inhibit the process of reflective writing (Doig et al., 2002; Falls, 2001). For example, word processing and the student learning management system for submitting assignments were familiar technologies for this group of students. The use of blogs for reflective writing (as described by Stiler & Philleo, 2003) was considered in this research study, but the extra time factor associated with learning a new technology, such as setting up a blog, and learning to write on one, was considered a barrier to the reflective process. Therefore, in the ‘spirit of simplicity’, the scaffolding provided in this study was restricted to instruction about reflection, use of the Reflective Framework, and feedback from the subject lecturer. In the following section, information about the data sources is described.

3.5.2 Sources of data

Several forms of data were collected for analysis: survey, written reflection assignments, supporting statement assignments, subject lecturer written feedback, participant interviews, and the subject lecturer interview. Each data source is portrayed in Table 39 (Appendix 12) alongside the strategies used to promote reflection, and the

strategies drawn on for analysis. The table includes a description about how the data answered the research questions. In this section, information about how each of the data sources was used in the study is described, in terms of the purpose and origin, and how each source was accessed and prepared for analysis.

3.5.2.1 Survey

Origin of data source: the survey called: Using a Reflective Framework to Develop Practice-based Evidence was developed by the researcher specifically for this study (see Appendix 13). **Purpose of the data source:** the survey was administered to collect information about demographics, previous methods of reflection, professional reflection and methods for learning. This was the first data collection method to be implemented. **Access to data source:** five participants filled out a hard copy of the survey during the face-to-face workshop. The potential for confusion about the wording of the questions was reduced by administering in class so that the researcher could introduce the questionnaire and explain its purpose and so that participants could address any questions to the researcher. Two other participants were sent the survey electronically on email, and they filled it out and returned it via email to the researcher. For the development of individual cases, and to obtain baseline information about each participant, it was necessary for the researcher to be able to identify each respondent. **Preparation for analysis:** codes were assigned to survey responses, and the list of names and codes was stored in the researcher's data base.

3.5.2.2 Written reflection assignments

Origin of data source: the written reflections were an assessment designed by the subject lecturer, and are described fully in Section 3.4.3. The Three-Step Reflective Framework used for writing each of the four written reflection assignments was designed by the researcher. **Purpose of the data source:** the strategy of collecting the written reflections enabled three aspects associated with reflective writing to be measured. For example:

- levels and types of reflection to estimate the approach to reflection exhibited by participants;
- what participants wrote about their professional practice (professional focus); and
- perceptions of participants about the feedback they received from the subject lecturer on their written reflections.

Access to data source: participants were expected to submit four written reflections on their design process, as part of the assessment in the multimedia design subject. The written reflection assignments provided fertile ground for analysis of participants' approaches to reflective writing, and how they used the Three-Step Reflective Framework. The compulsory nature of the assignments meant that the main source of data was assured, unless of course, participants withdrew from the research project, which no-one did. No extra work was involved for the participants, and therefore, access to this form of data was not compromised. As a result, 28 written reflection assignments, four from each participant, were downloaded from the Janison learning management system by the researcher as they were submitted. **Preparation for analysis:** the assignments were stored on the researcher's computer and in hard copy, ready for analysis. The word length required for each assignment was 600 – 800 words, but some were longer than this. Therefore, a substantial amount of writing was available for analysis. The Levels of Reflection taxonomy was developed to analyse this data (see Appendix 14).

3.5.2.3 Supporting statement assignments

Origin of data source: the assessment using the supporting statements was designed by the subject lecturer, and used several times in previous classes. This assessment involved the preparation and submission of a written statement describing the design process for each learning object (see Subject Outline, Appendix 3). Students were asked to use the proforma template which was provided on the subject website.

Purpose of the data source: The supporting statements were expected to contain useful contextual information about the design tasks and may have contained some reflection.

Access to data source: one supporting statement was required to accompany each of the three learning objects which students were designing and creating for the subject. Therefore, three supporting statement assignments per participant, that is, a total of 21, were available to be examined for evidence of reflection. These assignments were downloaded by the researcher from the Janison learning management system as they were submitted. **Preparation for analysis:** the assignments were stored on the researcher's computer and in hard copy, ready for analysis. The word length required for each assignment was 600 words; however, many were longer than this. Again, this provided a reasonable amount of material for analysis using the Levels of Reflection taxonomy.

3.5.2.4 Subject lecturer written feedback

Origin of data source: feedback was provided in written form by the subject lecturer as part of the teaching process. **Purpose of the data source:** collecting this data enabled the researcher to look for evidence of whether written feedback in this context scaffolded reflection. **Access to data source:** Penny added feedback to each participant's assignment (written reflections and supporting statements) using the facility on the Janison learning management system. This meant that feedback on 49 assignments was available. The researcher was given access to this material for download once the subject finished. **Preparation for analysis:** the feedback was compiled into one document by the researcher ready for analysis. Each item of feedback was separated and coded, in lieu of names, so content analysis could be carried out for each individual.

3.5.2.5 Participant interviews

Origin of data source: structured questions, for interviewing participants at the end of the subject, were developed by the researcher. The questions were based on the Three-Step Reflective Framework (see Appendix 15). A structured interview guide was developed so that a range of information about participants' reflective practice could be obtained. The guide included a range of questions about how participants had used

reflection, for example, before studying in EDGI931, their experiences using reflection in the subject, how feedback from the lecturer had helped, whether the written reflection assignments helped them to prepare their supporting statements, how they used the Three-Step Reflective Framework, and whether they intended to use reflective writing techniques in the future for their professional practice. **Purpose of the data source:** the interviews were primarily used to find out how participants used the Reflective Framework to prepare the written reflection assignments about their practice in the subject. **Access to data source:** participants were invited by email (at the end of the subject) to take part in an individual interview and this occurred once all assignments were submitted. One hour was estimated for each interview, and all but two of the seven participants were interviewed entirely by telephone. The telephone interviews were audio recorded using a digital recording device integrated with the telephone receiver. Two participants agreed to be interviewed via computer conferencing, and in one instance, difficulties with the Internet connection meant that the interview had to proceed on the telephone. Audacity software was used to record the recorded computer conferences. **Preparation for analysis:** recorded telephone interviews were converted from wav to mp3 format using Audacity software. All interviews were transcribed prior to analysis of the content. A professional transcription service was used, and the transcriber was asked to sign a confidentiality agreement prior to starting the work. Participants were sent transcriptions of their individual interviews and asked to check them for accuracy. One person requested changes be made in light of some minor typos, and the other participants were satisfied with their transcriptions. The researcher also checked the transcriptions for accuracy, and made adjustments where necessary.

3.5.2.6 Interview with subject lecturer

Origin of data source: interview questions for the subject lecturer (Penny) were developed by the researcher, and were also based on the Three-Step Reflective Framework (see Appendix 15). **Purpose of the data source:** collection of this data allowed an investigation of how participants used the Reflective Framework, and the type of reflection demonstrated by participants. **Access to data source:** Penny was

interviewed, by the researcher, for approximately one hour via telephone, using the pre-prepared list of questions. This interview also occurred once the multimedia design subject ended. Penny was given the opportunity to speak freely about her experiences using the Reflective Framework in the subject, and her perceptions about the reflective writing exhibited by participants. The interview was audio recorded using a digital wav recorder attached to the telephone receiver. **Preparation for analysis:** the recorded telephone interview was converted from wav to mp3 format using Audacity software. The recording was transcribed professionally and then checked by the researcher prior to content analysis.

The data sources which were gathered and collated to prepare the single case, was expected to describe patterns across participants and also individuals (see Chapter Five). In the following section, a description of the processes used to assess the quality of the research is presented.

3.6 Assessment of quality

An assessment of the quality of the research is important, to find out whether the information obtained is trustworthy (demonstrating credibility and dependability), and also if the researcher has used effective strategies for data collection and analysis. In a qualitative study, different terminology is used to describe the multitude of ways in which quality is usually judged (Mertens, 1998). Generally, the robustness of a research study is assessed differently in a qualitative study, compared to a quantitative study, and different terms are used. For example, credibility is used in qualitative research to describe internal validity, transferability denotes external validity, and dependability is the term used for reliability (Mertens, 1998). Although, measures of quality may be labeled differently, the primary concern is to use a process which confirms the rigor of the study (Merriam, 1998). Five of Merten's (1998) criteria were used to ascertain the quality of this study: Credibility, Transferability, Dependability, Confirmability, and Authenticity. A description of each of these criteria and how they were met follows.

3.6.1. Credibility

This is a check of internal validity, and is used to ascertain whether findings have captured the reality of the situation (Merriam, 1998). Six ways in which credibility can be assessed are possible and these are described in more detail here. For example: prolonged substantial engagement, peer debriefing, negative case analysis, progressive subjectivity, member checks, and triangulation.

3.6.1.1 Prolonged substantial engagement

This aspect was assured by collecting material over the entire subject, from beginning to end, until all anticipated sources were retrieved. The subject ran over one semester from the beginning of March until the end of May (three months). All the written reflection and supporting statement assignments were collected, as well as written feedback from the subject lecturer. Also, the researcher was involved in designing the strategy to promote reflective writing, and this was integrated into the assessment requirements for the subject as an intervention. At the end of the subject, participant interviews were conducted, and an interview about the Reflective Framework was undertaken with the subject lecturer. Therefore, the researcher was involved in collecting a range of data for an extended period.

3.6.1.2 Peer debriefing

Peer debriefing, according to Mertens (1998), involves in-depth discussion with a “disinterested peer [about] findings, conclusions, analysis, and hypotheses”, and this guides the next steps in the study (p. 182). This credibility check occurred when the report of the preliminary study was critiqued by Associate Professor Garry Hoban, and recommendations were made by him for the main study. Also, initial findings about the levels of reflective writing found in the main study were presented to colleagues at the Spotlight on Tertiary Teaching and Learning: Colloquium for the Southern Region in 2008. Feedback about the research was obtained from peers who attended the presentation.

Additionally, the Reflective Framework was trialed with a group of dental students at the University of Otago in 2007, following an invitation by a colleague. As a result of peer review of the session with the dental students and critique of the framework, the Reflective framework is integrated in the dental students' ePortfolio system, developed during a research project at the University of Otago (Kardos et al, 2007). Plus, the Reflective Framework is used in two online subjects (Flexible Learning and Evaluation of eLearning for Effective Practice) taught by the researcher, and therefore, students and colleagues have given feedback on its usefulness for assisting reflective writing on journals, including blogs, they used during the subjects.

The framework has also been used in a national Ministry of Education research project in New Zealand about Digital Information Literacy (Hegarty, Penman, Kelly, Jeffrey, Coburn & McDonald, 2009). Researchers in this project agreed the Reflective Framework was suitable for supporting reflective writing of participants during the research, and informed participants about it, as well as encouraged its use. Therefore, the Three-Step Reflective Framework, as a strategy, has been critiqued by an assortment of different peer groups, and used in diverse ways to support reflective writing.

3.6.1.3 Negative case analysis

When cases which do not fit are highlighted as part of an investigation, this is regarded as negative case analysis. For example, a participant, known as Ruth in this study, did not fit the norm because she had previous experience in reflective writing, unlike the other participants. Also, Ruth did not use the framework consistently, and did not plan to use the Reflective Framework in the future, which was unusual in comparison to the actions and perceptions of the other participants. If instances which are not consistent with the expected are examined in more depth, according to Seale (1999), "emerging ideas" may need to be altered, and as a result understanding of a situation may be broadened (p. 78). Ruth's case enabled a different perspective to be gained about the use of the Reflective Framework, and this is detailed in Chapter Five.


3.6.1.4 Progressive subjectivity

This check of credibility requires the researcher to monitor his or her ideas and beliefs as they develop throughout the study, and to share them with a peer debriefer who is able to challenge the researcher. This is useful if the researcher has “not kept an open mind but found only what was expected from the beginning” (Mertens, 1998, p. 182). The researcher has maintained a journal and made regular entries about her ideas during the research, and discussed these with supervisors and also work colleagues, thus contributing to this aspect of quality in the study.

3.6.1.5 Member checks

In qualitative studies, the checking of respondents views about the data is regarded as “the most important criteria in establishing credibility” (Mertens, 1998, p. 182). Therefore, the researcher sent each of the participants their interview transcript, so it could be checked for accuracy about what was said in the interview. The interview questions were structured to enable participants to describe a broad range of experience, with regard to the Reflective Framework and the use of reflective writing in the subject. According to Seale (1999), the feedback, obtained by participants (members) in the research, on the full report of the case under study, is the most effective form of what he calls “member validation” (p. 64). However, this has not occurred in this research due to the time lag between data collection and the write up of the thesis. The recall of participants, regarding what happened during the subject, may not be particularly reliable at this stage, due to the tendency for a process known as “refabrication” to occur when reconstructing an event from long term memory (Wolfe, 2001, p. 116).

3.6.1.6 Triangulation

When several different sources of data are collected this enables the information to be checked for consistency across the different methods which are used (Mertens, 1998). Therefore, to ensure triangulation and hence credibility of the data, multiple sampling methods were used (e.g., survey, interview, and written documents), and “multiple sources using the same method” were used (Mertens, 1998, p. 183). For example, Bronwyn Hegarty 

written data was collected as two types of written assignments, and in the form of feedback from the lecturer. Additionally, interviews took place with different subjects, using different questions for students in the subject and for the subject lecturer. These examples illustrate how triangulation can be extended to add depth to the findings, through use of “bracketing”, where one method (interview and written material in this research) is used to acquire several different sources of data (Reeves & Hedberg, 2003, p. 46).

3.6.1.7 Pattern matching

The use of “pattern matching” is claimed by Yin (2003, p. 36), to be an important means of addressing internal validity. Therefore, data was analysed using a variety of techniques to investigate patterns in the data. This enabled inferences to be drawn from the data, for example, the supposition that the Reflective Framework was responsible for scaffolding participants’ reflective writing. Consequently, the frequency of writing at each level of reflection was measured to determine if the Reflective Framework influenced the level of reflection exhibited in participants’ written reflections. The full details are presented in Table 6. A range of sources of data were found to support findings. For example, it was found that the Reflective Framework was useful for scaffolding reflective writing, and patterns to this effect were found in data obtained from the written reflections, and the participants’ interviews, as well as from the subject lecturer interview.

3.6.2. Transferability

This criterion of quality is used to describe measures of external validity, in particular, the generalizability of the study, and whether the findings can be replicated in other situations (Mertens, 1998; Yin, 2003). In qualitative research, and particularly in case study research, a single case may not be regarded as generalizable especially when compared to the results obtained from large survey research. This occurrence is described by Yin (2003) as “statistical generalization”, and he claims it is more applicable to a “larger universe” (p. 37). However, he believes that there should be a

distinction between “statistical generalization” and the “analytical generalization” of case study research, because the latter requires the researcher to “generalize findings to theory” (Yin, 2003, p. 38). This approach, Yin (2003) claims, enables the theory to be tested by replicating the findings in other similar circumstances, and is more suited to qualitative research.

Conversely, the use of “thick description”, described as “careful and extensive description of the time, place, context, culture” is recommended by Mertens (1998, p. 183). She also refers to the “applicability of the research to another setting”, and this could be interpreted by the reader as ensuring there is rich enough description about the case (Mertens, 1998, p. 355). In other words, when sufficient information is provided, “readers” of the research are able to make a judgment about the relevance of the findings within their own context, and this contributes to transferability of the findings (Mertens, 1998, p. 183).

3.6.2.1 Thick description

In this study, a single case containing detailed description of the methodology and findings was constructed to answer the research questions. This single case included descriptions about seven individuals and the impact of the intervention on them. This level of description should be sufficient to enable other researchers to replicate the study in other situations, or to deduce how the intervention might be applicable in their context. Therefore, the rich description, and also dependability of the data can allow other researchers to experience the study as if they had done it themselves (Patton, 2002).

3.6.2.2 Generalizability

In this study, the single case is based on a robust theoretical framework, and concurs with the “analytical generalization” recommended by Yin (2003, p. 183). The detailed description of the themes and patterns found in the data also enables naturalistic generalization, claimed by Merriam (1998) to be possible if other researchers use their

experience, intuition and knowledge to interpret the data in a study to seek patterns which could explain other situations which arise.

3.6.3. Dependability

This is a term used to describe the reliability of the data, and the methods used to “minimize the errors and biases in a study” (Yin, 2003, p. 37). In case study research, Yin (2003) recommends research processes are carefully documented, and a “case study protocol” is developed and adhered to during data collection, so that bias is reduced or eliminated (p. 67). Also, the research, when repeated, must demonstrate results which are “consistent with the data collected” and dependable (Merriam, 1998, p. 206). Therefore, for dependability, it is necessary to conduct the “same case study all over again, ... [and] arrive at the same findings and conclusions” as opposed to ... replicating the results of one case by doing another case study” (Yin, 2003, p. 37). Triangulation of the data also assists in measuring dependability when multiple records of collected data are audited (Seale, 1999). Also, assessing reliability as an ongoing process is favoured by Mertens (1998), through such means as a dependability audit.

3.6.3.1 Dependability audit

This type of quality check is used so that emerging patterns found during analysis can enable a change of approach during the study (Yin, 2003). For example, in this study, responses to the survey and patterns which emerged during analysis of the written reflections, helped to guide the structure of the participant interview questions. The patterns and themes, which became apparent in the written material, led to changes in the coding taxonomy used for measuring the levels of reflection in the written reflection assignments. A number of coding frameworks for analyzing the written material and the interview transcripts were also developed, and are outlined in Section 3.7.1.

The case study protocol was documented in notes and journal entries kept by the researcher during the study, and this is a record of the range of changes which were made as the research progressed. Additionally, all sources of data from this study are

available as both electronic and hard copy files and most are located as a project in NVivo, the software used in the analysis, and are also stored on an external hard drive, which means they are readily available for audit purposes (QSR, 2007).

3.6.3.2 Triangulation

As mentioned previously, there are multiple sources of data available for inspection. Triangulation is important for measuring both dependability and credibility of qualitative research (Mertens, 1998).

3.6.4. Confirmability

This is a measure of objectivity and involves an audit of the evidence to determine the trustworthiness of the data. The intention is for the data to be interpreted so that it reflects reality as closely as possible rather than as the researcher would like it to appear (Patton, 2002). This means, “the influence of the researcher’s judgment is minimized” (Mertens, 1998, p. 184). A confirmability audit or chain of evidence is recommended to ensure the source of all data can be located (Guba & Lincoln, 1994), and this can be done at the same time as the dependability audit (Mertens, 1998). A chain of evidence, according to Yin (2003), allows “the reader of the case study – to follow the derivation of any evidence” (p. 105). For example, in this study, the origin of the research questions, the theoretical framework on which the intervention and the Levels of Reflection taxonomy is based, the data comprising the results, and the theory informing the discussion and conclusions and recommendations can easily be tracked. Additionally, several approaches were used to analyse and interpret the data, and all phases are documented in detail in this thesis. As previously established, there are multiple sources of data, and materials used during the analysis process include several coding frameworks, annotations of queries which were run in NVivo, original work from participants, and interview transcriptions. Also, the thesis contains citations to specific data sources (based on recommendations by Yin, 2003), for example, participant interviews, quotes from the written reflections, and the subject lecturer

interview. Plus, the methods used in the study are cross-referenced to the results, a technique, also used by Yin (2003), to ensure a chain of evidence is available.

Additionally, a coding check, using the Levels of Reflection taxonomy, was carried out by a post-graduate student, on two samples of data. This measure of intercoder reliability is described in Section 3.7.3. The coding process used in the coding check was found to be similar to that used by the researcher, meaning the coding checker took a similar perspective to interpret the data.

3.6.5. Authenticity

To demonstrate authenticity in qualitative research, it is necessary to present a “balanced view of all perspectives, values and beliefs”, and this is defined as fairness (Mertens, 1998, p. 184). Fairness was estimated through the development of individual cases so that a range of perspectives about the intervention could be presented. Through these cases the reader learns about each participant’s experience through authentic “rich description, thoughtful sequencing, appropriate use of quotes, and contextual clarity so that the reader joins the inquirer in the search for meaning” (Patton, 2002, p. 65).

3.7 Data analysis

Analysis and interpretation of the data began during data collection with the researcher making notes, audio recordings and journal entries of her perceptions of the procedures. However, in-depth analysis of all components of the data did not occur until all data had been collected to reduce the potential for error. This approach followed a model recommended by Patton (2002) where collecting all the “raw case data”, and organising and classifying it to compile a “case record” is recommended prior to analysis and writing of the case (p. 450). This enables the raw data to be selectively analysed and collated for interpretation, prior to writing up the case. In this research, the frequency of writing at each level of reflection for each participant was calculated in the summative phase, before writing up the findings for the case, and prior to developing the individual case studies for each participant.

A range of approaches to data analysis was used, and detail about this is shown in Table 39 (Appendix 12), alongside the research questions, and the strategies used to promote reflection. For example, the frequency of survey question responses was calculated. Students' reflective writing was coded at the sentence level, then categorised using a range of different coding frameworks (see Section 3.7.1), and the frequency of the different categories and sub-categories was calculated. For example, the Levels of Reflection taxonomy was developed to analyse the written reflections. Also, thematic content analysis of written material and interview responses, and constant comparative analysis of patterns in the written material was carried out. The process of constructing categories to collate the data, according to Merriam (1998), is actual data analysis and interpretation, because the data is initially examined for recurring patterns (regularities), which then become the categories or themes into which data is eventually sorted. Congruent with this approach, the researcher expected to discover specific patterns and themes in the written data, and use this information as the basis for content analysis, subsequently developing further categories for coding and sorting the data. Initially, categories for content analysis were developed for the Levels of Reflection taxonomy using the theoretical framework underpinning the research. This occurred alongside the initial exploration of participants' writing in the written reflections.

The development of the interview questions provides another example of the manner in which the analysis process informed some of the data collection methods. The structure of the participant interview questions was initially guided by the Three-Step Reflective Framework. It was anticipated, however, that the survey responses and the writing exhibited by the participants would raise issues that could be clarified in the interviews. With this possibility in mind, the interview questions were not finalised until the survey responses and written reflections were gathered and a preliminary analysis carried out. Therefore, development of some of the data collection methods occurred, prior to data being gathered, and others were developed progressively, in response to the data. Categories are claimed to be important in helping to answer the research questions in a study (Merriam, 1998). Therefore, it was necessary to develop a classification system of coding frameworks, containing categories relevant for the various forms of data.

3.7.1 Classification system used for analysis

Four coding frameworks were devised for the classification system, to ensure the themes and patterns in the written data could be categorized in an organised manner. Several coding frameworks were developed to analyse different aspects of the participants' writing. Each framework had a different role, that is, one framework was used to analyse 'how' the students wrote (at different levels of reflection), and another was used to analyse what they wrote (content associated with their professional focus). This helped to ensure that a broad range and diversity of themes and patterns could emerge. This included the Levels of Reflection taxonomy, and three other coding frameworks which are listed in Table 5.

Table 5: Classification system used to analyse data.

Type of data analysed	Coding framework	Source
Written reflections.	Levels of Reflection taxonomy.	Literature – theoretical framework.
Written reflections.	Professional Focus coding system.	Participants – content analysis of participants' writing.
Written reflections.	Three-Step Reflective Framework coding system.	Researcher – steps in the Reflective Framework, and theoretical framework.
Participant interviews.	Professional Reflection coding system.	Researcher – interview questions and responses.

Shown in the right hand column in Table 5 is the source which informed each coding framework. For example, the source for the Levels of Reflection taxonomy was the theoretical framework which was developed following an exploration of the literature. The Levels of Reflection taxonomy is hierarchical, and contains categories which are mutually exclusive, unlike the other three coding frameworks. Two types of data, written reflections and participant interviews, were analysed using the classification system and are depicted in Table 5. All the coding frameworks can be found detailed in the Appendices (Appendix 14, 16, 18 & 19).

The Professional Focus coding system was developed alongside an examination of the patterns from the Levels of Reflection taxonomy, and this was in accordance with the constant comparison approach. For example, some participants reflected on their professional skills, and this led the researcher to define a category called *Professional capability* in the Professional Focus coding system. The Three-Step Reflective Framework coding system was developed from the steps of the Reflective Framework, and the theoretical framework informing it. This process helped to confirm the theoretical foundations of the Reflective Framework. Writing was analysed using this coding system only when the students had used headings from the template accompanying the Reflective Framework, as this indicated clearly that they had used the framework to structure their writing.

The variety of coding frameworks used for analysis demonstrates that a broad approach to inquiry was used, and a number of them were developed as a result of an initial investigation of the data. At the start of the analysis, data was examined without the use of pre-determined categories, moving later on, to a more specific and structured analysis of the data using the coding frameworks. This approach fits with the idea that qualitative research involves, “the practice of inquiry and the implausibility of any one point”, and can be regarded as representing a broad look at the data to prevent any important points being missed (Gillham, 2000, p. 7). This mix of structured and unstructured approaches is believed to be helpful when the researcher is uncertain about the type of data, which is needed to answer the research questions (Gillham, 2000). In this research, the coding frameworks enabled deeper analysis to occur, and they were developed later in the analysis phase, once the researcher had examined the reflective writing of participants. The categories used to describe the data were also part of the process of interpreting the data (see Section 3.7.1), and this approach is based on the work described by Merriam (1998). An overview of the steps taken to develop the case study and the procedures put in place is presented in Table 6, shown next. Six steps were used in the analysis phase: data management, investigation, description, classification, interpretation, and depiction. The way each was used to develop the case study is outlined along with a description of the processes.

Table 6: Processes used in the analysis phase.

Step	Development of case study	Processes
1. Data management.	Collected, created, arranged and stored data files.	Written assignments were downloaded from Janison, and stored electronically in categorised folders on the computer. The written material was also uploaded to NVivo, and stored as a project. Hard copies were printed and stored in a filing folder with sections for each participant. Word processing files were used to collate queries from NVivo, and tables of annotations were set up by the researcher (see example, Appendix 21). Data is also stored on an external hard drive.
2. Investigation	Scanned (lightly read) text material, read in more depth, made notes throughout the text, recorded initial ideas and developed initial codes.	Spreadsheets were set up once data was coded and calculations done. Measures of similarities and differences in themes and patterns were organised in a spreadsheet. 1. Data sources were read thoroughly several times. 2. Notes were made throughout the printed files re early themes and patterns, and anomalies. 3. Observation of trends in the data was noted in the researcher's journal, and initial ideas for codes were noted in the researcher's journal.
3. Description.	Information was collected to reveal details about the case.	1. Details of the setting and context were recorded in the researcher's journal. 2. Several sources were gathered to represent the development of the case such as the subject outline, feedback on assignments, researcher reflections and discussion about the workshop, participant interview transcripts, transcript of the subject lecturer interview and discussion. 3. Descriptive analysis, e.g., frequencies, was used to quantify themes and patterns which emerged after analysis with a software application (NVivo). 4. Aspects of the case were described in the researcher's journal.

Table 6 continued:

Step	Development of case study	Processes
4. Classification.	Categories were defined and units of measurement coded.	Coding categories emerged from: initial themes in the data; research questions; taxonomy and other coding frameworks based on theoretical framework; discussions with supervisors; and mind maps which were drawn to represent themes so that relationships and patterns could be visualised. Software (NVivo) suitable for data management and qualitative analysis was used to code data and investigate themes and patterns. “Categorical aggregation - Direct interpretation of individual instances and aggregation of instances” occurred (Stake, 2000, p. 74).
5. Interpretation.	Individual data sources underwent direct interpretation. Comparative analysis.	1. Data sources for each participant were coded using categories from the coding frameworks so that patterns and themes could be revealed and described. 2. Patterns and themes were described with illustrative quotes. 3. Matrices were generated using the NVivo analysis software used to reveal relationships. For example, to compare the frequency of self-questioning at Descriptive and Explanatory levels of reflection.
6. Depiction.	A general case and individual cases were constructed.	1. Findings from the analysis process are reported as a single case in Chapter Four (Results), and Chapter Five (individual case studies). 2. Data is presented and interpretations are described by the researcher’s discussion of findings, along with: Tables and Figures, quotes taken from the participants’ work, survey comments, and interviews. 3. Quotes are used in original form where possible. Additional or modified words were inserted in square brackets to clarify meaning where necessary. Spelling is only corrected to prevent confusion for readers.

In the next section, detailed description about each of the coding frameworks in the classification system is presented.

3.7.1.1 Levels of Reflection taxonomy

Five levels of reflection formed the main categories in this taxonomy, and each included several sub-categories. A summary of the taxonomy is shown in Table 7, shown next.

This taxonomy was used to investigate five levels of reflection in participants' writing: Descriptive, Explanatory, Supported, Contextual, and Critical. The first two levels (Descriptive reflection and Explanatory reflection) are considered to be lower quality reflective writing than the other levels of reflection. The five categories are listed alongside the sub-categories (shown in italics), and accompanied by a description of each category. An outline of each sub-category follows further on.

Table 7: Levels of Reflection taxonomy in summary (see full version, Appendix 14).

Categories and Sub-categories (in italics)	Description
1. Descriptive reflection - <i>Noticing, Deciding, Stating, Self-Questioning, Goals.</i>	Writing is superficial with descriptions about what has happened and the decisions made but not why.
2. Explanatory reflection – <i>Personal; Professional; Deciding; Self-Questioning; Reactions; Learning; Stating; Goals.</i>	Analysis of the experience from a personal or professional perspective about decisions, reactions, learning and goals.
3. Supported reflection — <i>Evidence Mentioned; Evidence Identified; Learning from Evidence; Reactions to Evidence.</i>	Evidence from the literature is mentioned in some way or referenced.
4. Contextual reflection – <i>Analysis; Cross-Linking; New Perspectives.</i>	Different perspectives are considered.
5. Critical reflection — <i>Application of Learning.</i>	Multiple perspectives and consideration of wider professional issues.

The taxonomy is unique to this study and is based on work by several researchers (Allen & Jeffers, 2002; Hatton & Smith, 1995; McCollum 2002; Sparks-Langer et al., 1990; Ward & Cotter, 2004) and is described fully in Section 3.7.1. The full taxonomy can be seen in Table 40 (Appendix 14). Several frameworks informed the development of the Levels of Reflection taxonomy, and a comparison of their alignment with the taxonomy developed for this research is shown in Table 38 (Appendix 10). A comparison of the new taxonomy with the frameworks which informed it makes it clearer for other researchers to see the similarities and differences in terminology and criteria and may assist them in further research in the area.

In this research study, the term Descriptive reflection is used to define level one writing which is descriptive as well as reflective, and also includes feelings, a point of difference with other frameworks where the first level of writing is regarded as non-reflective (e.g., Hatton & Smith, 1995; and Sparks-Langer et al., 1990). Even so, reflection at the Descriptive level, in this research, was expected to be superficial, and without any analysis of the experience, or the decisions made at the time of the experience. According to Hatton and Smith (1995), reflection occurs once justification is provided, and the experience is explored in depth, and they labeled this Descriptive reflection. However, in this research, this level of reflection was categorised as level two, Explanatory reflection.

The third level of reflection in the taxonomy was categorised as Supported reflection, and was expected to include references to theory. Contextual reflection was the fourth level in the Levels of Reflection taxonomy, and was based on the concept of dialectic thinking which involves the recognition of personal belief systems and how they fit with others' perspectives (Allen & Jeffers, 2000). Critical reflection is also included in the Levels of Reflection taxonomy, as the fifth level of reflection. Critiquing how learning will be applied in practice is also included at the fifth level, and this is not generally a feature of other frameworks.

3.7.1.1.1 Coding using the Levels of Reflection taxonomy

The coding approach used for the Levels of Reflection taxonomy is explained in detail in this sub-section. During the data coding process, the categories in the taxonomy were modified to account for the characteristics of the content. For example, several participants used questions in their writing at the Descriptive and Explanatory levels of reflection, and therefore, a sub-category called *Self-Questioning* was added to the taxonomy. This process, of developing and exploring categories and investigating relationships between them, is referred to as constant comparative analysis (Glaser & Strauss, 1967). However, the procedure used in this study was not used to develop theory as recommended by Glaser and Strauss (1967), and aligns more closely with the method described by Maykut and Morehouse (1994), as illustrated in Figure 3. This is

because an “exploration of relationships and patterns across categories”, and “integration of data”, similar to the procedure described by Maykut and Morehouse (1994, p. 135), led to an understanding of the case.

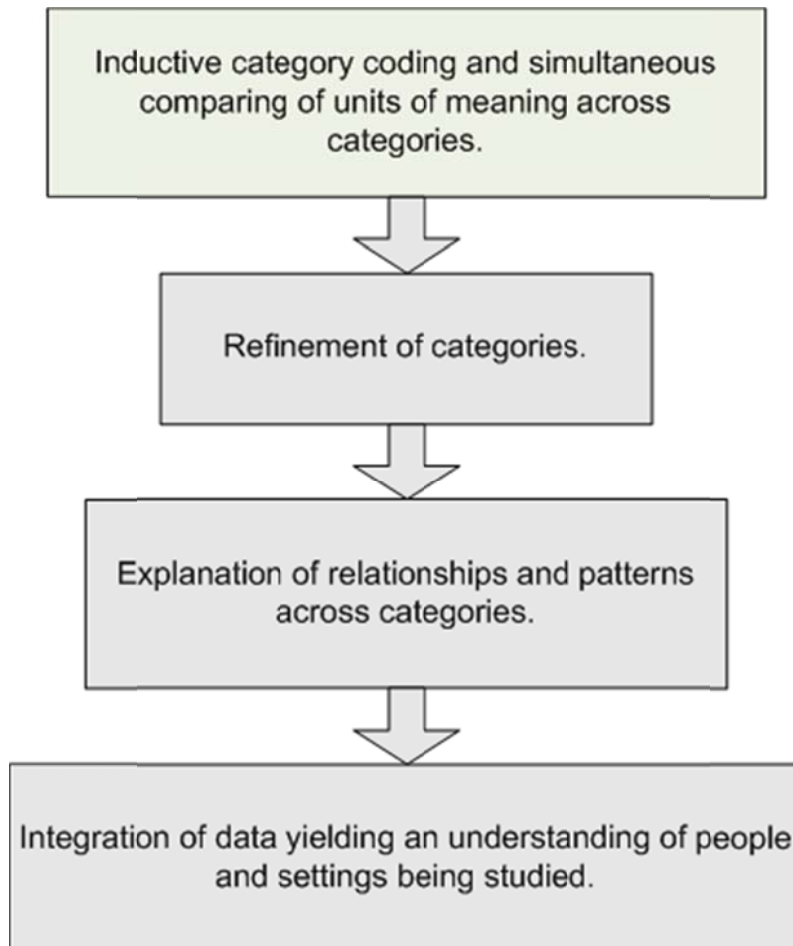


Figure 3: Constant comparative method of data analysis (reproduced from Maykut & Morehouse, 1994, p. 135).

Constant comparative analysis is also described as a way to “interact with the data” and ask questions of it, so that the complexity of the data is revealed (Mertens, 1998, p. 171). Therefore, the method used in this study disclosed layers of meaning in the form of categories, and helped to reiterate the initial theoretical basis of the approach, and this was done through the data. Data was grouped together on the basis of the similarities it exhibited to become a category. For example, data at each of the levels of reflection was categorised according to the dimensions of reflection found in the writing. When this approach of categorisation is used in qualitative research, it enables patterns to be

looked for in the data (Patton, 2002). For example, the frequency at which participants wrote at different levels of reflection, or how often they mentioned professional or personal aspects in their writing was examined for patterns or trends. Constant comparative analysis was also used to compare the similarities and differences between data components when patterns in participants' professional focus (the way they wrote about their professional areas) were examined. By looking at the relationships between variables in the data, for example, levels of reflection and writing at each of the three steps of the framework, interpretations about the variations in reflective writing were conceptualised in relation to the theoretical framework.

During initial coding, each sentence of text in the written reflections was coded into one of the levels of reflection. This allowed the researcher to roughly estimate the levels of reflection in participants' writing. (Each sentence was regarded primarily as a unit, but may also be described as a reference or an instance in the results chapter.) However, coding with only the level of reflection was not sufficient to allow the patterns in participants' writing to become apparent. Therefore, sub-categories were added to the taxonomy to broaden the analysis. This occurred in response to the 'first run through' with the data, enabling aspects associated with the research questions, and the steps and prompts of the Three-Step Reflective Framework to be included. For example, at Step 1 of the Reflective Framework, participants were given the following headings to encourage Descriptive reflection:

- Take notice & describe the experience - description of evidence;
- What do you do, know, feel, think, need?
- What decisions did you make?

Therefore, particular sub-categories were allocated to the taxonomy to capture writing about what participants were: 1. noticing (doing, knowing, feeling, thinking, and needing); and 2. deciding about their experiences. This allowed a deeper analysis of their writing at the Descriptive level of reflection, and permitted patterns such as 'noticing' and 'deciding' to materialize. New sub-categories were only added when several instances of a particular type of writing were found, and no existing sub-

category was suitable. For example, the *self-questioning* sub-category (as previously mentioned) was added to the taxonomy when several instances of questions were found in participants' writing. The aim was to develop sufficient sub-categories for a fine-grained analysis but ensure that the overall coding scheme was still manageable.

If only the categories denoting the levels of reflection had been used to code the data, the diverse manner in which participants wrote about their experiences would have been missed. Therefore, each sentence in participants' written reflections was coded with one *sub-category node* for the appropriate level of reflection (also regarded as a category), and this process using NVivo software is further explained in Section 3.7.2. Each level of reflection is described in the following paragraphs.

Descriptive level of reflection

At this level of reflection, sub-categories included *Noticing* and *Deciding*, as these were expected from the structure of the Reflective Framework. Different sub-categories were pre-determined by the sections of the Reflective Framework, but others emerged because of the way participants were writing. For example, some participants used self-questioning or listed goals, and made statements which did not have a particular focus, hence, there was a need to code these types of writing using sub-categories such as *Self-Questioning*, *Goals*, or *Stating*. This helped to differentiate the way in which participants were writing, and the type of reflection they were exhibiting. A description of each sub-category demonstrates the different types of reflection which were possible at this level.

Noticing - describes the process - what has happened and what he/she sees, knows, feels, thinks, needs at a superficial level.

Deciding - decisions are described but no reasons are provided.

Stating - states what occurred without providing rationale or emotional responses.

Self-Questioning - states an actual question without reasoning apparent.

Goals - stated or implied with no reasons given.

Explanatory level of reflection

At the Explanatory level, the sub-categories which were pre-determined by the structure of the Reflective Framework included *Deciding* and *Reactions*, which were guided at Step 2 by the heading: *Analyse the experience - implications of decision/action, reaction*; and two sub-questions:

- Why these decisions and actions?
- What was your reaction?

During the coding process, the other sub-categories which emerged were added to the coding scheme. For example:

Personal – perspectives from a personal angle;

Professional – explanations about professional practice;

Stating – simple sentences with explanations which did not fit in any other sub-category;

Self-Questioning – described writing where participant's asked questions of themselves about their decisions or processes;

Goals – intentions for their learning or way forward.

Some of the sub-categories at the Explanatory level were similar to sub-categories at the Descriptive level of reflection (e.g., *Deciding*, *Stating*, *Self-Questioning* and *Goals*) - whereas others were quite different (e.g., *Reactions* and *Learning*). Sub-categories, such as *Personal* and *Professional*, were only used for the Explanatory level of reflection to represent personal and professional aspects which emerged in participants' explanations and analysis of practice. References to personal or professional issues at the Descriptive level of reflection were captured by the *Noticing* sub-category.

Supported reflection

Supported reflection, as a category, enabled instances about the evidence participants used in the design processes to be coded. Four sub-categories were used at this level, and the first two, as shown in the list below, were most frequently assigned to the data.

Evidence Mentioned – theoretical evidence was written about but not cited.

Evidence Identified – references were cited from the literature.

Learning from Evidence – participants mentioned what they had learned specifically from theory.

Reactions to Evidence – opinions and beliefs about what they were reading were described.

Participants tended not to refer to personal or professional matters at the Supported level of reflection, and therefore, sub-categories to capture these were not needed.

Contextual reflection

This category was included in the taxonomy, and was used to capture dialectic reflection, as described by Allen and Jeffers (2000) in the theoretical framework on which the taxonomy was based. Although, the data was investigated for evidence of this level of reflection, after much exploration and re-adjustment of the definition, no sentences could be coded using this category. No headings or prompts were included in the Reflective Framework to guide participants to write at this level, where multiple perspectives in relation to their own ideas and beliefs were critiqued and discussed. Even so, three sub-categories were assigned at this level.

Analysis - different perspectives were given in relation to their own.

Cross-Linking - different sources were mentioned relative to their importance and the participants' perspectives.

New Perspectives - new ways of thinking were discussed.

Critical reflection

One sub-category was assigned at this level - *Application of Learning* – when participants wrote about what was learned and how it would be applied. This sub-category was prompted in the Reflective Framework at Step 3. However, the intricacies of critical reflection such as socioeconomic, political, cultural, and multiple theories, principles and multiple perspectives were not prompted in the framework. After the data had been coded using the Levels of Reflection taxonomy, a second coding framework was used to examine what the participants wrote in relation to their practice in the subject or workplace, that is, their professional focus.

3.7.1.2 Professional Focus coding system

This coding system, like the others, was developed specifically for the project. Categories and sub-categories (in italics) are listed in Table 8 with a description alongside. This coding system, in particular, was developed following an exploration of the content of the written reflections, extracted unit by unit, by running queries in NVivo using the Levels of Reflection taxonomy. The units of data were annotated and an example of the process can be seen in Table 45 (Appendix 21). This process revealed five prevalent themes in the data which were formed into the Professional Focus coding system.

Table 8: Professional Focus coding system in summary (see full version, Table 41, Appendix 16).

Categories and sub-categories (in italics)	Description
Professional practice -- <i>past, present, future</i> .	Experiences, knowledge and beliefs in the past, present and future in relation to professional practice.
Professional capability - <i>critique, learning, application</i> .	Existing professional skills are discussed and areas for up-skilling are mentioned.
Professional relevance - <i>theoretical, technical</i> .	The focus of the approaches, relevance, issues/challenges and how they can be useful professionally.
Professional constraints – no sub-categories.	Aspects which hinder or pose barriers.
Wider profession – no sub-categories.	Principles and concepts which are discussed broadly in the context of the profession.

Full descriptions of each sub-category can be found in Table 41 (Appendix 16). The written reflections were examined using the Professional Focus coding system to detect themes, and these are compiled in Table 42 (Appendix 17). An example of the type of themes found in three participants' writing can be seen further on in Table 10. A further coding framework used to investigate participants' writing at each of the three steps of the framework is described next.

3.7.1.3 Three-step Reflective Framework coding system

This coding system was developed to analyse the writing produced by participants who used the Three Step Reflective Framework. This coding system was based specifically on the steps of the Reflective Framework, and has three categories called: Step 1, Step 2, and Step 3. The full Three-Step Reflective Framework coding system can be found in Table 43 (Appendix 18). Each category has two sub-categories described below, and these are similar to the sub-categories in the Levels of Reflection taxonomy.

Step 1:

Noticing - writes about what he/she does, knows, feels, thinks, needs and how it relates to the professional career.

Deciding - decisions are described but no reasons are provided.

Step 2:

Explanation – why actions and decisions were helpful or necessary, what worked and what did not.

Reactions - reasons for intellectual, emotional and physical responses.

Step 3:

Learning - explanation of what was learned and what helped.

Application - explanation of how the learning will change or affect future practice.

Each sub-category was defined in the same way as the matching sub-categories in the Levels of Reflection taxonomy. Writing was analysed using this coding system only when the student's submitted assignment had used the headings from the framework, thereby indicating their working for each step. This was taken to indicate that they had used the framework to structure their writing. Therefore, for each step in the Reflective Framework, codes were only allocated to sentences written under headings or questions for that step. Each sentence was coded with one sub-category or category node only. Coding the data at each step was insufficient on its own, but was necessary so that comparisons could be made between data coded at each of the three steps, and data coded at the five levels of reflection (using the Levels of Reflection taxonomy). To analyse whether a particular level of reflection occurred when writing at each step, participants' writing in the written reflections was examined using the Query/Matrix function in NVIVO. A cross analysis, between each level of reflection and each step on the framework, was obtained by selecting all categories.

3.7.1.4 Professional Reflection coding system

This coding system was developed in preparation for coding the participants' interview transcripts. Five categories (and no sub-categories) were used for coding and they are listed below with the definitions alongside. This coding system in its entirety can be found in Table 44 (Appendix 19).

- *Past reflection* - familiarity and experience with reflection before taking the subject.
- *Current reflection* - reflection during the subject.
- *Reflective Framework use* – feelings and opinion about the helpfulness and usefulness of the reflective framework, and how it was used.
- *Future reflection* - use of reflective techniques in general to put together a professional portfolio in the future.
- *Opinion reflection* - opinions about using reflective techniques to help professionally.

Each interview transcript was examined manually using this coding framework as a guide, and responses relating to each category were compiled to form narration. In the section which follows, the way in which the software NVivo was utilised in the research to assign codes is detailed.

3.7.2 Use of NVivo

Once the researcher collated all the data which was collected, and developed a classification system, NVivo was used to categorise it. NVivo is a software application which can be used to organise and analyse any volume of data effectively (QSR, 2007). However, data analysis software is only a tool, and is “usually most helpful if [the researcher] knows what to look for” (Yin, 2003, p. 110).

A project was set up in NVivo and all the written data intended for analysis in the research was imported into the software application, and organised in folders. The files were in Microsoft Word or rich text formats; however, other formats such as pdf could have been used as well. The software enabled the material to be sorted into meaningful sets of sources ready for coding. A classification system using two coding frameworks (Levels of Reflection taxonomy and the Three-step Reflective Framework coding system) was set up in NVivo, as tree nodes, ready for coding the material. As mentioned previously, the coding frameworks originated from various sources, including a process of manual coding. This is an approach recommended by a number of qualitative researchers (e.g., Glaser & Strauss, 1967; Lincoln & Guba, 1985; Maykut & Morehouse, 1994; Mertens, 1998).

When the written reflections were analysed using NVivo, each sentence was coded using the classification structure (Tree Nodes) set up for the levels of reflection. In the initial phase, several codes were applied to each sentence (unit), and these were systematically checked until just the most suitable code was assigned to each, and then the other codes were removed. Therefore, the process occurred like this. In the first stage, each sentence was coded with a category (node), or sub-category (sub-node) from the Levels of Reflection taxonomy, according to the level of reflection (category)

exhibited, and the type of reflection found in the writing (sub-category). For example, if a participant gave the reasons for an idea, concept or process, that is explained what occurred, this was regarded as Explanatory reflection. If the explanation did not fit any of the sub-categories for that level, for example, *Learning*, *Reactions*, or *Deciding*, the sentence was coded as *Stating*. If the participant demonstrated reasoning about a situation or experience which related, for example, to their professional practice, the sentence was coded with the sub-category *Professional*. This unit of analysis is referred to as Explanatory/ Professional in the Results in Chapter Four. Codes were assigned, and checked two or three times until the researcher was satisfied that the correct level of reflection and type of reflection was assigned to each unit. As the researcher moved through the data, sentences which were challenging to code were annotated using the annotation tool in NVivo, so they could be returned to later and checked more closely. Eventually, after several quality checks, done in this systematic fashion, the data was organised into what is known as individual units of meaning (Herrington & Oliver, 1999), or instances (Stake, 1995).

As mentioned previously, sub-categories also evolved as the data was coded in response to what the participants had written. Careful checking of each sentence was needed, to ensure all units were coded accurately. This was done as a manual check, later on, using the *coding density* facility, and again during reruns of the *query* function in NVivo. The same process was undertaken when coding the written reflections using the nodes for the Three-Step Reflective Framework coding system. Particularly, at the beginning stages of analysis using NVivo, units of text where issues arose were annotated using the tool within the software specifically for this purpose. The annotations enabled a record of how the coding was developed. For example, some text was difficult to categorise as one particular Step in the Three-Step Reflective Framework coding system. Therefore, the annotation, which was created about the issue, contained an explanation of the coding options and the dilemma which had arisen. The annotation written about the statement by Qadir in his first written reflection assignment illustrates this.

Recoded as Step 3 - this sentence does not exhibit characteristics of the learning and application sub-categories at Step 3, so was coded as a main Step 3 category.

The annotation referred to the following statement:

In my opinion, MD is one of the most important subjects because it deals with the Design that is one of the Instructional Design's five steps (Analysis, Design, Development, Implementation, & evaluation). (Qadir, Written Reflection 1.)

The queries run in NVivo had a two-fold purpose. Codes could be checked – some queries drew several sentences in a chunk, as opposed to one sentence per query, which was the required unit of measurement. This meant errant sentences needed to be re-coded, and the queries repeated. Additionally, data was organised for annotation outside NVivo. This was done by collating query results in tables for each level of reflection, and for each participant. An example of the annotated data for one participant, Qadir, can be seen in Table 45. The full list of codes added to NVivo, including definitions for each and examples of text coded with the categories and sub-categories, can be viewed in the Levels of Reflection taxonomy (Table 40, Appendix 14), and the Three-Step Reflective Framework coding system (Table 43, Appendix 18). Coding checks were carried out to ascertain intercoder reliability of the assigned categories, and the process is outlined next.

3.7.3 Intercoder reliability

To assess the quality of the content analysis used in the research, it was necessary to check for intercoder reliability. In other words “to measure the percent of agreement between raters”, as a means of assessing the accuracy of the codes (Stemler, 2001, p. 6). Therefore, an external coder, a post-graduate researcher, was invited by the research supervisors to undertake a coding check on a sample of content, previously analysed by the researcher. It is necessary for “reproducibility, or inter-rater reliability”, to find out if the “coding schemes lead to the same text being coded in the same category by

different people” (Stemler, 2001, p. 5). The aim of undertaking a coding check is to ensure the coding classification system is consistent and non-ambiguous, and as recommended by Stemler (2001), able to be used by others apart from the researcher.

Even so, it was considered essential to get another person to rate the levels of reflection in participants’ writing, using the taxonomy which the researcher devised for coding the written reflections (that is, the Levels of Reflection taxonomy). The external coder was required to manually code the material, sentence by sentence, in two participants’ written reflections, and Yonten’s and Qadir’s reflections were used.

Overall, a 6% difference was found between the researcher’s coding for the written reflection prepared by Yonten, and the check done by the external coder. Up to 6% was the agreed percentage difference which was acceptable to the research supervisors and the researcher, that is, an agreement of 94%. This percentage is based on work by Stemler (2001) who recommends 95% agreement, and Lombard, Snyder-Duch and Bracken (2002) who claim that 90% agreement and higher is acceptable when *percentage agreement* is used for checking intercoder reliability. For the second written reflection, prepared by Qadir, the researcher’s coding was maintained, since no difference was found between the researcher’s coding and the external coder’s interpretation. The following processes were used to measure the percentage difference in coding.

In Yonten’s written reflection, a total of 33 sentences were coded. Initially, a total of eight instances demonstrated a difference in coding, between codes allocated by the researcher, and those used by the external coder. On further examination, only two examples of coding which demonstrated clear disagreement were noted. For example, in three of the eight instances, the coder checker had coded three of the items in a bulleted list separately when they were in fact linked via a colon and should have been coded as one unit (as it was one sentence) at the Explanatory level of reflection. This sentence containing five bulleted items was coded by the researcher as Explanatory/Deciding since the participant was clearly explaining his decisions. Therefore, misinterpretation by the coder about the use of a colon for punctuation

appears to have led to the difference in interpretation. In other three instances, the context of the surrounding writing was not taken into account by the coder checker, and this was regarded by the researcher as important for deciding on the correct coding, and was a process used consistently when coding all the written reflections. However, in one instance of difference, it was apparent that the difference in coding was due to an ambiguous definition of Contextual reflection in the Levels of Reflection taxonomy. As a result, the description of Contextual reflection was rewritten slightly to make it clearer to understand.

Similarly, the same process was followed for the written reflection prepared by Qadir, and a total of 36 instances were coded. In eleven instances, disagreement initially occurred in the coding for different levels of reflection; however, the researcher's coding was maintained in all instances, and the reason for this is explained next. This meant that 100% agreement between coders was obtained. Again, the differences appeared primarily to occur due to a lack of consideration by the coder checker for the context surrounding the instances. The context of surrounding sentences was considered by the researcher to be a very important part of the coding process and was used in conjunction with key words. The importance of considering the context and where sentences were placed in the overall meaning of the writing came about through a prolonged process of coding and interpretation of the data by the researcher, and an indepth understanding of the coding system developed by the researcher and the theoretical framework underpinning the research. The independent coder, of course, could only take the coding system and the words in each sentence at face value using a prescriptive rather than the interpretative approach used by the researcher. This method is acceptable in qualitative research as interpretation is a major aspect of this type of research. The intercoder reliability check was not only a check to make sure that the data was being coded appropriately, but it also provided an opportunity for the researcher to justify the interpretations being made about the data. The following example demonstrates the differences in interpretation when the context of surrounding sentences is considered.

Qadir stated: “I started using visual-Audio aids”. The independent coder coded this sentence as – Descriptive/Deciding, whereas the researcher regarded it as Explanatory/Personal for the following reasons. When linking the sentence in context to the previous sentence – “I decided to change my learning style to new one which uses the educational technology as instructional tools to achieve the learning objectives.” It also fits with the sentence following, as part of an explanation: “I used computer-based learning to ensure achieving learning objectives. In fact, I quickly discovered that the cognitive process of learning has significantly increased by using variety of instructional design and instructional technology to support the achievement of the learning objectives.” In both cases the sentence fits as part of an explanation of why he tried something different. The ‘I’ word makes it personal.

Two instances of difference relating to coding for Contextual reflection were not accepted by the researcher, but the results from the coding check for the other participant influenced the decision to redefine Contextual reflection slightly so it was more clearly described. This process of modifying classification categories during content analysis is regarded as an acceptable practice by researchers such as Mayring (2000) and Neuendorf (2002). Intercoder reliability checking can provide an opportunity for the researcher and coder checkers to discuss the definitions used in the classification process and may lead to changes (Mayring, 2000). According to Neuendorf (2002), “rewriting coding instructions to clarify measurement” or “changing the categories of the variable” is expected if differences are found between coders (p. 147-148). In this study, this opportunity for discussion about the definitions occurred with the research supervisors instead of with the external coder, and agreement was reached about the definitions used in the Levels of Reflection classification taxonomy. Therefore, the definition for Contextual reflection was revised to remove any ambiguity and avoid misinterpretation by someone unfamiliar with the research, as was the case with the independent coder. Even though the study followed the protocol recommended by Neuendorf (2002) of using a minimum of two coders, it would also have been beneficial to train the coder in the use of the taxonomy. However, an acceptable result was obtained, without the coder being trained in use of the taxonomy. More detail

about the processes used to interpret the data for emergent themes and patterns are described in the following section.

3.8 Interpretation of data

An interpretative analytical process was used to investigate the individual data sources, previously described. The descriptive analysis phase occurred when data was processed in NVivo, and subsequent frequencies were collated and manipulated in Microsoft Excel. Once this process was completed, patterns inherent in participants' reflective writing were investigated. To do this, the frequency of writing at each level of reflection (main categories – Descriptive, Explanatory, Supported, Contextual and Critical) was compared across the seven participants (Table 50, Chapter Four).

Before this was done, the overall number of incidences of each level of reflection was counted and presented as units (See Table 13 showing the number of units of different types of reflective writing at five levels of reflection in Chapter Four). Frequencies and patterns apparent in each of the sub-categories were calculated, and presented for each level of reflection. For example, several sub-categories for Descriptive reflection are apparent in Figure 6 (Chapter Four). In some situations, the number of incidences was counted and presented as units not frequencies. For example, in Table 16 (Chapter Four) the number of units is shown for the sub-categories *Deciding*, *Learning*, and *Goals* at each step of the Reflective Framework. The same was done for other levels of reflection. The detail about the process undertaken to interpret each of the research questions is outlined further on. Two predominant patterns emerged in the investigation of the research questions: 1. levels and types of reflection; and 2. professional focus.

3.8.1 Levels and types of reflection

An interpretation process was undertaken, and comparisons were made across the levels and types of reflection. The manner in which the levels of reflection were interpreted has previously been described. The types of reflection in participants' writing were estimated by examining the frequency of the sub-categories which were found at each

level, for example, *Noticing*, *Learning*, *Deciding*, *Professional*, and *Personal*. Observations about participants' writing were described. The patterns which became apparent in the writing are reported in the Results (Chapter Four). A sample of the comparative analysis completed for three participants is shown in Table 9, on the next page. The same process was used for all seven participants and the findings are reported in the individual case studies in Chapter Five.

Table 9: An example of comparative analysis of levels and types of reflection (n = 3).

Qadir	Marie	Nicholas
Four different levels of reflective writing. Writing predominantly - Explanatory (level 2) reflection, Statement superficial reasons. Descriptive reflection – little written about what he was noticing, feeling etc. during the design process. Ranks 7 th . Information about the learning object (LO) structure – usability features, formats and content of LO, software for creating LO, multimedia design and learner, progress of the LO.	Three different levels of reflective writing. Writing predominantly- Descriptive (level 1) reflection), and is an open and honest account of her professional journey. Descriptive reflection – wrote almost a third of her descriptive reflection about what she was noticing, feeling etc. during the design process. Ranks 3 rd . Uses concept mapping to plan design of learning objects and gives an open and honest account of her professional journey. More...	Three different levels of reflective writing. Writing predominantly- Descriptive (level 1) reflection, and Explanatory (level 2) reflection are both very similar. Descriptive reflection – wrote almost a half of his descriptive reflection at this level. Ranks 4 th . Thinking around the use of software for creating the LO; <i>Noticing</i> . Wrote positive statements about feedback on a LO – relates to feedback from the lecturer, decision-making about the possible ...More...
Explanatory – ranks 1st. Wrote almost two-thirds at this level although the depth of his analysis was low. Some repetition of sentences and ideas both within and across reflections. More...	Explanatory – ranks 5th. Over a third of the writing was analytical and provided explanation for actions and processes. Contains quite a lot of personal reflection relating to her career, learning, design ideas, teaching approaches, and her skills. More...	Explanatory – ranks 4th. A lot of explanation given for the choice of software and content and problem-solving. Integrates his thinking so sentences are less stand-alone. A process of thinking and deciding about the design of the LO - software, content, usability for users - is evident.
Supported reflection - rank 7th - referred to one item of referenced evidence to validate his ideas for designing learning objects.	Supported reflection - rank 4th - seven instances directly reference what she is writing about; the topic of education and teaching is referenced More....	Supported reflection - rank 2nd - referred to six items of referenced evidence to support his writing.
Critical reflection (level 5) - small amount.	Critical reflection (level 5) - none.	Critical reflection (level 5) - none.

As well as interpreting the levels and the types of reflection found in the written reflection sources of data, the same material was checked for themes around participants' professional focus.

3.8.2 Professional focus

The Professional Focus coding system (Table 41, Appendix 16) was used to look for themes in participants' writing about their professional practice. Annotations from the initial phase of analysis were examined for emerging professional focus themes such as *Professional practice* and *Professional capability*. Common themes were incorporated into the coding system. Examples of the participants' statements under each of the themes were collected for inclusion in the coding system, as quoted examples. Next, the written reflection material was examined manually using the categories of the coding system. Following this process, themes which emerged for each participant were collated. An example of how the themes were collated for interpretation can be viewed in Table 10.

Table 10: Professional focus themes emerging from written reflections (n = 3).

Qadir	Marie	Nicholas
Professional background.	Professional background.	Current professional practice.
Past professional practice – experiences and knowledge.	Past professional practice – experiences and knowledge.	Professional role.
Current professional practice.	Current professional practice.	Application to practice.
Application to practice.	Professional capability – PD.	Building on and extending professional skills.
Professional capability. (Qualifications needed for profession).	Application to practice.	Professional capability – up-skilling pedagogy, and technical.
Future professional practice – career.	Wider profession.	Workplace issues and context.
Application of professional learning to practice.	Critiques own professional weaknesses.	Application of professional learning to practice. Designs from the angle of a gap in practice – professional capability (others').
Wider profession.	Pedagogy.	Designs from the angle of a gap in practice - availability of resources in the workplace.
Own beliefs.	Professional perspective.	
Professional perspective.	Professional context.	
Pedagogy.	Future professional practice – career.	Professional constraints – time, users, existing skills, challenging software, colleagues, professional decisions, process undertaken, professional perspective, professional context.
Professional context.		
Wider issues.		

As can be seen in Table 10, themes were organised to enable a comparison of similarities and differences. Professional focus themes for all participants are depicted

in Table 42 (Appendix 17). A full description of the themes and a discussion of the findings can be found in the Results (Chapter Four).

3.8.3 Analysis and interpretation of patterns

Once the data was analysed and interpreted, patterns which were forming in a consistent manner were sought. For example, writing at particular levels of reflection and the areas on which participants concentrated (that is, type of reflection) were found to have particular patterns. For example, there was a pattern of decision-making about the design process in which participants were involved. Some of the patterns were established following tabulation of percentage frequencies. This was done to establish how often each participant wrote at a particular level of reflection. For example, a pattern of Descriptive and Explanatory levels of reflection was apparent in the written reflection assignments (see Table 50 (Appendix 23). As a result of matching the patterns which were found in the data, explanations about the case and the individual case studies were built.

Yin (2003) describes “pattern matching logic” as a powerful technique for use in case study research, but claims it requires practice if optimal outcomes are to be obtained (p. 136). The importance of ensuring all the evidence is examined is needed to produce findings of the highest quality (Yin, 2003). This relies on analytical techniques which are used and which demonstrate a high level of skill. The end result, according to Yin (2003), should be the presentation of case studies which enthrall and hold a reader’s interest as the author informs the audience about the issues under investigation. The patterns which emerged in the data are reported in detail in the Results (Chapter Four), and in the Individual Case Studies (Chapter Five). Another process used in the research was the analysis and interpretation of written feedback and this is outlined next.

3.8.4 Analysis and interpretation of written feedback

The written feedback provided by the subject lecturer (Penny) was analysed manually. To do this analysis, the written feedback provided to each participant, on each of their

four written reflections, was examined for trends and common phrases. These were categorised so that themes and patterns in the type of scaffolding provided by Penny could be described. For example, acknowledgement, affirmation, encouragement and guidance were found to be common themes (Table 17, Chapter Four). The differences and similarities in Penny's feedback for each participant were studied, along with any patterns in the way she provided feedback on each group of written reflections. It was also important to find out participants' perspectives on this feedback. This part of the analysis occurred in two ways. When the content of the written reflections was examined, descriptions about Penny's feedback were sought. Also, participants were asked specific questions in the interviews about the feedback they were given. Responses were collated from the transcriptions prepared for the interviews. The coding framework approach was not used for this particular part of the analysis, because it was imperative that the data was formed into emergent categories, rather than slotted into pre-determined ones.

3.9 Summary

In this chapter, detail about the research design and the case study intervention, and the methods used to collect data is covered. As part of the research design, the context of the research was described along with the origin of the intervention used in the study. Findings from the preliminary study are outlined, and the recommendations which led to the main study are presented. Information about the process undertaken for ethics approval and recruitment of participants is provided, as well as the roles of the subject lecturer, researcher, and the participants. The intervention in the subject, that is, the Three-Step Reflective Framework is described in detail. Specific methods of data collection and analysis are explained, along with the processes of comparative analysis, and the ways in which the categories used in analysis evolved into a classification system. The various coding frameworks and the categories which were constructed for coding purposes are described. Detail about the software application, NVivo, a tool which was used to assist analysis and interpretation of the data is explained. Examples of data and how they were interpreted, based on levels of reflection and professional

focus, are shown to illustrate the processes undertaken. Lastly, the methods used to establish patterns in the data, and analyse and interpret written feedback are outlined. The findings of this research are presented as a case in Chapter Four.

4 CHAPTER FOUR: RESULTS

4.1 Introduction

Findings are organised descriptively in five sections.

- An introduction to the participants.
- Participants approaches to reflective writing.
- Use of the Three-Step Reflective Framework.
- Feedback as a form of scaffolding.
- The impact of reflective writing - professional perspectives.

Where appropriate, quotes are presented to illustrate points of interest. Quotes are taken from participants' responses to the survey, and their writing.

4.2 An introduction to the participants

Nicholas and Ruth were the only respondents who had previous experience with keeping a journal previously in a professional capacity, although Ruth also mentions the teenage years (Table 11). Both had a similar length of experience in keeping professional journals. Ruth had kept an academic journal for three years, and Nicholas maintained one for two and a half years. Previously, baseline information (such as gender, occupation and role, and professional qualifications) about the participants, obtained from the survey, was presented in Table 4 (Chapter Three) as an introduction to the participants. (The survey questions can be found in Appendix 13.)

Table 11: Participant survey responses - previous experience in reflection and the use of journals (n=7).

Name and previous experience with reflection		Type of journal	Format of journal	Purpose of journal	Length kept	Comments about keeping a journal
Qadir	No	n/a	n/a	n/a	n/a	Nil
Marie	No	n/a	n/a	n/a	n/a	Nil
Nicholas	Yes	Blog.	Electronic.	Nil	2.5 years	Primarily news/info/links oriented - not a lot of reflection.
Teresa	No	n/a	n/a	n/a	n/a	Nil
Yonten	No	n/a	n/a	n/a	n/a	Nil
Ruth	Yes	Diary, scrapbook, learning log, portfolio, blog, posit notes.	Electronic, handwritten.	I have used many types but find electronic most useful.	3 yr Academic teenage years.	Nil
Nabil	No	n/a	n/a	n/a	n/a	Nil

Ruth also mentioned keeping various journals (diary, scrapbook, learning log, portfolio, and blog), especially throughout her teenage years which suggests that she did not read the question correctly (Table 11). Both Ruth and Nicholas had used electronic formats for their journals, and although Ruth had kept hand-written journals as well, she appeared to have a preference for electronic formats. In Ruth's case, the purpose for journaling was related to professional development, with Nicholas using a blog for recording news, information and links to other material. He stated he did not use the blog for reflection.

For some reason, only two participants (Nicholas and Ruth) responded to the survey question about how they normally reflected on their performance and experiences in their professional life. Nicholas stated that “discussion with colleagues” (survey) was the method used, and Ruth responded: “through professional development units” (survey). The other participants did not answer this question. It may be that they missed it or did not understand what was meant by the questions about using reflection professionally. Nevertheless, this information was obtained during an interview with each participant at the end of the study, and is presented in Section 4.6. In contrast, there were several responses to feelings and perceptions about using reflection as part of their professional life (Table 12). Four participants (Nicholas, Teresa, Qadir, and Yonten) regarded professional reflection as important and useful for improving thinking, also for organising ideas and for moving forward professionally (Table 12). Both Nicholas and Teresa stated they could see the potential of using reflection. Teresa stated: “It’s something I do automatically and often unconsciously” (survey).

Table 12: Participant survey responses - using reflection in their professional lives (n = 7).

Participant	Responses re feelings and perceptions about reflection
Qadir	It’s really important to improve my thinking skills.
Marie	I dislike writing journals. It feels like I'm spending my time (which I value) on an exercise that will provide me with little benefit.
Nicholas	Potentially useful as a way of examining methods and fleshing out ideas.
Teresa	I think it's important to reflect on what you do professionally and it's something I do automatically and often unconsciously.
Yonten	I think it will be very handy in justifying work undertaken; reviewing work done, to keep track of change in trend. It is a great idea.
Ruth	Very helpful.
Nabil	It’s a great step to reflect what you have done, especially to achieve the essential aim, e.g., improve your work.

Participants were also asked, in the survey, about what they did when they wanted to learn something new. This included the approach they took, and the type of support or

methods they used. Participants were also asked what worked best when they learned something new, and they were given the chance to comment further. The intention of this group of questions was to give participants the opportunity to describe their approach to professional learning. It was also an opportunity for the participants to indicate whether they used reflective learning strategies in this capacity. When learning something new, participants mentioned using several different approaches and methods and these fell into three main categories: seeking assistance from others; searching for and using resources, and the organisation of learning. For example, Marie, Teresa, Ruth, and Yonten tended to seek assistance from others who were experienced in the area they wanted to learn about. For Marie, Teresa, and Yonten, human assistance worked best for them, right at the start of learning something new. In contrast, Qadir preferred using the Internet, while Nicholas liked to read first, try things out and then carry them out; he also liked to look online for material. Marie, in comparison, even though she used the Internet for finding information, initially liked to: “talk to my peers about their experience [then] search the net” (Marie, survey). She stated that she found this saved her valuable time which otherwise would have been wasted on research. In response to the question about learning something new, Ruth also focused on how she organised her learning. She indicated that she broke problems down into manageable sections and timeframes, made regular use of a calendar to organise her learning experiences, and used an electronic notebook to support her learning. Uniquely, in response to the survey question about learning, Marie provided a diagram of the steps she used in her personal learning process. The diagram, as shown in Figure 4, illustrates the step-wise process she used, and shows how she connected her learning to her professional practice.

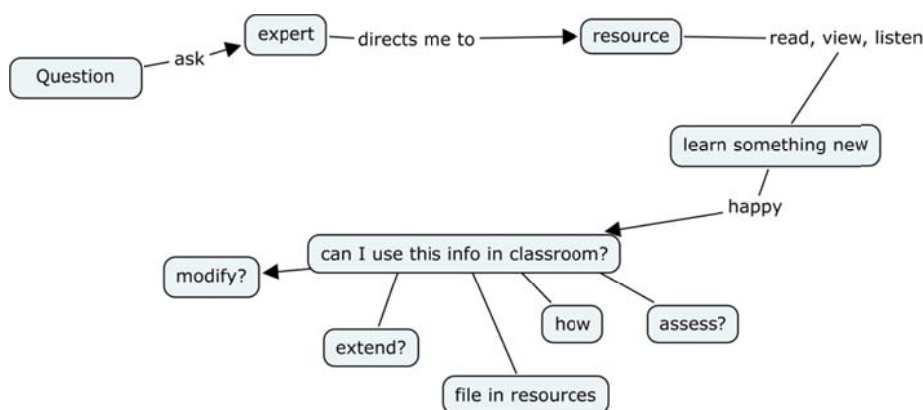


Figure 4: Professional learning pathway – Marie’s response to question 10 in the survey.

Overall, the methods used by participants to learn were very similar, and included peer support from colleagues, accessing online and traditional information sources, working through tutorials, and writing down instructions from a colleague. No-one mentioned using any specific reflective technique when learning new knowledge or skills. A full overview of the responses to question 10 (about learning) is available in Table 49 (Appendix 22).

The manner in which participants approached reflective writing is described in the next section.

4.3 Participants approaches to reflective writing

The reflective writing that each participant produced in four written reflection assignments was of particular interest, and is described first in Section 4.3.1. Details about the patterns of writing at five levels and types of reflection, obtained using the Levels of Reflection taxonomy (see Section 3.7.1), are described. As mentioned previously, use of the Three-Step Reflective Framework was optional, nevertheless all participants stated in the interview that they had used the framework, and it had influenced their writing, (See Sections 3.4.2 and 3.7.1.1 for a detailed description of the framework.)

In Section 4.3.2, patterns of reflective writing from the three supporting statement assignments for each participant are described. Participants did not use the Reflective Framework for this task. In Section 4.3.3, themes about professional practice which were found in the written reflections are described. (This analysis is based on the Professional Focus coding system outlined in Section 3.8.2.) Detail about how participants used the Reflective Framework, and how their writing varied at each of the three steps of the framework is described in Section 4.4. Penny's perceptions about the reflective writing which participants produced were also an important aspect in determining the approach taken. Additionally, the participants' views about their reflective writing experience during the multimedia design subject were examined to ascertain how they approached the task.

4.3.1 Patterns of reflective writing in written reflections

A pattern of reflective writing emerged in the data gathered from the written reflections, and four levels of reflection - Descriptive, Explanatory, Supported, and Critical – were demonstrated. Contextual reflection was not found. Several different types of reflection were apparent, each varying in frequency. For example, most participants commonly demonstrated *Stating*, but not all participants demonstrated *Self-Questioning*, which was generally found at a lower frequency than other types of reflection.

4.3.1.1 Overall pattern

The different levels of reflection in the writing of all seven participants are illustrated in Figure 5. Specific percentages for each participant are also listed in Table 50 (Appendix 23).

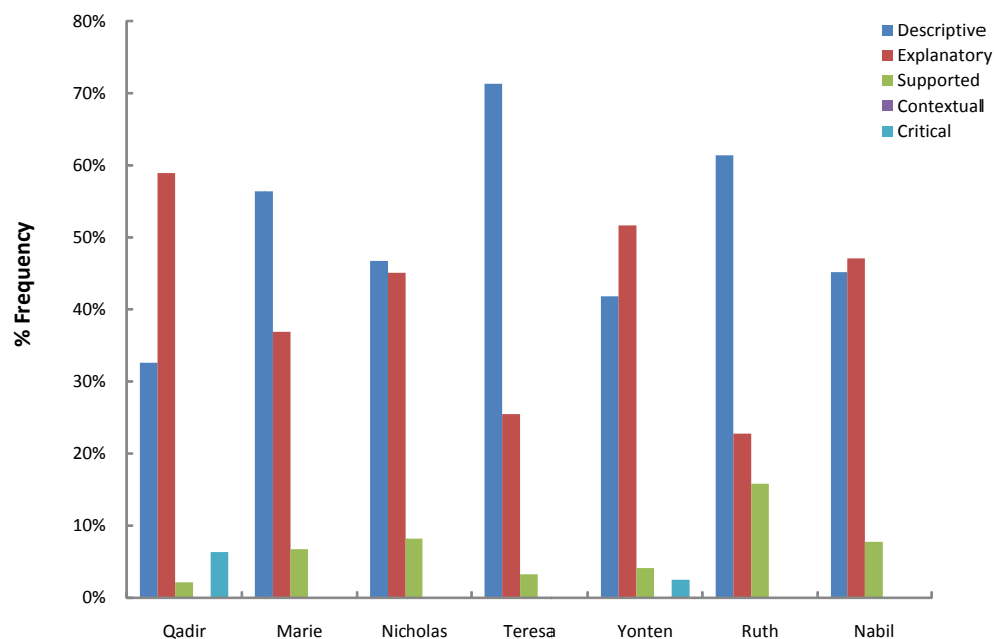


Figure 5: The distribution of five levels of reflection in written reflections (n=7).

Descriptive and Explanatory levels of reflection were found most frequently (Figure 5). The proportions varied between participants, for example, Teresa demonstrated a much greater degree of Descriptive reflection, compared to Qadir who exhibited mostly Explanatory reflection (Figure 5). Several other points of interest can be seen in Figure 5. For example, Descriptive reflection was most commonly demonstrated, with four of the participants (Marie, Nicholas, Teresa, and Ruth) writing at this level. The other three participants (Qadir, Yonten, and Nabil) demonstrated mainly Explanatory reflection. Nicholas and Nabil each produced similar proportions of Descriptive and Explanatory reflection, at comparable frequencies (Figure 5). Supported reflection was found at a much lower frequency for all participants, and only two participants demonstrated Critical reflection (Qadir and Yonten) (Figure 5). No-one demonstrated writing at the Contextual level of reflection.

Participants' writing demonstrated a pattern at four levels of reflection. When different types of reflection were examined, a wider range of diversity was found. The number of units for each type of reflection is shown in Table 13.

Table 13: Number of units of different types of reflective writing at five levels of reflection (n=7).

Sub-categories	Units	Sub-categories	Units	Sub-categories	Units	Sub-categories	Units
Descriptive reflection	1	Explanatory reflection	3	Supported reflection	1	Critical reflection	7
Noticing	200	Personal	53	Evidence Mentioned	20	Application of Learning	4
Deciding	117	Professional	60	Evidence Identified	42		
Stating	265	Deciding	134	Learning from Evidence	12		
Goals	9	Self-Questioning	11	Reactions to Evidence	13		
Self-Questioning	28	Reactions	25				
		Learning	34				
		Stating	102				
		Goals	23				

For example, *Stating*, and *Noticing* were the most common types of reflection at the Descriptive level (265 and 200 instances, respectively), and *Application of Learning* at the Critical level was the least frequent with four instances found. *Stating* was also frequently found at the Explanatory level of reflection.

The other type of reflection of note was *Deciding*, which occurred at a high rate at both the Explanatory reflection and Descriptive levels of reflection. *Evidence Identified* was found at a proportionately high rate at the Supported level of reflection (Table 13). In the following sections, the type of reflective writing for each level of reflection is presented. This provides a clearer picture of the reflection in which participants engaged. Contextual reflection is excluded due to its absence in participants' writing.

4.3.1.2 Descriptive reflection

The frequency of writing at the Descriptive level of reflection ranged from 32.6% to 71.3% (Figure 6). This level of reflection was assigned when participants described their experiences superficially without providing any explanations or analysis of their actions and decisions. This finding appears to indicate variation in participants' skills for reflective writing.

The five types of reflection found at this level (*Noticing*, *Deciding*, *Stating*, *Self-Questioning* and *Goals*) varied in frequency, with *Stating*, *Noticing*, and *Deciding* most common (see Figure 6). (Specific percentages for each participant are listed in Table 51 (Appendix 23.) *Stating* was found at the highest frequency, ranging from 25.5% to 68.9% (Figure 6). Qadir, for instance, wrote almost three-quarters of his descriptions as statements (*Stating*), and Teresa used this type of reflection frequently. Further detail about Qadir's and Teresa's writing can be found in Table 20 and Table 27, in Chapter Five. Examples of *Stating* included short sentences as well as more detailed descriptions. Participants wrote about topics such as: design process, work situation or professional role, and the multimedia subject. For example:

A grand plan. (Marie, Written Reflection 2.) (Coded as: *Descriptive/Stating*.)

Furthermore, games play a crucial rule in enhancing educational process & achieving the learning objectives. (Qadir, Written Reflection 2.) (Coded as: *Descriptive/Stating*.)

This essentially involved recording the capture process while narrating it, going back and adding graphics about connecting the camcorder, narrating those and then adding titles and graphical "call-outs" to complement and reinforce the audio and draw attention to the focal point of the visuals. (Nicholas, Written Reflection 4.) (Coded as: *Descriptive/Stating*.)

The second most common form of reflective writing was *Noticing*, also found within a broad range (17.8% to 60.8%), as illustrated in Figure 6. The *Noticing* sub-category

was allocated when participants described their feelings and thoughts about their experiences, providing they did not analyse their experiences. This type of reflection was also an expression of what participants knew and needed, in any given situation. Yonten demonstrated the highest frequency of this type of writing. Qadir, in contrast, demonstrated the least amount of *Noticing*. This is possibly because Qadir wrote primarily at the Explanatory level of reflection (that is, 58.9% c.f. 32.6% Descriptive reflection). Therefore, he tended to write about his thoughts using more explanation, which excluded much of his writing from the *Descriptive/Noticing* category.

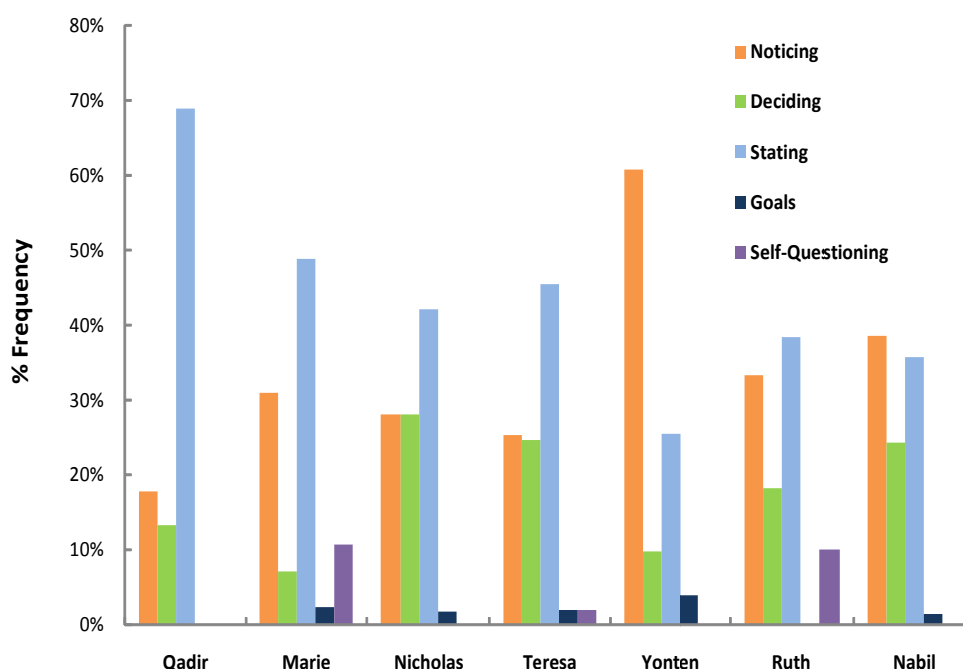


Figure 6: Frequency of Descriptive types of reflection for all participants (n=7).

Participants' writing coded as *Noticing*, often included words such as: *saw*, *knew*, *felt*, *thought*, and *needed*. The following example shows how Nabil described the challenges he incurred when creating a learning object. He stated that he was challenged, but he did not overtly use the word *feelings*. However, it was apparent that he was expressing how he was feeling. For example:

The greatest challenge in creating this learning object was in using more than one software such as PowerPoint presentation and Macromedia Flash Player, and the second challenge was in writing sentences with simple words to help students and public audience understanding the main concept of the learning object. (Nabil, Written Reflection 4.) (Coded as: *Descriptive/Noticing*.)

Other participants tended to write more directly about what they were feeling and noticing, using words such as *feel*, and *think*. For example:

So far I *feel* that I've deepened my understanding of the pedagogical strategies that I have in the past applied either instinctively or because of the situation – e.g., not creating icons because I couldn't *think* of a universal way of visually representing a concept. (Nicholas, Written Reflection 1.) (Coded as: *Descriptive/Noticing*.)

Participants also demonstrated other aspects of self-awareness, in addition to feelings, through the use of keywords such as *know*, *my knowledge*, and *need*. For example:

My knowledge of creating graphics is patchy and has been gleaned from observing others using Fireworks MX and my own trial and error when using this program. (Teresa, Written Reflection 4.) (Coded as: *Descriptive/Noticing*.)

I guess I didn't really *know* how to learn or how to organise myself. (Marie, Written Reflection 1.) (Coded as: *Descriptive/Noticing*.)

I *need* to read a lot of books and articles related to this subject. (Nabil, Written Reflection 1.) (Coded as: *Descriptive/Noticing*.)

However, in some cases what was known was mentioned, rather than the actual word *know* being used.

Deciding was the third most frequent type of reflection, and was engaged in by all participants, to some degree, to describe their decisions. The frequency of *Deciding* ranged from 7.1% to 28.1% (Figure 6). Marie exhibited this type of reflection less

frequently than the other participants, and Nicholas, in contrast, demonstrated it most frequently (Figure 6). Nicholas used words such as *looking for*. For example:

For the video clip, I'm *looking for* something that reflects something that the teacher would be most likely to use themselves. (Nicholas, Written Reflection 2.) (Coded as: *Descriptive/Deciding*.)

The decision-making process was also denoted by words such as *probably will use*, and *to see*. For example:

Based on the above, I *probably will use* Flash or Photoshop for the next learning object *to see* how my skills improved in using pictures and word-processing. (Nabil, Written Reflection 3.) (Coded as: *Descriptive/Deciding*.)

Therefore, *Stating*, *Noticing*, and *Deciding* types of reflection at the Descriptive level were demonstrated by all participants, in varying degrees. In contrast, writing about goals (coded as: *Goals*), and using a self-questioning technique (coded as: *Self-Questioning*) was not engaged in by all participants. Both types of reflection were much less prevalent than other types (see Figure 5). For example, five participants (Yonten, Marie, Teresa, Nicholas, and Nabil) used descriptions which were coded as *Goals*, and three participants (Marie, Ruth, and Teresa) used questions in their writing (i.e., *Self-Questioning*).

The setting of goals is an important component of learning, and self-questioning has been shown to stimulate reflection (see Section 2.4.2.1). Therefore, these findings are worth noting. Another important point, worth mentioning here, is that goals were not strongly prompted in the Reflective Framework, and were only mentioned briefly in the tips at Step 3. However, *Self-Questioning* may have occurred as a consequence of the prompting questions in the Reflective Framework, although this was not readily apparent. The following example, clearly demonstrates how one participant, Yonten, wrote about setting goals. Three different sets of keywords – *objectives*, *goals set for myself*, and *planned* – were used.

To remind of the overall *goals set for myself* for taking this subject, apart from the core *objectives* of being able to design and develop an Interactive Multimedia, I *planned* to design the three learning objects using three different authoring environments. (Yonten, Written Reflection 3.) (Coded as: *Descriptive/Goals.*)

The coding process for sub-categories such as *Deciding* and *Goals* was often challenging, because the word *goals* was not always used, but was implied. For example, in the following sentence the combination of keywords (*need, specifically on, and see*) appear to denote a direction in which Nicholas definitely intended to go. Therefore, this sentence was interpreted as *Goals*. The context provided by the writing around the keywords was also important.

I *need* to focus some more attention *specifically on* game design principles and *see* what links I can make to educational strategies. (Nicholas, Written Reflection 3.) (Coded as: *Descriptive/Goals.*)

This example illustrates why it was not possible to rely on specific words. When participants actually stated their *Goals*, their writing was coded as such, however in other situations the meaning was examined carefully to determine if participants were writing about goals or decisions. In the previous example, if Nicholas had written *may need* instead of *need* and left out the word *specifically*, this sentence would have been coded as *Deciding*. As it stands, Nicholas demonstrated he had specific goals.

A second example, illustrates Marie's use of the word *need*, which was an indicator of uncertainty surrounding her decisions about skill development. Therefore, her writing was coded as *Deciding* rather than *Goals*.

I *need* to understand the cognitive components of learning better. (Marie, Written Reflection 2.) (Coded as: *Descriptive/Deciding.*)

Therefore, for a sentence to be coded as *Goals*, it needed to be written more decisively than what was required for writing to be coded as *Deciding*. Similarly, when coding

Self-Questioning, it was necessary to differentiate between an explicit question and an implied one. The following examples illustrate this difference.

What do I need to learn? (Marie, Written Reflection 1.) (Coded as: *Descriptive/Self-Questioning*.)

... the current problem is how to organise myself and to put myself on a huge learning curve. (Ruth, Written Reflection 2.) (Coded as: *Descriptive/Self-Questioning*.)

The first example is clearly a question due to the question mark Marie has used. The second example implies Ruth is questioning her actions. Even so, *Self-Questioning* was easier to code than *Goals* and *Deciding*. A more detailed example of the way in which Marie used *Self-Questioning* can be seen in Figure 15 (Chapter Five).

In summary, the previous examples illustrate five different types of reflection at the Descriptive level of reflection, and illustrate the variation in how participants were reflecting. The coding process took into account the language which participants used, and also the context in which sentences were placed.

4.3.1.3 Explanatory reflection

All participants exhibited writing at the Explanatory level of reflection, with frequencies varying from 22.8% to 58.9% (see Figure 5). Therefore, all participants were providing explanations in the written reflections, and demonstrating analysis of their experiences and activities. Eight different types of reflection were found at the Explanatory level, and frequencies are illustrated in Figure 7 and Figure 8. For example: *Personal*, *Professional*, *Deciding*, *Self-Questioning*, *Reactions*, *Learning*, *Stating*, and *Goals*. *Deciding* was the most common type of writing at this level. This was followed in frequency by *Stating*, *Professional*, and *Personal* types of reflection, which were all found at similar rates. *Learning*, *Reactions*, and *Goals* were at a lower frequency, and *Self-Questioning* was the least common type of writing.

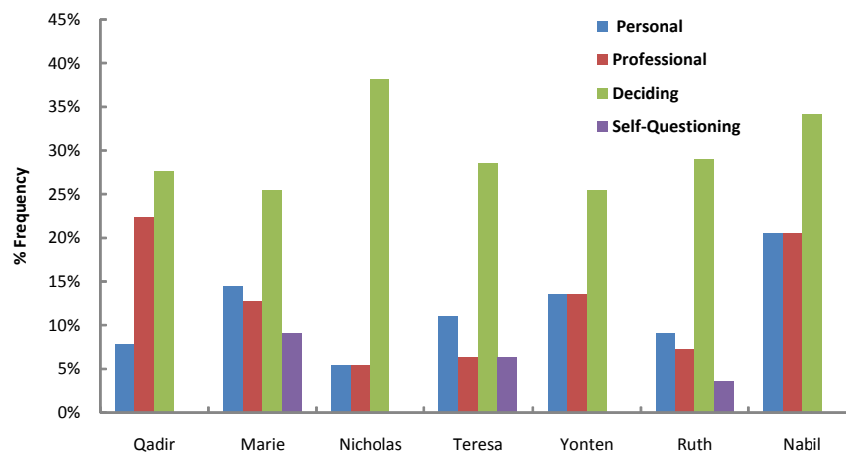


Figure 7: Frequency of Explanatory levels of reflection in four sub-categories – Personal, Professional, Deciding, Self-Questioning (n=7).

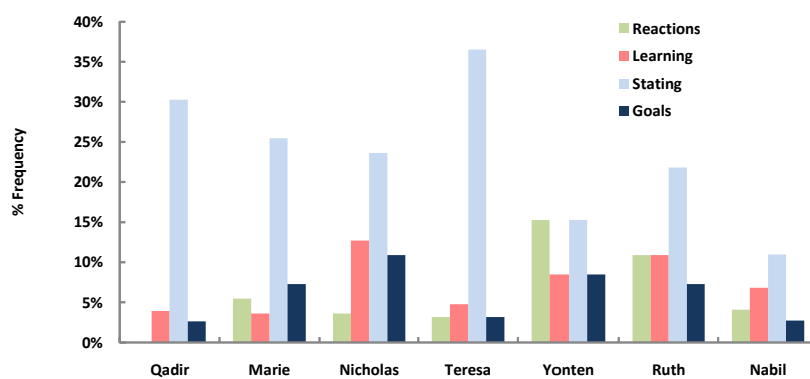


Figure 8: Frequency of Explanatory levels of reflection in four sub-categories – Reactions, Learning, Stating, Goals (n=7).

The high proportion of the *Deciding* type of reflection stands out. Participants devoted 25.5% to 38.2% of their writing, at the Explanatory level, to the decisions they were making in their practice, when designing learning objects (Figure7). For example:

Fortunately, I *decided* to use images and text via Macromedia Flash Player because I thought this form of learning object will help students understanding the contents of the subject and promote my skills in teaching as

well as enhance my skills of Graphics software (Nabil, Written Reflection 4.) (Coded as: *Explanatory/Deciding*.)

These examples were clearly about decision-making, as the words *decision* or *decided* were used. However, this was not always the case, as demonstrated by the next example. The words, *need*, and *should be*, suggest a process of decision-making was occurring in Marie's writing.

I would still *need* to incorporate elements of the scaffolding depicted above but my primary focus *should be* to replace conventional face to face teaching with a more holistic approach. (Marie, Written Reflection 2.) (Coded as: *Explanatory/Deciding*.)

In contrast, the frequency of the *Stating* type of reflection was less consistent (11% to 36.5%) (Figure 7). For example:

The main idea in this object deals with the basic concept of mathematics, "The multiplication table"; because most of my students used to find difficulties with it. (Qadir, Written Reflection 1.) (Coded as: *Explanatory/Stating*.)

The amount of personal reflection (coded as: *Personal*) and explanations about professional situations (coded as: *Professional*) was much lower than *Stating* and *Deciding* types of reflection. When participants wrote from a personal perspective, it was often about the skills they needed for multimedia design. For example, Teresa explained the reasons she needed to learn more about interactivity in design.

I've learnt quite a bit about the technical aspects of putting web pages together (using Dreamweaver etc), but know I'm lacking on how to use interactivity in a purposeful and meaningful way. (Teresa, Written Reflection 1.) (Coded as: *Explanatory/Personal*.)

In comparison, Teresa's explanation about a professional experience included information about a colleague. For example:

I know this, because before I came to this job I had the fantastic (albeit short) experience of working with a colleague at an education provider called X (Teresa, Written Reflection 1.) (Coded as: *Explanatory/Professional*).

Learning was the fifth most common type of reflection, and ranged in frequency from 3.6% to 12.7% (Figure 8). All participants demonstrated this type of reflection when they either stated clearly what they had learned, using words such as *learnt*, or they implied that learning had occurred. For example, Nicholas used the words *learnt* and *found* to express his learning process.

I've *learnt* to be more thorough in my testing process and to try to empathise more with the likely needs of learners for easy access to resources. (Nicholas, Written Reflection 3.) (Coded as: *Explanatory/Learning*.)

After submitting the Learning Object, I did some further testing on it and *found* that I should have been more mindful of screen size. (Nicholas, Written Reflection 3.) (Coded as: *Explanatory/Learning*.)

Uncommonly, participants expressed themselves emotively, and this type of writing was coded as *Reactions*. All participants, apart from Qadir, demonstrated this form of writing. For example, Maria, and Yonten expressed their reactions to the design process.

I was disappointed in myself for not anticipating the problem and should have started my assignment much earlier. (Marie, Written Reflection 3.) (Coded as: *Explanatory/Reactions*.)

This kind of intimidating and quite a pessimistic thought is basically due to superficial exposure to those finished product of Multimedia in the market. (Yonten, Written Reflection 2.) (Coded as: *Explanatory/Reactions*.)

Writing about *Goals* at the Explanatory level was also infrequent, but conversely, all participants engaged in this type of reflection. However, deciphering this type of

reflection, as with Descriptive reflection, was not always straightforward. For example, Ruth wrote about what she intended to achieve in the subject in relation to learning theory, though initially she did not use the word *Goals*.

I wish to understand good design principles and improve on my understanding of designing rich media for effective learning. (Ruth, Written Reflection 1.)
(Coded as: *Explanatory/Goals*.)

Whereas, in Ruth's second reflection assignment, a firm list of goals and explanations about them was stipulated.

My goals are to:

Investigate software requirements. Flash looks good, but the new Powerpoint 2007 may be a good starter as well.

Front page of content page on teaching units- smarter look and maybe more uniform throughout units, i.e., the graphics are selected to be closely tied to the concepts.

The possibility of virtual landscape of NSW regions and maybe incorporate some gaming in the learning object. (Ruth, Written Reflection 2.) (Coded as: *Explanatory/Goals*.)

The complete list was coded as one unit due to the use of a colon, and the context surrounding the goals. A further type of reflection which was found infrequently at the Explanatory level of reflection was *Self-Questioning*, and was demonstrated by Marie, Teresa, and Ruth, at frequencies between 3.6% and 9.1% (Figure 7). The *Self-Questioning* used by Marie at this level developed in complexity, as can be seen in her case study (Figure 17, Chapter 5).

Overall, the use of Explanatory reflection was frequent, and included a number of types of reflection. *Deciding* was the most common type of reflection, and *Self-Questioning* was found least frequently. At this level of reflection, different sub-categories were required (e.g., *Personal*, *Professional*, *Reactions* and *Learning*). Other differences between the types of reflection at the Descriptive and Explanatory levels of reflection

were apparent (see Table 13). For example, both *Stating* and *Self-Questioning* were found more frequently at the Descriptive level, and *Deciding* and *Goals* were found more frequently at the Explanatory level. Notably, the use of the self-questioning technique occurred at a similar frequency at both levels of reflection, and was demonstrated by the same three participants. This suggests that *Self-Questioning* was a specific skill associated with the reflective writing of these participants. Discussion about this finding can be found in Section 6.2.3.2.

It was common to see progression between Descriptive and Explanatory levels of reflection in participants' writing. For example, Marie in her writing, appeared to use a process of reasoning or analysis about her practice, and demonstrated different levels of reflection as she problem-solved. For example, a paragraph of writing began with a descriptive statement about a situation in her classroom.

When in the lab, students can't wait to light things, mix stuff and get things to explode. (Marie, Written Reflection 3.) (Coded as: *Descriptive/Stating*.)

Marie then carried on exploring the situation. For example:

To do this, students should be encouraged to look at the equipment around them and theorise what each piece is used for. (Marie, Written Reflection 3.) (Coded as: *Explanatory/Stating*.)

She followed the sentence with a decision.

For this to occur, I must present information regarding equipment in different forms. (Marie, Written Reflection 3.) (Coded as: *Explanatory/Deciding*.)

Marie also asked a question to find a reason for the decision, and she related this to the learners' preferences and learning styles.

Why? (Coded as: *Explanatory/Self-Questioning*.) Some students selectively listen in class, others are visual and some are kinaesthetic - they need to see and

touch the equipment. (Marie, Written Reflection 3.) (Coded as: *Explanatory/Stating*.)

Other participants also underwent a similar process as they analysed their actions and decisions about tasks they were undertaking. In some cases, the explanation was relatively superficial and presented in one sentence. In others, there was much more detail which continued over several sentences.

In summary, Descriptive and Explanatory levels of reflection were engaged in frequently and were the most common levels of reflective writing found in participants' writing.

4.3.1.4 Supported reflection

Supported reflection was demonstrated by all participants. The lowest frequency made up 2.3% of participants' writing, and the highest frequency was 15.8% (see Figure 9). This established that participants were able to link their design ideas to theoretical evidence; however, they did not always cite the literature. Ruth demonstrated the highest frequency in her writing. Qadir's writing contained the least Supported reflection. The most frequent type of reflection at this level was *Evidence Identified*, followed by *Evidence Mentioned*. There were low frequencies of other types, *Learning from Evidence*, and *Reactions to Evidence* (Figure 9).

Notably, two participants (Nabil, and Yonten), who had the highest frequency of writing coded as *Evidence Mentioned*, did not provide any evidence at all to support their writing. In Chapter Five, the possible reasons for this finding are discussed.

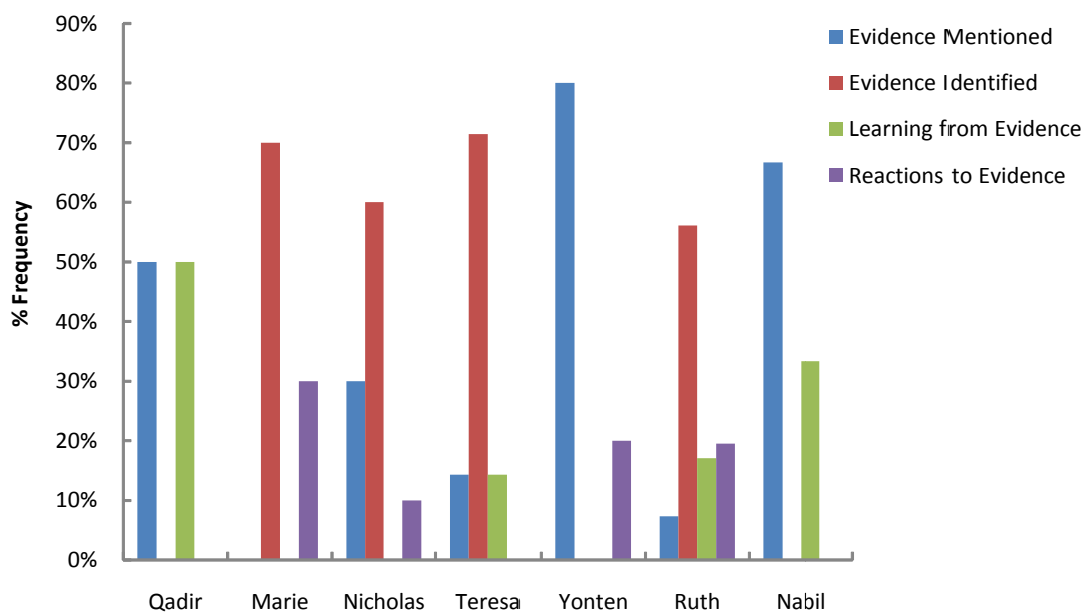


Figure 9: Frequency of Supported types of reflection for all participants (n=7).

Ruth demonstrated all four types of Supported reflection, and 56% of her writing contained citations, coded as: *Evidence Identified*. In comparison, Teresa, Marie, and Nicholas demonstrated writing coded as: *Evidence Identified*, at higher frequencies than Ruth (i.e., 71%, 70% and 60% respectively) (Figure 9), because this was the main type of Supported reflection demonstrated by them. More explanation about each of these participants can be found in Chapter Five.

The quality of writing at the Supported level of reflection varied. Brief statements of opinion about design principles, for example, demonstrated awareness of theory, whereas, complex explanations of theoretical ideas accompanied by references indicated exploration about the subject and the likelihood of new knowledge. The references provided were mostly to literature provided in the subject readings, which indicated the participants were engaging in learning guided by the subject lecturer. Some participants outlined their personal views, and others presented the views of others. Nicholas, for example, presented a variety of theoretical ideas, both referenced and un-referenced. For example:

The primary purpose of the resource is to create some kind of matrix allowing for easy comparison – essentially a cognitivist approach, shaping the knowledge that is presented to the learner in such a way that makes it more easily digestible. (Nicholas, Written Reflection 2.) (Coded as: *Supported/Evidence Mentioned.*)

This is mainly because it is focusing on an area of knowledge and understanding that the learners will have minimal prior knowledge of and it will be more difficult for learners to form direct associations. (Colvin Clark, R. and Mayer R.E 2001). (Nicholas, Written Reflection 2.) (Coded as: *Supported/Evidence Identified.*)

Sometimes, multiple references were used in one sentence. Although, Ruth referred to a lot of different theoretical ideas from different authors and extracted a lot of detail, most of the information was merely listed. Ruth did not tend to describe and critique the authors' ideas and make connections with her own design ideas and beliefs. In the following example, Ruth summarised a common theme from several readings.

Read a the papers on Moore, Burton and Myers, () the long debate of media and learning with Kozma () , Clark (1988), Papert, 1977, and others which now has become a reality in education. The consensus is that multimedia has widespread effects and benefits for learning. (Ruth, Written Reflection 1.) (Coded as: *Supported/Evidence Identified.*)

The Contextual level of reflection would have been present, if Ruth had also included her own perspectives in relation to the evidence she presented. Ruth was not the only participant who did not explain how she was integrating ideas from the literature into her design tasks. The way in which the participants wrote in their written reflections implied that they were moving towards an understanding of the concepts and principles they were reading, rather than critiquing them. Therefore, even the frequent use of Supported reflection did not necessarily lead to dialectic or critical forms of reflection, where multiple perspectives from the literature were debated and critiqued.

4.3.1.5 Critical Reflection

Two participants, Yonten, and Qadir, demonstrated the Critical level of reflection (Figure 5). Seven instances of Critical reflection, and four instances of the type of Critical reflection coded as *Application of Learning* were found overall (see Table 13). As such, these participants demonstrated consideration of other perspectives related to wider social, cultural, and political aspects of practice. For example:

The main idea deals with the basic concept of English language “The English language Alphabet” because last year the Ministry of Education applied English language as official subject in elementary schools in X. (Qadir, Written Reflection 4.) (Coded as: *Critical Reflection*.)

The *Application of Learning* type of Critical reflection was present if participants mentioned how they were intending to apply new knowledge. For example:


Finally, I’ll apply what I have learnt in my experience as a teacher in Saudi Arabia as well as whatever materials I get in this class in specific & in my subject study in general. (Qadir, Written Reflection 2.) (Coded as: *Critical reflection/ Application of Learning*.)

Qadir wrote more frequently using Critical reflection (6.2%), compared to Yonten who produced 2.5% of his writing at this level (Figure 5). There were few examples of Critical reflection, and the low frequency of this level of reflection is discussed in Chapter Six.

The reflective writing approaches used by all participants in their supporting statements are outlined next.

4.3.2 Patterns of reflective writing in supporting statements

In the supporting statements, participants provided mostly description about their learning objects. Therefore, the Descriptive level of reflection was predominant. The Explanatory level of reflection was also found to varying degrees with some

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participants providing more explanation than others. Supported reflection was also found in four of the participants' supporting statements (Ruth, Marie, Nicholas and Teresa). In contrast, Nabil, Yonten and Qadir did not include citations of evidence. Although they provided a list of references in each supporting statement, this did not meet the criteria for Supported reflection. Levels of Contextual and Critical reflection were not found in any of the supporting statements. All participants used the headings in the supporting statement template, and three participants modified them to suit.

Explanations, in the supporting statements, were generally provided in the section called: *Learning context and purpose*; and also in the *Why* column of the media design table. Examples of Explanatory reflection prepared by Nabil are listed in Table 14.

Table 14: Sample of a media design table – Nabil, supporting statement 1.

Media	How ?	Why ?
Text	Text is used to present the main contents of the subject with different style (color and font).	Text is used with simple words and sentences to enable students understand the main concepts of the learning object. Text is used with different style (color and font) to attract students and drive their attention to the main ideas of the learning object.

Additionally, an example of Supported reflection, where evidence is cited by Teresa, can be seen in Table 1. Therefore, there was evidence of three levels of reflection present in the supporting statements – Descriptive, Explanatory and Supported.

Table 15: Sample of a media design table – Teresa, supporting statement 1.

Media	How?	Why?
Text	Titles	Titles are used to structure information about SOAs.
	Information text	Provides the content about SOAs. Complexity of the text was reduced and text is delivered in small chunks (one topic per html page) to reduce cognitive load on learner. Reducing load on working memory assists learning (Miller 1956: in Colvin Clark & Mayer 2007).

Participants were found to write about several different areas of practice: their decisions regarding multimedia design; the background to their choice of learning object; what they learned when designing; and the goals and objectives for the learning object. They also wrote about some of the challenges they faced in their learning and in using software, and four participants referred to the readings regarding design and learning theory. The reflective writing process used for the written reflections was claimed to help four participants (Nicholas, Qadir, Nabil and Marie) to prepare their supporting statements. For example, Nicholas explained in the interview that the Reflective Framework helped him reflect in preparation for writing the supporting statements. For example:

... the supporting statement had it's own set of questions and kind of prompts which I tended to go with, but I think that the reflection had probably shaped my thought process (Nicholas, interview).

However, Teresa said in the interview that she found writing for both the written reflections and the supporting statements got a bit confusing. This was because she was not sure where to place each type of writing. For example:

... there were times when I wasn't sure what I was writing in my reflective assignments was stuff that I should have been putting in my supporting statements. Whether I was crossing over too much. (Teresa, interview.)

Therefore, the reflective writing approach used for the written reflections appeared to confer some benefits on participants as preparation for the supporting statements. In conclusion, Descriptive reflection, Explanatory reflection, and Supported reflection were found in the supporting statements.

An outline of the professional focus demonstrated by participants, and the themes which emerged in their writing is presented in the next section.

4.3.3 Professional focus

Professional practice and *professional learning* were the main themes which emerged in the written reflections. The full list of themes are listed in Table 42 (Appendix 17). Within these themes, participants wrote about their skills and capability, the relevance of pedagogical and technical approaches, issues, challenges and constraints they encountered, and their professional backgrounds. There were a range of similarities and differences in participants' writing. For example, all but one of the participants, Nicholas, wrote about their *professional background*. The majority wrote about their *past professional practice* in light of their experiences and knowledge. For example:

I entered this field with a strong background in education; which has helped me a lot, however multimedia design is my weakness (Teresa, Written Reflection 1).

Yonten also mentioned the relationship between his expertise in education, multimedia design, and his *professional role*. For example:

Since I have a background in teaching and as well as in the field of ICT, I feel I can be a good bridge between the technical experts and the subject specialist (Yonten, Written Reflection 1).

Marie, and Qadir, located their *professional roles* and views, within teaching as a profession, and also wrote about the effect of educational technology on teaching and learning, and this came under the theme - *wider professional context*. For example:

I do love to teach, I think the inability of the profession to change with the times is really frustrating (Marie, Written Reflection 1).

... teachers have to recognize and understand the rules of using educational technologies in the classroom in order to use them effectively (Qadir, Written Reflection 4).

For five participants, the content in their written reflections was very closely attuned to activities under the theme, *current professional practice*. As such, they were primarily concerned with how their actions and learning, in relation to the multimedia design subject, could be applied to practice. As a result, the themes *professional learning* and *application of professional learning* emerged strongly in participants' writing. For example, Nicholas described what he was intending to gain knowledge about as he created a resource for his teaching.

I'm going to experiment with developing a resource for the audio/video workshops which allows me to cover the various file characteristics in the depth that I think is needed but which allows learners to dip into it at their own level (Nicholas, Written Reflection 1).

As can be seen from this example, Nicholas was also concerned with his role as an educator. Therefore, his writing came under a further theme, *professional roles*. This theme emerged when participants discussed their responsibilities in professional roles such as teaching, instructional design and management. Two participants (Qadir and Nabil) were focused on the qualifications and skills they needed for their careers and the future requirements of their roles. This type of writing contributed to the theme, *professional capability*. Others were more concerned with the type of professional development they needed to enhance their skills in the workplace (Marie, Teresa, Yonten, Ruth, and Nabil). This writing contributed to a *professional development* theme, and within this theme, participants critiqued their professional weaknesses, and discussed ways they could build on, and extend their professional skills. For example:

... for the purposes of this assignment and my own professional development, I should choose media which will enable me to learn some new skills (Teresa, Written Reflection 2).

My initial reactions are purely frustration with the lack of expertise and understanding of using Flash or for that matter multimedia (Ruth, Written Reflection 3).

A further theme, *professional context*, emerged as a result of participants situating their writing within specific contexts such as the relevance of educational design, and the learning theories underpinning the use of multimedia. Four participants (Teresa, Yonten, Ruth, and Nicholas) brought in ideas and perspectives from their professional experience. Nicholas and Ruth mentioned constraints they were working under such as: lack of time and workloads; needs of the users of the learning objects; gaps in their existing skills; challenges concerning software they were required to use to create the learning objects; and colleagues who needed a lot of assistance. All these topics contributed to the theme, *professional constraints*. The same two participants also mentioned topics under the theme, *professional capability*. For example, how they were catering to gaps they perceived in practice, concerning the professional capability of others' and themselves, and issues concerning professional skills and the availability of resources in the workplace. For example:

My anxiety about having to design a complex learning environment increases and I am beginning to use X to self teach myself Flash and Quicktime, however, I find it really difficult (Ruth, Written Reflection 1).

Ruth's writing was strongly theory-based, and there was a significant focus on the challenges she encountered during the design process. In contrast, Teresa was the only participant who gave a detailed account of the design process undertaken. She provided a commentary on the actions she had taken (e.g., storyboard, steps, challenges, progress, and illustrations), and on which she was reflecting. Nicholas, in comparison, provided an account about the process he went through, but his focus was more technical and

about specific details, rather than a description of his progress. Other items of note in participants' writing included information about software they were using for the learning objects. When discussing the software, they also described the skills they needed, the challenges of using the software, and the end users of their learning objects. Also, principles of design, their decisions and the approach they were taking, whether it was technical or pedagogical, was explained. One participant in particular (Ruth), wrote openly about the challenges she was encountering, and her frustrations with the process. In comparison to Ruth, the other participants reflected in a more positive and less emotionally charged manner. A comparison of the following two examples demonstrates this difference in participants' reflections.

My initial reactions are purely frustration with the lack of expertise and understanding of using Flash or for that matter multimedia (Ruth, Written Reflection 3).

As I worked through my storyboard I was starting to wonder whether my design was reaching beyond my Flash skill limits at this point in time (Teresa, Written Reflection 3).

In summary, the professional focus of participants' writing in the written reflections demonstrated some clear themes such as: *professional backgrounds* and *professional roles*, *current professional practice*, *professional learning*, *application of professional learning*, *professional capability*, *wider professional contexts* and *professional constraints*.

In the supporting statements, participants generally presented information about the professional use for the learning objects under the heading *Learning context and purpose*. Participants, such as Marie, and Nicholas, made it very clear how the design was going to help their professional areas. Marie, for instance, provided information to 'set the scene' in her professional context, by including concept maps she had drawn as well as assessment tools she used in her classes (Figure 15). Also, Marie revealed an

interest in using metaphor in her design, indicating this approach supported her professional discipline and the subjects she taught in schools. For example:

A “Mad Scientist’s Lab” is an easily recognisable metaphor and one that can be used with humour when entering the laboratory. The students are the important users of the learning object It is also important for the Teacher to set the scene. I must “sell” the object to my students. (Marie, supporting statement 1.)

Nicholas was concerned about the relevance of the content in the learning object he was designing, as the learning object was to be used when he worked with academic staff in his professional capacity.

I had hoped to use clips more closely related to the kinds of videos that ... teachers might use to demonstrate how audio quality is affected by compression and bitrate as well as image quality. The ultimate purpose of the learning object though was to convey how file size needs to be balanced up against file quality and accessibility and I feel that the clip chosen met this need. (Nicholas, supporting statement 1.)

Others, such as Qadir, Teresa, Yonten, Ruth and Nabil, mentioned the target audience for the learning objects, but did not specify their relationship with them. For example:

The learning object aims to facilitate and support the cognitive achievements and learning process for elementary schools’ students (Qadir, supporting statement 1).

Teresa mentioned the potential users of a learning object. For example:

The target learners are those already working in the ... industry, who wish to keep their professional knowledge up to date. This learning object could serve as background information ... and could fit into a lesson on how to write an (Teresa, supporting statement 1.)

Therefore, it was evident that all participants were engaged in activities associated with their professional areas. As such, they wrote about three main situations:

1. development of learning objects, which were potentially going to be useful for their area of professional interest;
2. how the learning objects would be built, using the expertise they had in their professional discipline, and their existing knowledge;
3. how the exercise was helping them to extend their professional skills.

Overall, the supporting statements were used by the participants as a way to express the design process they were undertaking. The assignments indicated the direction of the participants' professional focus – discipline knowledge, relevance of content and design for learners and users, learning theory, professional development of themselves or others, skills, technical considerations, and personal challenges.

In the next section, the usefulness of the facilitation strategies used to scaffold reflection about professional practice is reported.

4.4 Use of the Three-Step Reflective Framework

Scaffolding, where participants used the Three-Step Reflective Framework for written assignments, was found to assist participants' reflection on their professional practice. There was a measureable impact on participants' reflective writing in the written reflections, and participants' perspectives (and those of the subject lecturer) about the intervention were positive.

4.4.1 Levels of reflection and the Reflective Framework

In the written reflections, all participants, apart from Nabil, used the headings of the framework template to varying degrees. Participants' inconsistent use of the framework impacted on a comparison of the levels of reflection at each step. Comparison was fully possible in Nicholas' and Yonten's reflections as they used the framework for all four written reflection assignments. However, Marie and Teresa used the Reflective

Framework for only three reflection assignments, Ruth used it for just two assignments, and Qadir used it for only one of the assignments. Only assignments where the headings for each step were used were subjected to this analysis; a total of 17 out of a possible 28. This was necessary to ensure a consistent approach to measuring the variation in the levels of reflection at each step of the framework because only when participants used the headings of the Reflective Framework template was it certain that they had used the framework to structure their writing. This does not imply that other students did not use the framework at all, only that in the structure of their assignments it was not possible to identify which sections responded to each of the steps. It should be noted that written work from all students was included in other analysis steps, for example the analysis of levels of reflection throughout the assignment as a whole. Variation in the levels of reflection at each step of the framework was found when the writing was analysed using the Levels of Reflection taxonomy.

Overall, there was a greater frequency of Descriptive reflection in all the steps. As expected, Descriptive reflection was found more frequently at Step 1 compared to the other two steps (Figure 10). The higher proportion of Descriptive reflection at Step 2 and Step 3, compared to Explanatory reflection, was unexpected. (Detail about the specific percentages is outlined in Table 54, Appendix 23.)

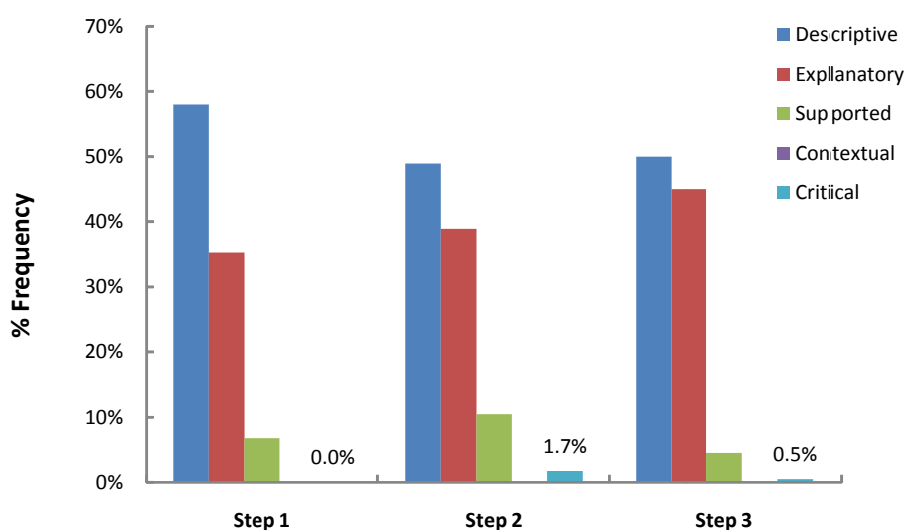


Figure 10: Levels of reflection at each step of the Reflective Framework (n=7).

Supported reflection was found most frequently at Step 2. Critical reflection occurred only at Step 3, and at a low frequency (Figure 10). This did not support the expectation by the researcher that there would be a greater frequency of Critical reflection at Step 3.

At an individual level, several trends emerged in the writing of Nicholas and Yonten when it was compared for similarities and differences. This comparison was of particular interest because of all the participants they were the only ones to demonstrate consistent use of the Reflective Framework through using the headings of the template. This may indicate that the framework may meet the needs of some students for a structured approach to reflective writing whereas others may feel more confident in this regard.

Both Nicholas and Yonten exhibited a higher frequency of Descriptive reflection at Step 1, compared to Step 2. Explanatory reflection occurred more frequently at Step 2, compared to Step 1. Notably, Explanatory reflection was found to occur most frequently in Yonten's writing at Step 3, and Critical reflection was found in his writing at both Step 2 and Step 3. This trend in Yonten's writing is illustrated in Figure 26 (Chapter Five). Nicholas, in comparison, did not exhibit Critical reflection at any step. More detail about how each of the seven participants used the Reflective Framework is available in the individual case studies in Chapter 5.

Further evidence emerged to support the proposition that the Reflective Framework scaffolded participants' writing. The manner in which they wrote about their decisions, learning, and goals in the written reflections supplied this evidence following analysis using the Three-Step Reflective Framework coding framework (see Section 3.7.1). Firstly, most references to decision-making (Coded as: *Deciding*) were found at Steps 1 and 2 (see Table 16). This was not unanticipated because the headings in these steps of the framework were designed to guide participants to think about their decisions. For example, at Step 1, participants were questioned about their decisions: *What decisions did you make?* And also, at Step 2, they were guided by the question: *Why these decisions and actions?* Additionally, at Step 2, participants were prompted by the instruction: *Think about how your actions and decisions may help your practice.*

Therefore, the high number of references to *Deciding*, at Steps 1 and 2, is indicative that participants were following the headings and prompts in the framework. The number of references to *Deciding* is shown in Table 16.

Secondly, *Learning* was mentioned most frequently at Step 3 (see Table 16), where this was guided by headings and prompts, such as: *What did you learn? How will you use this Learning?* Prompts were also available at this step, suggesting participants do the following: *Indicate what you learned; indicate what helped you to learn.* *Learning* was also prompted at Step 2 by the instruction: *Think about what you learned.* However, the number of references to *Learning* at Step 2 was low in comparison to the other steps. Even though there were no prompts or headings about learning, at Step 1, learning was written about 2.25 times more at Step 1 compared to Step 2 (see Table 16), and this was unusual. Discussion about the connection of this finding to reflection can be found in Chapter Six.

Lastly, *Goals* were mentioned twice as much at Step 3, where they were prompted, compared to Step 2, where they were not (see Table 16). Participants were instructed by a prompt stating: *Identify what you need to explore further or seek help with;* and a Tip suggesting: *Set yourself realistic goals, and indicate when you will achieve them.* However, there was also a high incidence of writing about goals at Step 1, where they were not prompted. This was an unusual finding, and cannot be explained by the numbers alone. However, the relevance of goals to learning is discussed in Chapter Six. Overall, the findings indicate that the six participants who used the Reflective Framework probably used the prompts for *Deciding*, *Learning*, and *Goals*. Therefore, the framework appears to have been useful in providing guidance for reflective writing in these areas.

Table 16: Number of units - *Deciding, Learning, and Goals* at each step of the Reflective Framework (n = 7).

Type and level of reflection	Step 1	Step 2	Step 3
Learning (Explanatory).	9	4	12
Goals (Descriptive & Explanatory).	11	5	10
Deciding (Descriptive & Explanatory).	71	50	20

Another indication that the instructions in the framework were followed by participants is the way in which, at Step 2, they provided justification and explanation about the decisions and actions they had previously described at Step 1. They were asked to provide reasons for their decisions and actions at Step 2, which suggests participants were following the framework.

Further information about the way in which participants used the framework was obtained when they were interviewed.

4.4.2 Participant interviews

All participants said they found the Three-Step Reflective Framework useful, and most said the framework helped them in some way to prepare the written reflections. For example, the Reflective Framework prompted them to think more carefully about the design process, and this stimulated them to reflect on their beliefs and knowledge in the written assignments. All participants said they referred to the framework headings and prompting questions when preparing the written reflections, even if they did not use them. This included Nabil who did not use the headings in any of his written reflections, and also Qadir, Marie, Teresa, and Ruth who did not use them consistently. Nicholas, Qadir, Marie, Teresa, and Nabil also mentioned that the Reflective Framework headings and prompting questions were useful in helping them structure and organise their thoughts and writing. For example, Qadir said he felt the headings helped him to plan, evaluate and organise his work. Nicholas found the framework logical for writing his reflections. For example:

... just documenting without judgement what I'd done and then looking at why I'd done it and then what the consequences of that has been and then what I'd learnt from it I guess. So just having a structure really. (Nicholas, interview.)

Nicholas also said he found the structure of the framework helped him to “sharpen his ideas” (Nicholas, interview). Teresa expressed a similar view: “If I didn’t have that, I wouldn’t have had a clue really what to put” (Teresa, interview). Her experience using the Reflective Framework was similar to the others in that respect. Due to the optional nature of the framework, it was not necessary to investigate why some of the participants did not consistently use it.

In addition to providing structure, the headings and prompting questions guided participants, such as Nabil and Qadir, to reflect. Qadir said that the prompts in the framework helped him to differentiate between writing just a descriptive journal and being able to write a “really effective journal”, which was reflective (Qadir, interview). Nabil believed the prompts at Step 1 encouraged him to describe his work and decisions, whereas Step 2 prompted him to analyse what he was doing. He said this was important in helping him to improve his work. Qadir also said he found Step 2 was really important because it guided him to write about the decisions he made and encouraged him to be a more active learner. In particular, Nabil said he used the prompts to help him decide on the type of design which was suitable for his target audience. For example: “[finding out] what kind of design is suitable for them ... gives me a chance to express what I feel and what I have to do for them” (Nabil, interview). From another perspective, Teresa said she found the act of having to write down what she was doing, and learning, helped her reflect.

Conversely, although all participants found the prompting questions in the framework useful, not everyone found them directly relevant. For example, Marie said it took her a while to realize that she did not actually have to use all the prompting questions. Apparently, it was her concerns about whether she was writing the reflections correctly, which made her try and use all the prompts in the beginning. Nicholas, in contrast, said he thought the prompting questions were relevant to his situation. Teresa said she

mostly found the prompts relevant, and only used the ones which assisted her. Similarly to the other participants, Yonten said he used the prompting questions and looked at them regularly. For example:

... everything makes sense but when you actually try to put it down, suddenly it occurs that it is more complicated, and then you go down to the prompt and it really clarified things and you sort of separate from one to the other, and it gives a clearer direction of which to go (Yonten, interview).

However, Yonten found the relevance of the prompting questions was variable. For example: “I was trying to position myself in my present professional position or role, and at times [the prompting questions] were not really relevant” (Yonten, interview). Not only was it interesting to discover what participants thought about the usefulness of the headings and prompts in the Reflective Framework, it was also surprising to discover how participants used it. Nicholas, for example, said that he had written down his thoughts, and then slotted them into each of the three steps. He said that he did this rather than write something in each of the steps of the Reflective Framework. This was because he found it easier to write down what he wanted to say first. This was different to how other participants said they approached using the framework; they tended to write under the headings as they went. For example, Teresa said she found she reflected and wrote to suit each of the three steps. She also said she preferred to write using the actual steps of the Reflective Framework rather than mixing up the elements required for each step throughout in her writing. This participant used the framework as it was intended.

Although, generally all participants said they liked the Three-Step Reflective Framework and the structure it provided, they also mentioned how they were flexible when using it. For example, by the last assignment Marie was tired of using the framework structure: “I had got to a point where all my reflections had been quite structured, and then at the end I really don’t need to use these steps anymore because I am at the end of it” (Marie, interview). The same sentiment was expressed in the fourth written reflection. In contrast, Ruth and Teresa tended to insert extra

headings in all the written reflections they prepared. Ruth was of the view that permanent modifications were needed to improve the framework. Details about these views are described in the individual case studies in Chapter Five.

Use of the tips in the framework was variable. For example, Teresa, Marie, and Ruth said they found that the tips encouraged them to include diagrams and illustrations in their reflections, and not just text. Additionally, Marie said she found both the tips and the prompting questions very helpful, particularly in the initial stages of writing the reflections. She said she would have really struggled otherwise. Unlike the others, Nicholas and Yonten said they did not use the tips. Yonten said he presented his reflections predominantly as text, rather than following the tips about diagrams and illustrations.

The participants were also asked how they wrote, using the three steps of the Reflective Framework. As a result, some of the participants mentioned specific challenges they had encountered when using the framework. For example, Qadir said he found it difficult to write about his feelings as instructed at Step 1. He did not feel comfortable having to think more deeply, and the process was challenging for him. Marie found both Steps 1 and 2 the hardest to write. In particular, at Step 2, the process of analysing her experience “really challenged” her because she had to think about the literature, and also think about the direction in which her teaching needed to go (Marie, interview). In Step 1, writing freely to draw her ideas together was also hard for Marie. Nicholas found his writing became “more concise through each step” as he generally had less to “say” for Step 3 than for the others (Nicholas, interview). Teresa admitted, during the interview, that she wrote mostly at Steps 1 and 2, and tended to write less for Step 3, which was similar to Nicholas’ experience. Teresa also said she found that having to write about what she learned at Step 2 “really forced [her] to think back” (Teresa interview). Yonten said he thought his writing in the steps overlapped a little. He also expressed his satisfaction with the framework. For example:

It was very useful and I am actually keen to use it ... [and], make it mandatory for myself to practice this very often. Like regularly in my work place as well. I find it very interesting and helped a lot” (Yonten, interview).

Yonten said he found Step 1 “a little bit tricky ... because it was mostly done just on feelings so there wasn’t much of a critical aspect ... trying to look in to yourself, that helped a lot” (Yonten, interview).

Overall participants said during their interviews that they found the Three-Step Reflective Framework useful. Even when they did not include the headings in their written reflections, they said they had referred to them, and also to the prompting questions. There was variation in how relevant participants found the prompting questions. Even when they were not relevant, participants such as Marie said they were good as a guide. Teresa said she only used those prompts which were relevant. Whereas, all participants said they used the prompting questions, not everyone used the tips consistently. However, Marie, Teresa and Ruth used the tips and found they encouraged them to be more creative. There was consensus from the participants that the Reflective Framework had assisted them in preparing their written reflection assignments, although not everyone articulated how the framework helped them to reflect. The views of the subject lecturer about the use of the Reflective Framework were also important and were discussed during an interview once the subject ended. The outcome of the interview is described next.

4.4.3 Interview with the subject lecturer

According to Penny, the intention of using the Three-Step Reflective Framework was to encourage students to engage reflectively with “a process of developing their ideas”, and use “feedback and ideas from the subject and the [previous] learning object ... and build on that for the next time” (Penny, interview). Penny believed the workshop at the start of the subject removed any mysterious elements associated with using the framework, and gave the participants valuable practice for using it later in the subject. This was particularly important, Penny believed, for the international students who

needed to get used to the terminology, and language associated with the framework. The term, prompting questions, may have confused some students who were unfamiliar with the English language. Participants who were unable to attend the workshop accessed the framework via the subject website, and Penny was confident sufficient support was available.

Penny found it was important to ‘demystify’ the process of reflection, and did this through the use of simple language, for example, by calling the assignments - written reflections. She also wanted to make the process of reflection relevant to each of her students. Penny did this through encouraging them to integrate learning they gained in the subject with their “professional lives”, and to apply the learning in their “professional context” (Penny, interview). For example, in the case of the teachers they were encouraged to reflect on the type of multimedia which was going to be appropriate for use in the classroom. Penny found that the workshop session, where participants tried out the framework, helped her to find out more about the students’ backgrounds. This information gave her better oversight, and further on in the subject, she was able to get “a sense of how they were progressing with the subject” (Penny, interview).

What helped Penny to integrate use of the framework into the subject, was the logical statements and prompts for each step. Penny believed that the structured process, provided by the Reflective Framework, helped her students know what “they were supposed to be reflecting on and [understand] how they were actually reflecting” (Penny, interview). Penny believed that her students had not done much reflection or self-critique before, and therefore, they needed to use the Three-Step Reflective Framework if she was to provide adequate help and support. Penny felt that even if participants had written reflectively prior to taking the subject, they probably had not engaged in reflection to the extent she was expecting. She did not want them to just tell her what they had done. She wanted her students to be analytical, think about what they were doing in the subject, link it back to their own work, and critique their progress. She thought that the framework may have helped them to take this approach. She said

there were some students in particular who were very good at doing those things, which sometimes surprised her.

Penny found that the students, who did not appear to use the framework, wrote reflections at a lesser standard than students who did use the framework. Penny believed that use of the framework would have helped those individuals to move up to a higher level of reflection, and write in a more analytical and self-critical manner. Instead, they wrote in a diary-like fashion and “all over the place in a stream of consciousness” (Penny, interview). Penny confirmed in the interview that participants who believed they could already reflect adequately were prevented, by their perceptions about the reflective process, from using the framework effectively. However, she was clear that although the tool was provided it was each participant’s choice whether they used it or not. For example: “you have got to leave it open to them” (Penny, interview). Where participants regularly used the framework, Penny was able to see progression throughout the semester as they became more skilled at reflection. In other words, “they reflected better as they did more of it” (Penny, interview).

As a result of Penny’s experience and reflection on the use of the Reflective Framework during the subject, she felt that it would be helpful to insist that students used the framework, particularly in the beginning. For example:

At least everybody could have a decent go at it and ... because you want to give them some freedom and capacity to choose something that helps them individually, but you can give them too much freedom. So I suppose it is kind of a fine line as a teacher. Where do you say actually I think I know better here. This framework will help you reflect better, or do you leave them to their own devices. (Penny, interview.)

Therefore, overall, Penny found the framework useful for her students. She found the reflective writing assignments were more successful than previously, when students were asked to reflect without a framework. She mentioned that she had never had a class of students who were well prepared to be reflective. As such their writing tended

to be mainly descriptive and did not move beyond that level. She believed that reflective writing was a skill which had to be learned and practiced. The preparation of four written reflections certainly encouraged most of her students to progress their skills in reflection. Although, she had noted that not all students advanced their skills. However, in some instances there were conflicting factors, such as: time constraints, feelings of failure and frustration, and language barriers, all of which appeared to impact on the quality of their reflections and writing.

Penny also mentioned that she had found it beneficial to provide students with a framework. For example: “They tend to perform much better ... rather than spending a lot of time working out the mystery of the structure of the assignment which is, in this subject, a very minor part of what they should be doing, they are actually getting on with the guts of the assignment which I would much rather see them spending their time doing” (Penny, interview). Therefore, the Reflective Framework was useful because it assisted Penny to provide structure and guidance for her students, and encouraged them to write more reflectively. Penny found that sometimes evidence of what they were learning about design theory came through in their reflective writing, much more than it did in their learning objects. She was reasonably happy with the level of reflection for some of the students but not for others. Interestingly enough, Penny found the level of reflection which participants were using in their assignments was variable across the group. This, she said, was probably due to the students having differing abilities. For example:

There is a natural variability amongst students, and in addition, when you add on all the other factors ... like time, language ability, those are factors [which affected outcomes], but generally overall I was very happy with the level of reflection across the board ...” (Penny interview).

Additionally, Penny felt that the kind of background participants came from, as well as their intellectual inclinations, helped to influence their engagement in reflection. Another factor was the type of conceptual thinking they employed in the subject of multimedia design, and the way in which they critiqued evidence about design. Some

participants were naturally more analytical and critical in their thinking, and this showed in their writing, more so than for other students. This was probably because they were in professional positions, which encouraged a critical approach. In some cases, where mature age students had come back to study after a considerable break, they were out of practice with regard to academic thinking and critique. Penny was not particularly concerned with getting all the students to the same level, and believed the framework “allowed everyone to move forward ... even though they didn’t all come out with the same understanding in the end” (Penny, interview). Additionally, she found the framework to be a good strategy to address the issue she was faced with: “Do you make sure that you are teaching at the level of the participants with the most basic understanding, ... [which means] the participants with the advanced understanding are going to be bored and get nothing out of it? (Penny interview.)

Penny also believed that participants used the framework in different ways depending on the level where they were situated when they came into the subject. For example, this was evident in the case of students who had little background educational theory, and very good technical knowledge. Penny found the framework helped these students meet the requirements for reflective writing. It also assisted them to demonstrate, through their explanations, how they applied their design ideas. Without the framework, Penny felt that students with little theoretical background would have written descriptively rather than being reflective, and believed “the framework helped different participants in different ways” (Penny interview). This was “because the framework involved three steps it helped their writing and helped them to really clarify what the assignments were. I think for the students who were already analytically minded, it just gave them a framework so that within that they still did exceptionally good analysis, but they had something that made it easy for them to structure [their writing]” (Penny interview).

Penny found the 2007 class (where the Reflective Framework was used) reflected better than previous classes. She believed this occurred for a number of reasons. For example, the framework “helped them understand what I wanted from them [and] made

the whole process of reflection very explicit [rather than] relying on whether [they] understood or not how to reflect” (Penny, interview). She also said, “reflection needs to have several kinds of elements, the descriptive, the analytical and the looking forward” (Penny, interview). Penny had previously assumed that students would know what was meant by reflection. However, she discovered they did not know how to reflect naturally, and in the past this had led to disappointing results.

Consequently, in future classes Penny intended to make the Reflective Framework compulsory for at least the first assignment. This was so she could ensure that all students engaged with the framework, and knew both what was expected of them as well as understood the aspects of reflection they needed to practice. She also believed that marking reflections was easier when there were clear criteria which had to be followed. Penny believed that teaching often involved getting students to do things to help them learn, even if they did not want to engage or could not immediately perceive the benefits. Penny discovered from discussions with students, about frameworks in general, that the Reflective Framework was challenging for some of them. It was prescriptive, a characteristic of any framework, and forced them, for example, to identify critical incidents. For example: “It actually takes mental effort to look back and extract those things and be analytical ... many students will choose the path of least resistance” (Penny, interview). She also believed there was evidence that the Reflective Framework led participants on the path to critical thinking. For example: “I could see that all of them were doing some level of critical thinking about the subject, and their application of the concepts and what those things meant to their professional context” (Penny, interview). She said that learning was “not just about content, it was about what you do with the content” (Penny, interview). Also, all students, whether they were from an international culture or not, had to adjust to a post-graduate culture with ... very different ways of teaching and learning to what they are used to” (Penny, interview).

Therefore, from the perspective of the subject lecturer, the Three-Step Reflective Framework was beneficial in improving the approaches her students took in their

reflective writing. Penny also provided written feedback on the participants' assignments as a further means of providing scaffolding for reflection. The outcomes of this form of support are outlined in the following section.

4.5 Feedback as a form of scaffolding

All seven participants confirmed, when interviewed, that the written feedback Penny provided was helpful and supportive. This is not surprising since it was not possible to separate the effects of the framework and the lecturer's feedback because both were expected to work together to support the students. Hence, the role of the teacher was deliberately designed to be part of the process. Therefore, the provision of feedback became a strength of the study because the researcher was confident that an unsupported framework would not have been successful.

Ruth, Qadir, Nabil and Teresa believed feedback encouraged them to reflect more on what they were doing in the subject, and encouraged them to expand and refocus their ideas. Yonten found Penny's feedback improved the quality of his reflective writing. Overall, the positive feedback which participants received supported their progress in the subject. Penny's feedback assisted the participants in different ways. For example, Ruth said she found Penny's feedback helped her think more about the design of the next learning object. For example:

It was good actually for the next one. She would give you comments about how to extend it or other areas to look at and you could bring it in to the next one. It was very helpful. (Ruth, interview.)

Nicholas was also convinced that the feedback from the lecturer helped him reflect on the multimedia design process because the feedback was supportive of his actions. For example: "For the most part she actually seemed pretty happy with what I'd managed to achieve" (Nicholas, interview). He also said, he did not think that feedback would necessarily encourage reflection because the process was a personal one. As such, it

required self-analysis and thinking about what he had learned, which Penny could not do for him.


Qadir said the feedback from Penny helped him expand his ideas, because she gave him suggestions on how to look at his designs differently and change them. He thought the feedback helped to change what he did, and this impacted on him personally. For example: “You have to change you are different” (Qadir, interview). Teresa also said she found the feedback was good in assisting her to change her approach, and work through issues step-by-step. Nabil also said Penny’s feedback helped him to improve his work. For example: “because I wrote about what I have learned and what I feel about doing this learning project and what I will do in the future for the next learning object (Nabil, interview). He also said: “I feel happy because the teacher thought my work was improved” (Nabil, interview).

Marie believed Penny’s feedback worked well in combination with the Reflective Framework as both were constructive. Yonten had felt insecure about reflective writing when he started the subject, and the feedback had assisted him. For example:

I was trying to strike a balance between what I learn and what ... [is] expected ... back at my professional position I had really good positive feedback which actually helped me a lot ... thinking in that way. (Yonten, interview.)

Yonten also said the feedback helped him to look at his ideas from the different perspectives of all the people involved, such as the teachers, students, and designers, and to consider their point of view.

Therefore, all seven participants said they found the written feedback from Penny was useful in some way. They felt her feedback not only helped them with their thinking around the design process, it also helped them approach the challenges they faced within the subject, and to look at them from different perspectives. Only Yonten said the feedback helped him improve his ability to write reflectively, and Qadir said the process of reflection and feedback had changed him personally. Nicholas, in comparison, believed the process of reflection was too personal for feedback to be of

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any use. Additionally, six of the participants (apart from Qadir) wrote, in the written reflections, about the feedback provided by Penny. Four main themes emerged in participants' written reflections: *Technical and design*, *Accessing resources*, *Decisions*, *Helpful feedback*, and *Thanks*. These are listed in Table 17, alongside quotes illustrating the themes.

Table 17: Categories of feedback provided on participants' written reflections.

Categories	Quotes	Reference
Technical and design.	Penny suggests I use navigation tools appropriately and not clutter a page with too much information.	Marie, Written Reflection 3.
	Penny mentioned to focus on the design ideas and possibly explore just one area.	Ruth, Written Reflection 4.
	Penny suggested in her feedback on my previous learning object that one interactive feature of the design – the learning mentor – was not an obvious clickable link from the first page.	Teresa, Written Reflection 3.
Accessing resources.	Last week Penny suggested a site at ... a biomedical site.	Ruth, Written Reflection 2.
Decisions.	After I received the feedback for the first learning object, I will try to improve my skills for how to use pictures and animations.	Nabil, Written Reflection 3.
	Some thoughts from previous feedback.	Teresa, Written Reflection 3.
	Considering this suggestion I have decided with this learning object to make clickable links more obvious to the user.	Teresa, Written Reflection 3.
Helpful feedback	The feedback I received on my first learning object was very encouraging.	Nicholas, Written Reflection 3.
	It's satisfying to feel that I'm on the right track.	Nicholas, Written Reflection 3.
	The feedback on the first learning object is very encouraging and motivating	Yonten, Written Reflection 3.
Thanks	Penny- thanks heaps for your inspiration.	Marie, Written Reflection 4.
	Once again the positive feedback has been most encouraging – thanks for that Penny.	Nicholas, Written Reflection 4.

As expected, none of the participants mentioned feedback from Penny in the first written reflection, because they had not received any at that stage. Instead, references to Penny's feedback were mainly in the third and fourth reflection assignments. Additionally, the written feedback Penny provided to participants on their written reflections was encouraging and positive. In each of their first reflections, Penny

acknowledged the professional roles of the participants, and the relevance of multimedia design in their work context. For example:

Great work on your first reflection Qadir. You provide a very clear description of yourself as a teacher and what you have learned in relation to interactive multimedia on the basis of your past experiences. This subject will give you an opportunity to learn more about effective multimedia design so that you can use those principles in your home context of [name of country]. (Feedback given to Qadir, Written Reflection 1.)

It was evident in the feedback, which Penny provided, that right from the beginning participants were guided towards readings which would help them. She also encouraged them to start planning their designs. For example:

Understanding the basis of good design is the key to using multimedia well in the classroom. The readings and activities in the subject will give you a chance to explore those ideas. Your next step is to make some decisions about what you want to focus on for your first learning object. Choose some concepts from the readings that you want to apply and start planning your design. (Feedback given to Nabil, Written Reflection 1.)

The existing knowledge already held by participants was acknowledged in Penny's feedback, and they were given direction about what to expect from the subject. Penny also used questions. They were designed in such a way that participants were encouraged to set goals for themselves and to access the subject readings when making their decisions. For example:

The next thing to start thinking about is setting some concrete goals for your first learning object. What topic are you going to choose? How are you going to demonstrate some multimedia design skills? Anyway, now is time to make some decisions about what your focus will be for your first learning object and thinking about what you can apply from the readings. (Feedback given to Teresa, Written Reflection 1.)

An examination of Penny's written feedback confirmed that she not only guided participants' practices in the design process, she also guided their learning. For example, in their first written reflections Penny acknowledged the goals participants set for themselves. She also extended participants' thinking and activity further by encouraging participants to read widely and experiment. She also suggested they think about how they were going to apply the principles they took from the theoretical material, and put them to practical use. She also encouraged participants to think about the target audience and the professional applications of their designs. Penny also identified with participants' ideas. For instance when Nicholas mentioned he would like to investigate gaming as a multimedia approach, Penny wrote: "Games interest me as well, particularly how we can make sure there is high quality educational content and strategies embedded" (Feedback given to Nicholas, Written Reflection 1). Penny also directed Nicholas to resources to help him with his project, just as she did in her written feedback to other participants.

In the feedback given on the first written reflections, Penny's tendency was to encourage decision-making, and to prompt the engagement of participants with their professional areas. In contrast, her feedback on the second group of written reflections was more directive. She also challenged the participants with more in-depth questions, getting them to think more deeply about the target audience for their learning objects. And she also got participants to think about their professional context. For example:

... are there any core concepts you could reinforce using multimedia? Are there any concepts students have particular difficulty with and multimedia could provide another form of explanation for? It is a very good strategy to start simply in order to develop your design skills as well as technical skills. Simple multimedia resources can be effective for learning just as much as expensive applications. Remember to keep your learning object small and focused. (Feedback given to Nabil, Written Reflection 2.)

In some cases, Penny gave quite direct encouragement about the way participants were reflecting. In others, her feedback was used to encourage participants to think more broadly. She did this through the use of written questions. For example:

Nabil, you've included some very good reflections on the nature of multimedia design in this reflection. To apply the design principles you are learning, think about how they are relevant to your own teaching. For example are there any core concepts you could reinforce using multimedia? Are there any concepts students have particular difficulty with and multimedia could provide another form of explanation for? (Feedback given to Nabil, Written Reflection 2.)

Therefore, at first, Penny was encouraging the participants to think and critique their experiences. Later on, in the third group of reflections Penny acknowledged participants' reflective writing and the progress they were making with it. For example: "Teresa, a great reflection that gives plenty of insights into how your ideas are developing and what are you applying from the subject" (Feedback given to Teresa, Written Reflection 3). Additionally, Penny took the opportunity to teach Teresa. For example:

I also think it uses conventions that are well understood in the authoring 'community' but are different to other forms of software - thereby making it more challenging to learn. That said it is possible to do some very simple things in Flash and I think that simple animations using diagrams is the best way to start. Once you start adding other media like video and audio it becomes more complicated. (Feedback given to Teresa, Written Reflection 3.)

Penny used a similar approach in her feedback to the other six participants. However, there was more emphasis on the technical in her feedback to Ruth and Nicholas. The previous example illustrates the importance of the scaffolding provided by Penny in providing encouragement for the design work and for reflection, advice and information, technical support, and teaching, as well as praise for participants'

achievements. In contrast, the feedback which Penny gave to participants on the last written reflections was much shorter. Her written feedback was less about providing guidance regarding the design process and reflective writing, and more of an affirmation about their achievements. Generally, this was in areas to do with skill development and the designs they had created, including how their skills and ideas had progressed. The themes which emerged in Penny's feedback are collated in Table 18. Overall, Penny's written feedback was affirming and supported participants' practice. It was also used to teach and guide the students in the design process, and in their reflections about their experiences.

Table 18: Themes found in the written feedback provided on participants' written reflections.

Themes	Description of themes & patterns
Acknowledgement	Acknowledgement of existing knowledge and progress, and approach to reflective writing.
Affirmation	Affirmation about achievements in skill development and designs, and progression of ideas, as well as positive praise for abilities in reflection.
Application	Application of design ideas to tasks for the subject and to professional contexts.
Encouragement/Thinking	Challenging participants through questions to promote deeper thinking, as well as giving encouragement about their approaches and ideas, goals, decisions, as well as direct encouragement about reflection and how to think more broadly.
Encouragement/Example	Encouragement through lecturer identifying where participants' ideas matched lecturer's ideas, and lecturer "humanised" her feedback by sharing examples of her experience.
Guidance/Theory	Guidance towards readings and what to expect from the subject.
Guidance/Technical	Direction regarding software to use and resources and support of same.
Professional context	Mention of professional roles, relevance of multimedia design in a work context, recognition of professional practice.
Teaching	Teaching about the subject and design process.

In summary, there is evidence that the participants found the written feedback provided by Penny supported their professional learning and reflective practice. This was demonstrated in the written reflections and in their interview responses. The feedback appeared to complement the support provided by the Reflective Framework. The themes in the written feedback paralleled the views that the participants expressed when

interviewed. Although, the participants did not write in any detail about the support they received from Penny, the professional focus, taken in the written reflections, indicates that they were concentrating on their practice and learning and responding to feedback. It can be argued that Penny's written feedback scaffolded both the learning they reflected on in the subject and the reflective writing they produced as an outcome of using the framework. The participants' perspectives about reflective writing are outlined in the next section.

4.6. The impact of reflective writing - professional perspectives

Participants' had a range of views about reflection, and varied experiences with reflective writing for professional practice and professional learning. They also differed in their plans to use reflective approaches in their practice, in the future. All participants, apart from Ruth, said in the interview that they found it quite difficult to write the first reflection assignment for the subject. They believed this was due to their lack of familiarity with reflective writing and use of reflection as a learning method. For example, Marie found it threatening to write down her thoughts, and believed the framework provided guidelines to scaffold her writing. For example:

Having to writing something down diary style was really confronting and I certainly didn't think I could do it and the guidelines ... were helpful and ... the reflections became more of a scaffolding ... for me (Marie, interview).

Marie also believed the more she practiced reflective writing the easier the process became. In contrast, Ruth found it took more time to write reflectively when using the framework rather than her own methods as she felt compelled to write something for all the prompting questions. Teresa said she felt the reflective writing process was less desirable compared to the thinking she normally did on an informal basis. She said this was due to the need to include descriptions and terminology for the reader to understand. Yonten discovered that writing reflections for others to review was inhibiting. Teresa, Nabil and Nicholas believed the process of reflection positively supported the design process in the subject. For example, Teresa said she had to think

about the theory underpinning the design ideas she was working on, and justify her ideas for the reader. Nabil also found the process of reflection helped him improve his design work. For example: “I feel happy because my design, the second design was improved. So it was helpful and useful.” (Nabil, interview.)

Although, none of the participants, apart from Ruth, had used reflective journaling in their professional lives, all said they had undertaken reflective discussions with colleagues. For example, Teresa and Ruth said they regularly used reflection as part of performance review. In particular, Ruth kept written reflections about her performance, whereas Teresa only used verbal reflection. The inexperience of the participants with reflective writing appeared to impact, to some degree, on their ability to engage in the practice of writing about their experiences. For example, Teresa and Marie did not like the idea of reflective writing, at first, on entering the subject. Later on, Marie explained how she changed her attitude and became more positive about reflective writing after using the Reflective Framework. In contrast, Teresa did not change her opinion about reflection. For example:

I found it ... personally a bit of an awkward way to reflect I had to remember what I reflected on and put it in writing all the time, and I found it a more difficult way to reflect in a way, because I had to present things in such detail that [the lecturer] would understand (Teresa, interview).

In contrast, Nicholas and Ruth said they regarded the process of reflective writing as helpful when working through either a critical incident or when problem-solving. For example, Nicholas felt he already reflected.

I do feel that I do already reflect ... it is ... much more random and so [the Reflective Framework] would probably make it more effective.... I can see reflection being useful when I’m trying to problem solve. (Nicholas, interview.)

Additionally, five participants (Qadir, Yonten, Nabil, Marie, and Nicholas) believed the Reflective Framework was a good professional development tool. Therefore, they intended to continue to use the Reflective Framework to document their professional

practice, despite none of them being required to keep professional portfolios. However, Ruth and Teresa did not plan to use the Reflective Framework in the future. Nabil and Qadir both intended to use the framework with their students. They believed it would be helpful for their colleagues as well. Nabil wanted to introduce reflective writing to his professional area, and regarded it as, “a new form of literacy. Like use reflection for the students and for the teachers as well to improve our knowledge.” (Nabil, interview.) Nicholas found the Reflective Framework aided him to process new information, and his perspective was that as a result his reflection and writing would be more effective in the future. Yonten also found the Reflective Framework helped his ability to reflect. He believed he had become better at thinking, and also used different thinking techniques. This was also as a result of using the Reflective Framework in the subject, so he would continue to use it in the future to write a professional blog. He felt the Reflective Framework was a good professional development tool, not only to help him learn, but also to help his time management.

Although, most participants intended to continue to use the Reflective Framework, there was a difference between them with regard to the type of reflective practice they intended to pursue once the subject had ended. Nicholas and Yonten both planned to write reflectively using blogs, and Marie, Nabil and Qadir said they wanted to keep electronic journals based on the Reflective Framework. Only two of these participants, Yonten and Nabil, intended to prepare a portfolio of reflections for performance review purposes. Qadir, Yonten and Nabil said they felt that reflective writing would become easier and more intuitive the more they practiced. For example: “I am expecting it will be more of a natural thing” (Yonten, interview). Overall, none of the participants felt the need to learn more about how to write reflectively other than by practicing with the Reflective Framework.


Few of the participants were required to engage in reflective practice for their professions. Generally, where performance was reviewed it involved the filling out of standardised templates. For Teresa, this process did not encourage reflective writing. Instead, in Teresa’s situation, performance review was about filling out a template with

goals, and noting down whether her goals had been met or not. As she was not required to critique or judge her performance, it was not necessary to write reflectively in any way about her work. Therefore, in her professional context, Teresa had no requirement to write reflectively, and felt that continued use of the framework was not necessary. Ruth and Teresa, who also did not intend to continue using the Reflective Framework in the future, indicated in an interview that they had found it useful; particularly for the purpose of writing reflections for the multimedia design subject. However, both preferred to use their own methods of reflection in everyday professional practice. Teresa explained that she liked to think things through in her head as she went. Although, Teresa could see some value in recording her reflections in the future, if she was the only person reading them, she probably would not take the time to go back over what she had written and analyse her actions. Ruth indicated that she had her own reflective writing approaches, and intended to reflect on key academic learning areas and critical incidents, and would continue to do that in the future.

In summary, participants' views about the use of reflection and reflective writing were diverse. Ruth was the only participant to find writing the first written reflection easy. Participants found the reflective process challenging to start with, and intimidating overall. However, they found it became easier as they practiced. Some participants considered it intimidating to write reflectively when others were reading their reflections. Consequently, they preferred to think in their heads rather than write their thoughts down. For some participants, the process of reflection helped them to improve their work in the subject and to problem-solve. Overall, the Reflective Framework was regarded as a particularly useful tool for helping participants engage in reflective writing for the subject. For the majority, the approach was desirable to motivate them to continue with professional practice in the future.

4.7 Discussion of results

All participants demonstrated more frequent instances of the lower, three levels of reflection – Descriptive, Explanatory, and Supported reflection. This result was anticipated, according to the research on which the analysis of the levels of reflection

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was based (i.e., Hatton & Smith, 1995; McCollum, 2002; Rodgers, 2002; Sparks-Langer et al., 1990). Contextual reflection was not found, and only two participants demonstrated Critical reflection, but at a low frequency. The frequency of each level of reflection was variable at an individual level, and there was no consistent pattern across participants. Overall, participants wrote primarily at the Descriptive level of reflection (Figure 5). At an individual level, participants wrote, either equally at the Descriptive and Explanatory levels, or more so at one or other of the levels (see Table 50, Appendix 23). The type of reflection exhibited by participants in their written reflections was varied. Overall, *Stating* and *Noticing* types of reflection, at the Descriptive level, were most common. *Deciding* was found at a high frequency at both the Explanatory reflection and Descriptive levels of reflection. *Stating* was also proportionately high at the Explanatory level. *Evidence Identified*, at the Supported level of reflection, was also found at a relatively high rate across the written reflections (see Table 13).

Five of the participants were inexperienced in reflective writing, and two (Nicholas and Ruth) had used some form of reflective writing professionally, and for their studies. Only one participant (Ruth) felt she was experienced in reflective practice. Nabil said, in the interview at the end of the subject, that he had prepared written reflections previously for another subject, but he responded in the survey that he was inexperienced in using reflection and reflective writing. Therefore, considering the past experiences of the participants with reflective writing, it was evident that only one participant (Ruth) had the necessary experience to engage in advanced forms of reflection, such as Contextual and Critical. However, she did not demonstrate these levels of reflection.

The subject lecturer, Penny, believed the written reflection assignments were more successful than in previous classes, where students had been asked to write reflectively in the absence of a framework. In previous classes, she considered that her students had not been well prepared to be reflective. She had found their writing to be mainly descriptive, and saw no evidence of reflection at a deeper level. Penny said she believed that the opportunity participants were given to practice reflective writing, using a framework, had helped most of them to advance their skills in reflection.

However, the steps of the Reflective Framework did not appear to consistently influence any particular level of reflection at each step, apart from the greater frequency of Descriptive reflection, which was found at Step 1 compared to Steps 2 and 3. Unexpectedly, Descriptive reflection, in comparison to Explanatory reflection, was also more frequent at Step 2. Links between the headings and prompts in the Reflective Framework and what participants wrote were apparent. For example, *Deciding* was found more frequently at Step 1 and at Step 2, compared to Step 3 where it was not prompted. Critical reflection was not found at a greater frequency in any of the steps, including Step 3, where participants were expected to critique their learning and actions. Even so, participants' focus when they wrote about their areas of professional learning and practice became apparent in the themes which emerged – *professional capability*, *professional learning*, *professional practice*, and *professional context* – and the number of sub themes (see Table 42). Certainly, five participants (Qadir, Teresa, Marie, Nicholas and Yonten) described the connection between what they were doing and learning in the multimedia design subject, and their current professional practice, and how their learning could be applied to practice. This was regarded by the researcher and the subject lecturer (as stated in the interview) as evidence for professional learning, and gave an indication that these participants were developing their professional capability.

Additionally, the professional focus of participants in the supporting statements was related to the design process undertaken, that is, the practice they were immersed in at the time. The professional focus of the written reflections, and the supporting statements was found to be similar. Conversely, the written reflections contained evidence of four levels of reflection whereas the supporting statements contained three levels (Descriptive, Explanatory, and Supported). Although, use of the Reflective Framework was variable amongst participants, they all found it useful for guiding their reflective writing. The Reflective Framework was regarded as helpful, not only for the written reflections, but also indirectly for preparing the supporting statements. All but two participants (Ruth and Teresa) intended to continue using the framework in the future.

Written feedback from the subject lecturer was the other form of support provided in the subject to assist participants' reflective writing. Participants were unanimous that this was helpful. However, not all participants felt that the feedback guided actual reflection. Overall, the structure and scaffolding provided by the Three-Step Reflective Framework was found to be influential to some degree, and contributed to developing participants' skills in writing reflectively. In the following chapter, case studies for each of the seven participants are presented.

5 CHAPTER FIVE: CASE STUDIES

5.1 Introduction

In this chapter, seven individual case studies are described. This information about each of the individual participants provides a rich narrative about the approaches they took to reflective writing and how they used the Reflective Framework. The case studies are arranged using the following headings, and included with the headings listed here is an overview of the importance of these aspects of the case studies.

- Introduction to the participant.

Each case starts with an overview of the individual's role, interests and background, situated within his or her professional context. Previous experience in reflection is also mentioned in this section.

- Nature of reflective writing and professional focus.

The levels of reflection, the type of reflection and the patterns in each participant's writing are portrayed to illustrate the uniqueness of each case, and the emphasis each individual placed on different areas of practice.

- Use of the Three-Step Reflective Framework.

Each participant's use of the three steps of the Reflective Framework is described, illustrating the influence of the headings and prompts on their reflective writing.

- Reflective writing – views and experiences, and future use.

The diversity of each participant's knowledge about reflection and experience with reflective writing, during the multimedia subject, is outlined in this section. Additionally, the influence of this experience in informing future reflective practice is described.

- Summary of key findings.

The key points of each case are summarised in the final section.

5.2 Introduction to Qadir

Qadir was a school teacher at primary school level. He was inexperienced in using reflection, either professionally or in his personal life, as he had never used a journal or written reflectively. Early on, Qadir indicated that reflection was important for improving his skills in thinking. He preferred to learn new knowledge by accessing the Internet, and believed that eLearning was an effective method for learning, along with reading technology magazines and books. Therefore, Qadir used a range of technological approaches for his professional learning. Prior to engaging in reflective writing for the multimedia design subject, Qadir had disliked reflection.

Qadir's interest in educational design and technology occurred prior to entering the multimedia design subject when he discovered, early on in his career, the importance of using technology to engage his students in learning. His realization that some of his students were having difficulties with their learning, led him to seek technological solutions. Consequently, for the multimedia design subject, Qadir decided to design learning objects, which he could use in the classroom once he completed his studies. To make this change, Qadir sought out professional development opportunities, such as studying for a Masters in Education. He set some long term goals for his career, namely, learning more about information and communication technologies and multimedia design. Although, Qadir was inexperienced in reflective writing, he realized the benefits for his professional development.

5.2.1 Nature of reflective writing and professional focus for Qadir

Two thirds of Qadir's writing contained Explanatory reflection, and therefore, was the most common level of reflection found in his four written reflection assignments (labeled as: R1, R2, R3, and R4 in Table 19). Comparatively, Descriptive reflection

was less common, and there was a small proportion of Supported reflection and also Critical reflection. There was no evidence of Contextual reflection. The distribution of reflective writing across Qadir's four written reflections varied with a much lower amount of Explanatory reflection evident in the fourth written reflection (R4 in Table 19).

Table 19: Qadir - levels of reflection in four written reflections (R1 to R4).

Level	Overall	R1	R2	R3	R4
Descriptive	33%	18%	42%	39%	32%
Explanatory	60%	72%	55%	58%	48%
Supported	2%	8%	0%	0%	0%
Contextual	0%	0%	0%	0%	0%
Critical	6%	3%	3%	3%	20%
Total	100%	100%	100%	100%	100%

Noticeable differences between the proportions of Descriptive and Explanatory reflection in the first reflection assignment were found (18% c.f. 72%, respectively). Supported reflection was found only in Written Reflection 1, whereas Critical reflection was found in all four assignments, with a much higher proportion in the fourth written reflection. No increase occurred in the amount of any particular level of reflection over time, and therefore, no specific trend was noted. Statements (*Stating*) about the design process were a feature of Qadir's writing at both the Descriptive and Explanatory levels of reflection (Table 20).

At the Descriptive level of reflection, *Stating* was more frequent in comparison to other types of reflection (Table 20), and is illustrated by the following example:

Back to the first part of my project, it will be a game that deals with the multiplication table", and, "If the student clicks on the right answer the next page which is reinforced by the clapping sounds and positive expressions.
(Qadir, Written Reflection 2.) (The learning object is illustrated in Figure 11.)

Noticing types of reflection were found much less frequently (Table 20). This was possibly because Qadir, when writing about his thoughts concerning professional issues and his decisions, provided explanations, which took his writing to the Explanatory level of reflection. Even so, *Noticing* was the second most common form of writing demonstrated by Qadir, at the Descriptive level, and *Deciding* was the third most common (Table 20). Notably, *Goals* and *Self-Questioning* were not found in Qadir's writing at the Descriptive level of reflection, but *Goals* were found at the Explanatory level.

Table 20: Types of Descriptive reflection and Explanatory reflection for Qadir.

Descriptive	Stating	Noticing	Deciding	Goals	Self-Quest			
	68.9%	17.8%	13.3%	0.0%	0.0%			
Explanatory	Stating	Deciding	Professional	Personal	Learning	Goals	Reactions	Self-Quest
	30.3%	27.6%	22.4%	7.9%	3.9%	2.6%	0.0%	0.0%

At the Explanatory level of reflection, *Deciding* and *Professional* types of reflection emerged at similar frequencies (Table 20). When Qadir analysed his professional practice at this level, he mentioned the reasons for exploring multimedia design for use in his teaching with primary school students. He also referred to teachers in general, and the need for interactive learning experiences to meet learning objectives. The amount of *Personal* reflection, where he explained his feelings or beliefs, was low as were explanations about what he was learning.

Qadir demonstrated Supported reflection to a minor degree, with two instances found, only in the first written reflection. One piece of evidence was cited (*Evidence Identified*), and in the other instance he mentioned design theory (*Evidence Mentioned*). For example:

Nowadays, Clark, R and Mayer, R (2007) claim that “rich media can improve learning if they are used in ways that promote effective cognitive processes in learner. (Qadir, Written Reflection 1.) (Coded as: Supported reflection/Evidence Identified.)

In my opinion, MD is one of the most important subjects because it deals with the “Design” that is one of the Instructional Design’s five steps (Analysis, Design, Development, Implementation, & evaluation). (Qadir, Written Reflection 1.) (Coded as: Supported reflection/Evidence Mentioned.)

No further instances of Supported reflection were found, although this requirement was clearly stated in the Subject Outline (University of Wollongong, 2007, Appendix 3). Qadir also demonstrated a degree of Critical reflection, with seven instances measured overall including four instances categorized as *Application of Learning*. For example:

I’m not really sure about the way in which I’m going to apply what I get because this depends on both: (1) an updated study about the educational systems in [name of country], the place where I’m going to apply my experience in, & (2) the type of experience I get. (Qadir, Written Reflection 1.) (Coded as: Critical/ Application of Learning.)

Qadir was very focused on the professional relevance of the multimedia design processes he was undertaking in the subject. He mentioned how his learning about design and educational technology could be used in his teaching. For example, he wrote about five key areas: design features such as graphics and video; tools in use for creating learning objects; learning objectives and multimedia design; interaction with content; skills of teachers relating to multimedia design; and what he was learning about design.

The background to Qadir’s professional role was described, in some detail, in the first written reflection. He made it clear from the outset, when explaining the reasons for the designs he chose, that he had considered primary school students. Qadir wrote about the learning difficulties some of his students were exhibiting, and the need for good

design. The learning objects Qadir designed were intended for children to use as games to help them learn mathematics. As a result, Qadir frequently made reference to interactive design features, which he believed were suitable in motivating children to engage with the learning objects. For example, in the second and third written reflections, and all the supporting statements, he mentioned the need for using colour, pictures, audio, and video to produce interesting animations for students' learning. Consequently, the designs Qadir chose for his learning objects, and on which he reflected, were based on areas which he had noticed caused challenges for his students, such as mathematics multiplication tables and English language. For example:

As we can see that, the design is simple & effective. I have chosen variety of colors to show the students different steps of this test (see Figures 3, 4, 5). I used different type of funny pictures and multimedia such as Video & Flash game in both questions & prizing pages, because I want to make the design more attractive for target learners. I think the students in this level need “reinforces” so I applied some movies and games as prize when the complete successfully this test. (Qadir, Written Reflection 3.)

In his reflections, Qadir also included diagrams of the structure of the learning object to illustrate his design approach (see Figure 11).



Figure 11: An example of a learning object designed by Qadir.

His writing demonstrated his professional knowledge and awareness about design and learning theories. Although, he referred to design theory many times in all four written reflections, supporting evidence was rare. It was apparent by the number of times he mentioned the necessity of including interactive elements into his designs that he believed interactive design was important for motivating learning. However, he did not cite any evidence to support this claim. Some of Qadir's statements indicated he had contemplated the relevance of technology from a professional perspective. For example:

I used different type of funny pictures and multimedia such as Video & Flash game in both questions & prizing pages, because I want to make the design more attractive for target learners (Qadir, Written Reflection 3).

Qadir's beliefs and opinions about design and learning surfaced in his writing. Qadir provided explanations for his design decisions which were relevant to his professional role. For example, he chose games for his learning objects because he believed children understood concepts better when they were presented in the form of a game, and he believed this would make his teaching more effective. Qadir felt that his decisions to move away from using traditional teaching approaches and to introduce computer-based learning had resulted in a significant increase in the "cognitive process of learning" exhibited by his students (Qadir, Written Reflection 1). However, his reactions and feelings about the multimedia design process were not apparent, indicating he was not able to express his emotions when writing reflectively. Qadir's reflections, about how he intended to apply what he was learning, progressed over the course of his writing. He began by describing his initial concerns with the "the type of experience" he was gaining and questioned whether it was sufficient (Qadir, Written Reflection 1). Later on, Qadir described how he was going to use his learning. He wrote specifically about applying his new professional knowledge when he returned to his country. Qadir appeared to consider different perspectives in relation to his ideas and beliefs, but did not critique them in any depth as required for Contextual reflection.

Similarly, in the supporting statements, Qadir's writing emphasized a professional perspective with the focus on his students. For example:

I used these images and animations in order to attract and encourage the students. Using animations helps students to learn in a better way, & it enhances the validity of the written content. (Qadir, supporting statement 1.)

Evidence of both Descriptive and Explanatory levels of reflection was found in the supporting statements, but no Supported reflection. Qadir wrote about the challenges he faced, unlike his writing in the written reflections where he did not mention his difficulties. For example: "The other challenge was organizing the content in the main page and contributing each button link in different pages" (Qadir, supporting statement 1). In the interview, Qadir confirmed that the written reflections helped him prepare his supporting statements.

Overall, in his reflective writing for the multimedia design subject, Qadir demonstrated similar levels of reflection, with predominantly Explanatory reflection in the written reflections. Qadir's professional focus was associated with his role as a primary school teacher and the learning gaps he had identified in his students' experiences in the classroom.

5.2.2 Qadir's use of the Three-Step Reflective Framework

Qadir used the headings of the Three-Step Reflective Framework for the first reflection assignment, but not the other three. However, in the interview, he indicated that he had used the framework to help him shape all his written reflections. For example:

I think it [the reflective Framework] is really useful, and I think that it is really important for us as learners to recognize the difference between a descriptive journal [and a] reflective journal. It is easy for us to write a really effective journal, not just a descriptive journal, about what we are thinking, and about our planning and what we are doing and how we plan and evaluate. (Qadir, interview.)

However, only one assignment could be used to ascertain how his use of the framework influenced the levels of reflection at each step (see Figure 12). Qadir revealed that at first he found it very difficult to write reflectively, and was greatly helped by using the three steps of the framework, which he felt guided him to write well. Although, the Reflective Framework also helped Qadir select what to write, he found it difficult to write about feelings as required for Step 1, or to analyse his thinking and writing, as prompted at Step 2. For example:

I think it is a bit tough you know to describe your feelings some times and ... how you feel about some things so I think it is difficult and how you need to be thinking deeply about what you are going to do and the planning and what you are going to have to do. I think it is difficult to write your feelings (Qadir, interview).

Explanatory reflection was the only level present at Step 1, and it was also the main form of reflection at Step 2 (Figure 12). At Step 2, there was also writing at the Descriptive and Supported levels of reflection. Three levels of reflection were present at Step 3, including Critical reflection (Figure 12). The frequency of Explanatory reflection decreased with each of the three steps (Figure 13). Therefore, the way in which the Reflective Framework influenced Qadir's writing is not particularly clear, although the strong presence of Explanatory reflection at Step 2 indicates there may be a connection with the way he wrote and the prompts for this particular step.

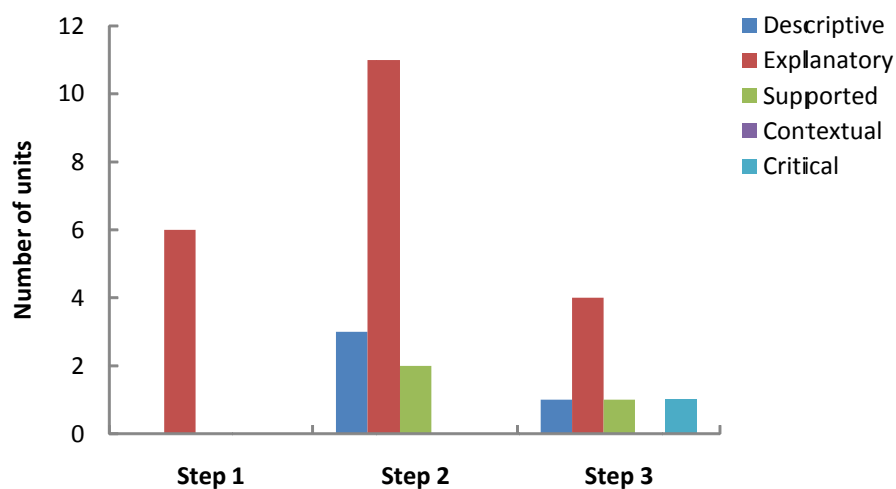


Figure 12: Qadir – Number of units of reflection at three steps of the Reflective Framework.

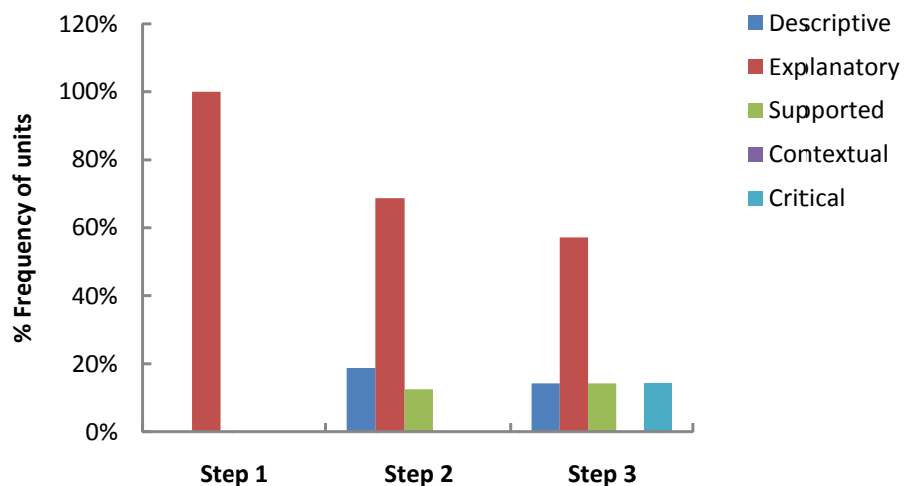


Figure 13: Qadir – Levels of reflection as % frequency at three steps of the Reflective Framework.

The measurement was based on just one assignment, and as such is not a reliable indication that the Reflective Framework influenced Qadir's writing. In the next section, Qadir's views about reflection and his experience with reflective writing in the multimedia design subject are outlined along with his intentions for reflective writing in the future.

5.2.3 Reflective writing – Qadir’s views and experiences, and future use

Qadir’s encounter with reflective writing in the multimedia subject was a new experience for him, professionally and personally. Reflection was challenging for him, but in the interview he said he had gained an understanding of the benefits, and felt that his reflective writing technique had improved with each of the written reflections. Qadir believed practice was necessary to improve his skills in reflection. He found the feedback from the subject lecture helpful. It guided him in his designs, and not only meant he changed his design ideas, in response to her suggestions, but consequently, his reflections. The written reflections also assisted Qadir to prepare the supporting statements. For example: “when you are writing a reflective journal about your project and after you do your projection you try and think and it helps to write a supporting statement because you are already thinking and you apply your idea ... and it is easy to write a supporting statement” (Qadir, interview).

Qadir also expressed a belief that by using the Reflective Framework with prompting questions relevant to his professional circumstances he would be equipped to create a professional portfolio in the future. Therefore, Qadir believed the Reflective Framework was a good professional development tool and would use it professionally, inform his colleagues about it, and also use it with his learners.

5.2.4 Summary of key findings for Qadir

Qadir demonstrated four levels of reflection in his writing: Descriptive, Explanatory, Supported and Critical. His writing contained two examples of Supported reflection, but only one cited piece of evidence to support his claims. *Stating* was the most common type of reflection, particularly at the Descriptive level. His design decisions (*Deciding*), and explanations about his professional practice (*Professional*) were the most common types of reflection. In his reflections, Qadir focused on the way in which multimedia design could assist his students’ learning, and the best ways to address this. He also critically reflected on how he would apply his new knowledge in the future. Although, Qadir used the Reflective Framework for only one written reflection, he

claimed that the framework assisted him to write reflectively, and intended to continue to use it professionally.

5.3 Introduction to Marie

Marie was a secondary school teacher who taught science, mathematics and physical education. She had not used reflective writing techniques previously, either in her work or for leisure, mainly because she did not like them. In the survey, she responded: “I dislike writing journals. It feels like I'm spending my time (which I value) on an exercise that will provide me with little benefit” (Marie, survey). Marie preferred to learn new knowledge by accessing colleagues who had the relevant knowledge and experience to help her. For example, in the survey, Marie mentioned that she preferred: “talk[ing] to my peers about their experiences”; and “search[ing] the net” because it was a “lot quicker” to talk to people before trying to find the information she needed (Marie, survey). Marie provided a diagram in the survey to illustrate the approach she took when learning something new (Figure 14).

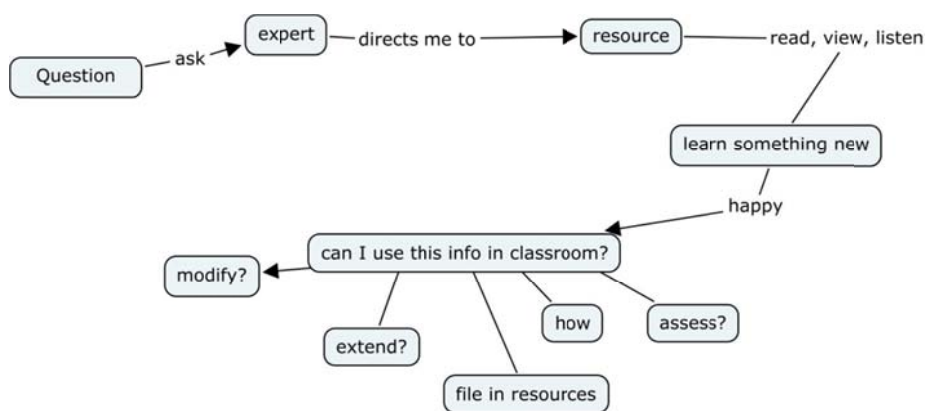


Figure 14: Diagram prepared by Marie in the survey.

Marie was studying the multimedia design subject for professional development, and stated: “The challenge is there - adjust or become a dinosaur!” (Marie, Written Reflection 1). Reflective writing was not favoured by Marie at the start of the multimedia design subject; however, it appears from Figure 14 that she naturally used reflective techniques to express her thoughts.

5.3.1 Nature of reflective writing and professional focus for Marie

Marie wrote primarily at the Descriptive level of reflection in the four written reflection assignments. Explanatory reflection was less frequent, and Supported reflection occurred at the lowest frequency (see Table 21). No Contextual reflection or Critical reflection was found. However, Marie demonstrated she was engaging in analysis of her decisions and actions because more than a third of her writing was at the Explanatory level of reflection.

Table 21: Marie - levels of reflection in four written reflections (R1 to R4).

Level	Overall	R1	R2	R3	R4
Descriptive	56.4	50%	47%	52%	85%
Explanatory	40%	42%	44%	43%	12%
Supported	7%	8%	9%	4%	4%
Contextual	0%	0%	0%	0%	0%
Critical	0%	0%	0%	0%	0%
Total	100%	100%	100%	100%	100%

Marie exhibited similar levels of Descriptive and Explanatory reflection in Written Reflection 1 and 3. In the final assignment, there was significantly more Descriptive reflection compared to Explanatory reflection (R4) (85% c.f. 12%). Marie began this reflection by writing: “I have decided to write my last reflection differently. I’m over the structure and now I just think I need to say whatever comes to mind.” (Marie, Written Reflection 4.) The last written reflection was presented as a summary of previous events, rather than an account of work in progress as she had done for the others. A trend towards increasingly Descriptive reflection was apparent across the four assignments. Supported reflection was 50% less prevalent in reflections 3 and 4, compared to the first two assignments.

Stating and *Noticing* types of reflection were most common at the Descriptive level (see Table 22). Marie expressed her feelings and emotions readily in her writing, through the use of phrases such as: “I was disappointed”; “I am confident”; “is empowering” (Marie, Written Reflection 3); and “I love” (Marie, Written Reflection 2); and also statements such as: “No icon will send me into apoplexy!” (Marie, Written Reflection 1.) *Self-Questioning* was the third most common type of reflection, followed by *Deciding* and *Goals*. Marie often used bulleted lists in her writing. For example:

Challenges:

To construct and implement relevant units of work;

To continue to improve my IT skills;

To plan more effectively. (Marie, Written Reflection 4.) (Coded as: Descriptive/Stating.)

Table 22: Types of Descriptive reflection and Explanatory reflection for Marie.

	Descriptive					Explanatory			
	Stating	Noticing	Self-Quest	Deciding	Goals	Stating	Deciding	Personal	Professional
	48.8%	31.0%	10.7%	7.1%	2.4%	25.5%	25.5%	14.5%	12.7%
						9.1%	7.3%	5.5%	3.6%

Marie also organised her thoughts and ideas into visual forms, such as flow diagrams and concept maps, and used questions to work through the design process. (See an example in Figure 15.)

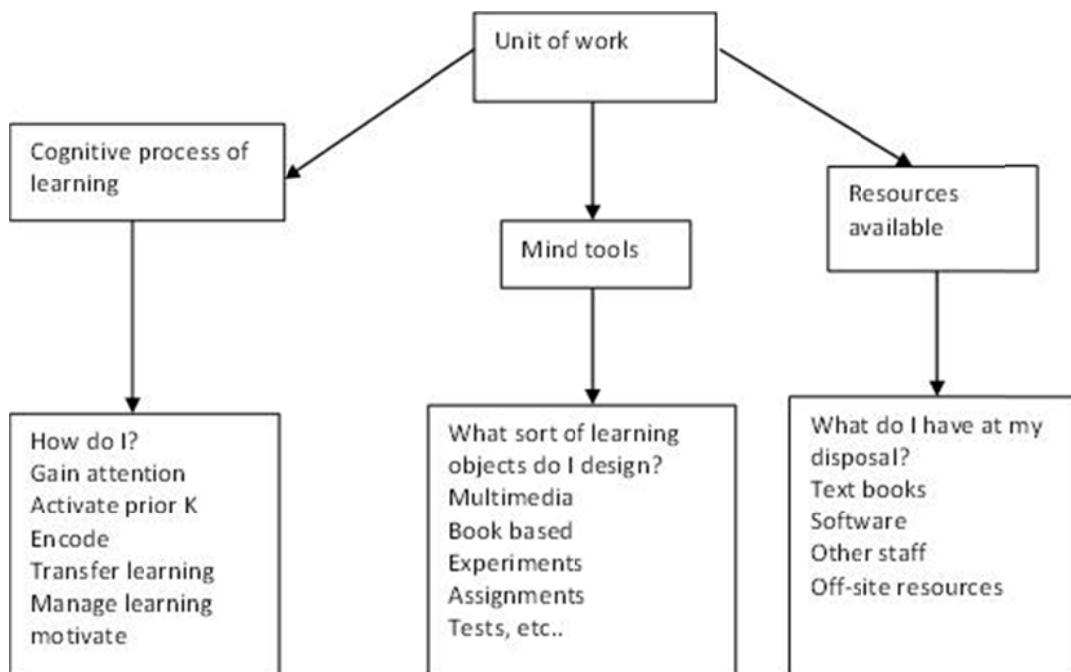


Figure 15: Concept map created by Marie in Written Reflection 2.

Marie explained in the written reflections that the use of diagrams helped her because she was a visual person and she used them to review her ideas, which triggered thoughts and aspects she would otherwise forget. Marie also used concept mapping to formulate her decisions and goals diagrammatically, as illustrated in Figure 16. Decisions are on the left and goals on the right. This is a good example of the differentiation between decision-making and goal-setting. For Marie, decision-making was a process she worked through using the *Self-Questioning* type of reflection at the Explanatory level, and she organised short term and long term goals as lists at the Descriptive level of reflection.

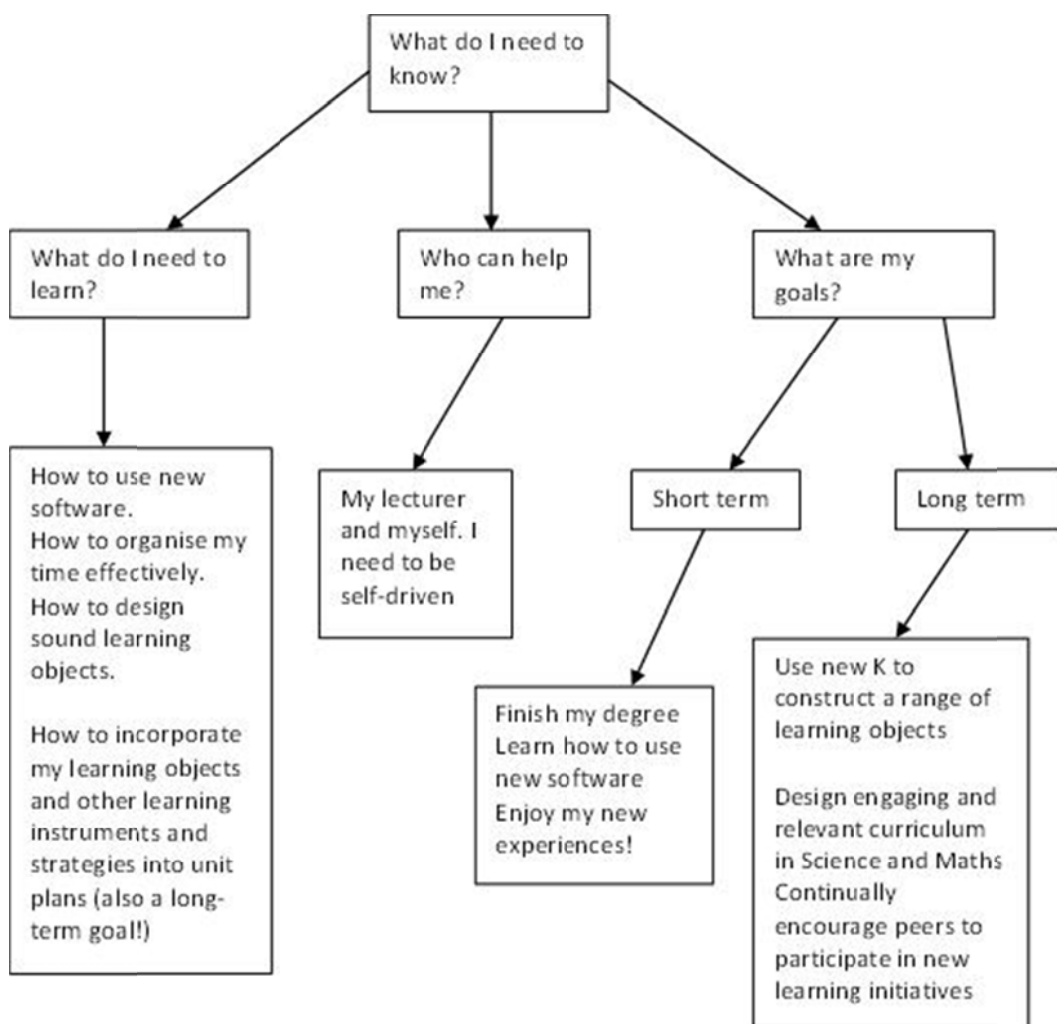


Figure 16: Decisions and goals - flow diagram created by Marie in Written Reflection 1.

The development of Marie's skills in reflective writing was further verified by the connections she made between reflections. For example, in Written Reflection 3 she based her thinking about the design process on a concept map she created in Written Reflection 2 (Figure 15). The way she expanded her thinking in Written Reflection 3 is illustrated in Figure 17 17, where she used the *Self-Questioning* type of reflection at the Explanatory level of reflection.

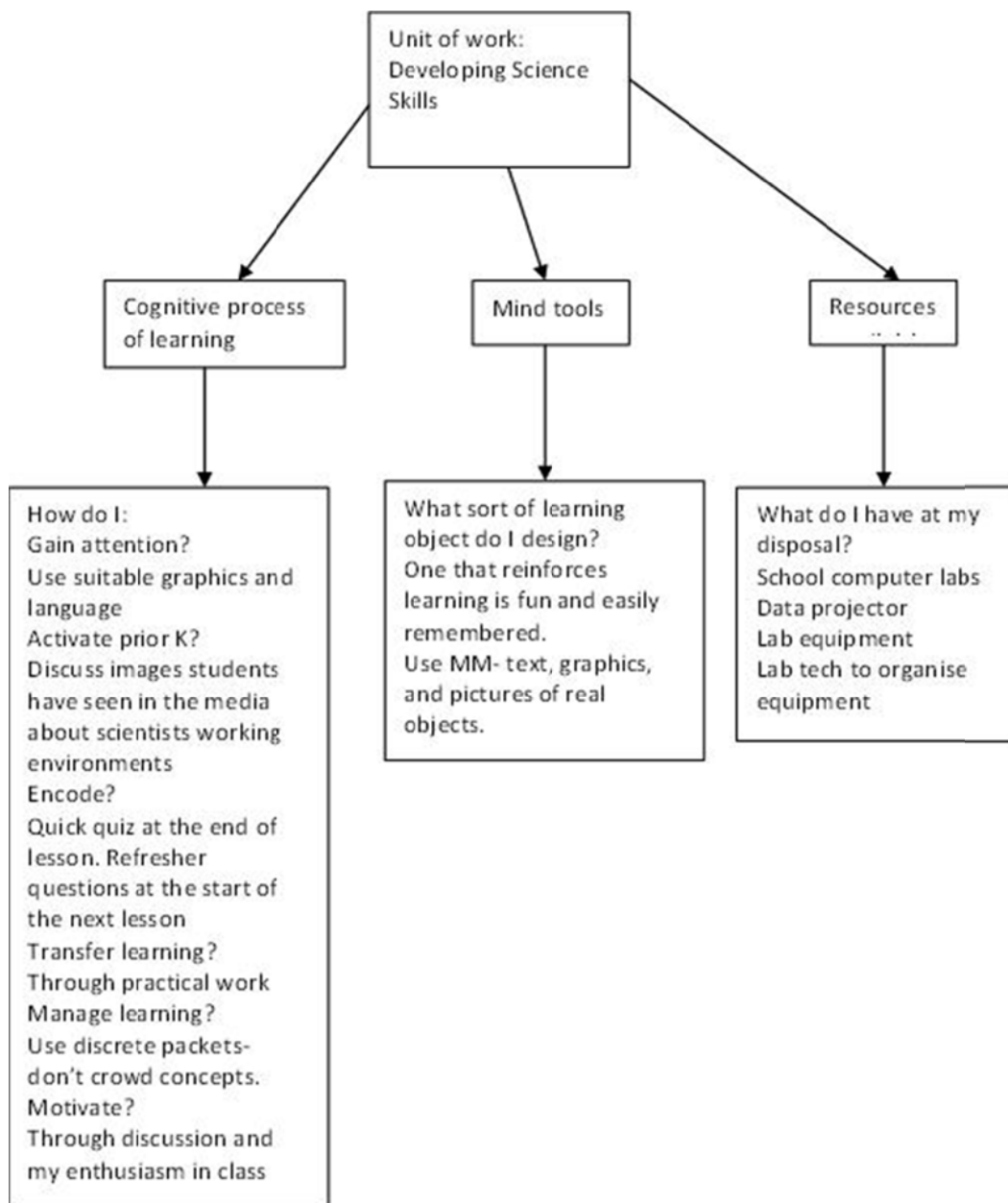


Figure 17: Concept map of the design process – Marie Written Reflection 3.

At the Descriptive and Explanatory levels of reflection, *Stating* was the most common type of reflection (Table 22). However, *Deciding* was also as common as *Stating* at the Explanatory level of reflection (Table 22). Also, at this level, Marie wrote frequently about her personal (*Personal*) and professional (*Professional*) aspirations, challenges and ideas, and these types of reflection were found at similar rates. *Self-Questioning* and *Goals* were also found at the Explanatory level of reflection (Table 22). Marie's

explanations about her *Reactions* and her *Learning* were the least frequent types of Explanatory reflection.

Supported reflection was less common than the Descriptive and Explanatory levels, and Marie referenced her writing in all four written reflections. In total, seven sources of evidence were cited (*Evidence Identified*), although she tended not to cite the dates. Additionally, there were three instances in which she expressed her reactions to what she had been reading (*Reactions to Evidence*).

Marie's professional focus in the reflections also helped to gauge the nature of her reflective writing. Marie gave an open and honest account of her professional journey including detailed background information about her professional role and career. She described her professional characteristics as practical and visual, pedagogically focused, and she acknowledged that she was an evidence-based practitioner. Marie was clearly passionate about her practice as a teacher. She wrote, "Couldn't imagine doing anything else (I've tried other stuff- way too boring!)" (Marie, Written Reflection 4). Marie seemed very aware of her strengths and limitations, and wrote in her first reflection about the computer skills she needed to work on. She identified these as skills she needed if she was going to be up-to-date and able to practice evidence-based teaching, something she regarded as very important.

Marie claimed her self-efficacy for using IT was low compared to colleagues, and she mentioned this from the outset in her first written reflection. She was passionate about teaching, and wrote critically about aspects of her profession. For example, although she "loved to teach", she was quite disillusioned with "the inability of the profession to change with the times", and was frustrated with teachers' attitudes (Marie, Written Reflection 1). She was also unhappy with the private educational system, particularly the behaviourist pedagogical approach used in Science, and the lack of support (in terms of funding and resources) for secondary schools (Marie, Written Reflection 1). Marie included frequent personal reflections regarding her career, such as: her design ideas, teaching approaches, and her skills and knowledge. She also described events and her

thoughts about the design process, based on her feelings, beliefs and understanding. For example:

My first design was poor. I lost focus because I couldn't get the software I needed up and running. I was disappointed in myself for not anticipating the problem and should have started my assignment much earlier. (Marie, Written Reflection 1.)

Marie also revealed how she approached her teaching. For example, information about her professional development, and the relevance of designing and creating the learning objects for her teaching role came through in some of the descriptions. Marie mentioned the characteristics of potential users of the learning objects, and some of the challenges for her when teaching science. For example, she paid particular attention, in her designs, to the fact that her students needed help with scientific language and content: "When I teach, I tend to use a lot of applied reading tasks to really challenge my students to improve their scientific literacy and their ability to comprehend scientific terms and ideas" (Marie, Written Reflection 1). Marie's goals to improve content knowledge and science literacy for her students carried on through the reflections as a theme which was driving her professionally. Consequently, Marie was aware she needed to undertake significant professional development to achieve her goals. She described how professional development was offered after school to help teachers learn to use the new software the school had purchased, and she was hopeful about improving her knowledge. Marie was also insightful about herself as a practitioner, and about the importance of using reflection to help her professional skills. For example:

The learning objects I design can always be improved on. Whether they are a simple handout, a practical task, a creative task or a MM design, things can always be done differently and made more effective. Reflection is an important part of this process. Peer discussion is also important. (Marie, Written Reflection 3.)

Marie tended to focus on pedagogical design for the learning objects, rather than being challenged by the technology she needed to use. She organised questions and possible solutions in concept maps (e.g., “*How do I: Gain attention? Use suitable graphics and language; Activate prior K?*”) (see Figure 17Figure 17). She appeared to be demonstrating a need to understand the cognitive processes of learning so she could transfer that knowledge to the approaches she took with her students. The focus on pedagogy was the mainstay of Marie’s written reflections. Therefore, Marie’s reflective writing articulated her professional interest in sound design for supporting her students’ learning using technology, and also the development of her skills as a teacher. She was able to express her feelings about the design process, and about teaching as a profession, and link her experiences to the literature. Her writing was interspersed with diagrams and questions, which she used to engage in the reflective process

Writing in the supporting statements also depicted Marie’s interest in providing motivating and engaging learning opportunities for her students. For example, she described how she used the “mad scientist” metaphor in the first learning object, as a way to stimulate her students’ curiosity (Marie, supporting statement 1). Her writing about the learning context, and the purpose of the learning objects demonstrated a degree of reflection, as shown in Table 23.

Table 23: Marie - An example of reflection in supporting statement 1.

Media	How?	Why?
Graphics	Screen 1 Image of a science lab with scientist.	This photo is used to draw the attention of the student.
	Callout.	Encourages students to work through the navigation titles listed below.
	Navigation statements.	Synthesise what students can expect in the presentation.

Marie’s writing about the direction she took with tasks was written as a descriptive account rather than using reasoning and in-depth explanation. For example:

Next pictures and icons were sourced from clip art and the internet. These were stored in a file folder for later introduction into Dreamweaver. Moving graphics were also collected for their entertainment value but also the message they conveyed. (Marie, supporting statement 4.)

Nonetheless, evidence of Explanatory reflection was apparent when Marie provided reasons for her design choices. In two instances, literature was cited in the supporting statements, indicating a low degree of Supported reflection. In her interview, Marie made a comment that it would be too time consuming to prepare detailed supporting statements every time a teacher wanted to create a new resource to use in teaching. However, she believed it would be realistic to prepare a reflective statement containing notes about the process and the reasons for them.

Overall, Marie's writing in both the written reflections and the supporting statements was primarily Descriptive reflection with some explanation about the underlying drivers for the direction she was taking (i.e., Explanatory reflection), supported to some extent by evidence (Supported reflection), in the written reflections.

5.3.2 Marie's use of the Three-Step Reflective Framework

Marie used the Three-Step Reflective Framework for her first three written reflections, but not the final one. Marie said during the interview that she found the framework comfortable to use because the prompting questions and tips enabled her to personalise her reflections, and structure them in a way which suited her style of writing. She preferred to use flow diagrams and lists rather than having to write pages of prose. Marie's propensity for using diagrams and questions during the reflective process began with her responses to the survey, and continued throughout the written reflections.

In all three steps, the writing was mainly at Descriptive and Explanatory levels of reflection, with a low proportion of Supported reflection (Figure 18). In Step 1, Explanatory reflection was found at a higher frequency, whereas at Step 2, Descriptive reflection was more frequent. This finding is opposite to what was expected for each

step according to the guidelines provided at those steps. In Step 3, both Descriptive and Explanatory levels of reflection were found at a similar rate. Marie tended to write least at Step 3 (Figure 19).

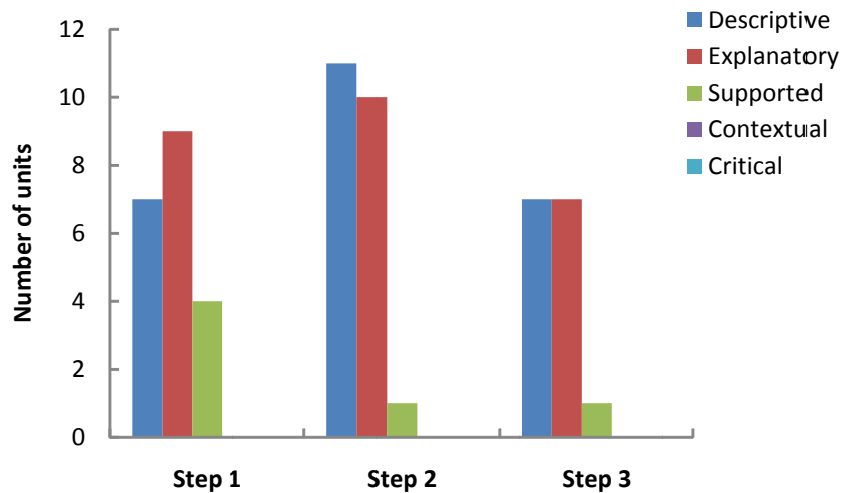


Figure 18: Marie – Number of units of reflection at three steps of the Reflective Framework.

Proportionately, Descriptive and Explanatory levels of reflection were relatively evenly distributed across the three steps (Figure 19).

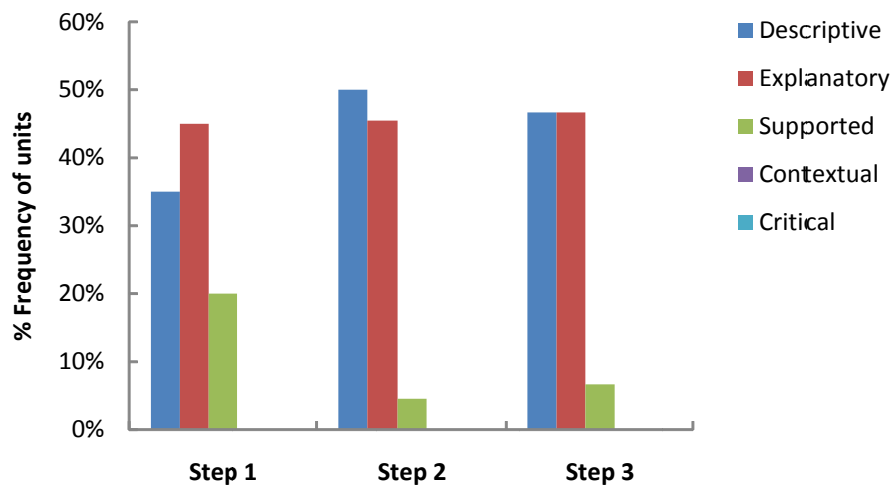


Figure 19: Marie – Levels of reflection as % frequency at three steps of the Reflective Framework.

Marie found it helpful to have the three steps in the Reflective Framework as it assisted her to organise what she wrote. When she was writing using the Reflective Framework, she said she was encouraged by the tips in the framework to use diagrams as well as text, and therefore, she went with “whatever was comfortable at the time” (Marie, interview). Marie said she found Step 1 and Step 2 the hardest to write. In particular, having to analyse her actions made her feel “really challenged ... to think about all the literature we had read and also to think about where I was going next in my teaching experience” (Marie, interview). In Step 1, by contrast, she said she tended to “scribble things down” to draw her ideas together, and although that was hard, the real challenge lay at Step 2 of the Reflective Framework (Marie, interview).

Marie also said she found the prompting questions very helpful, particularly in the initial stages of writing the reflections, and would have really struggled otherwise. Even though sometimes she did not always find the prompts particularly relevant, overall she said they were very good as a guide to help her know what to write. She added that it took her some time to realize that she did not have to use any of the prompts, and certainly not all of them, but because she was concerned about writing the reflections correctly, she used them all in the beginning. In contrast, Marie commented that the headings in the Reflective Framework were “terrific”, though she did not feel the need to use them in the last written reflection, explaining: “I had got to a point where all my reflections has been quite structured and then at the end.... [I thought] I really don’t need to use these steps any more because I’m at the end of it.” (Marie, interview.)

Notably, the level of reflection in the final reflection assignment was primarily Descriptive (Table 21). Due to the relatively even distribution of Descriptive and Explanatory reflection at the three steps, it is unclear how the structure provided by the Three-Step Reflective Framework directly influenced Marie’s reflective writing. The influence of the tips is not clear due to Marie’s preference for using visual forms of expression such as flow diagrams and concept maps, though the tips may have given her permission to use her preferred approach. However, Marie’s perceptions about how the framework helped her learning is detailed in the next section.

5.3.3 Reflective writing – Marie’s views, experiences and future use

Although, Marie said in the interview she used to think it was a waste of time to write down her reflections, because she preferred to use her own internal strategies for reflecting, and to talk with colleagues, she changed her opinion after taking the multimedia design subject. Marie also said she might use some aspects of reflective writing in her teaching. Due to her lack of experience in reflective writing, she found the first written reflection the most difficult to do, mainly because she was unsure what to write and how to write it, and felt that she was trying to please the lecturer rather than write honestly about her personal experiences. She found it was easier to write candidly for the second written reflection. On entry into the multimedia design subject, Marie had difficulty facing up to the requirement to write down her experiences and reflections, and did not believe she would be able to do it. However, the guidance provided by the Reflective Framework and the subject lecturer, assisted her. She also said in the interview that she found it easier to write reflectively for the written reflection assignments, once the lecturer conveyed the message to the class that the reflections did not need to be written in a particularly stringent manner. Marie found the feedback provided by the lecturer very helpful and constructive, and the “loose” structure of the framework helped a lot (Marie, interview). Additionally, she found the feedback from the lecturer, about how she needed to progress her design ideas, often aligned with the structure of the Reflective Framework.

Marie had particularly enjoyed reading material from the literature, and found the reflection assignments had helped to scaffold her learning in the subject. Not only did the lack of background in reflective writing mean the first written reflection was the hardest to write, but Marie also felt that she did not have anything to say, and felt the need to “write down what I thought [the lecturer] would want to read, more than what I thought was correct for the unit and more than what I thought personally” (Marie, interview). The second written reflection was much easier because she was able to write about the strengths and weaknesses of the learning object she had just designed, and therefore, felt she had something to focus on in her writing. She also mentioned the

effect her study in the multimedia design subject had on her reflective practice. For example:

The biggest positive out of all this, however, is the effect the course has had on my teaching. I'm thinking differently. It's helping me differentiate the tasks I set. It's making me think of how to extend and support my students. I know that this unit wasn't supposed to help me in this way but it has. (Marie, Written Reflection 4.)

One reason Marie said she liked the Reflective Framework, was the way it allowed her to approach the writing in a step-wise fashion. She explained that this helped her feel comfortable, and suited her personality, and the way she thought through things. Additionally, the framework gave her the freedom to use bulleted lists, flow charts and graphics, and meant she was not restricted to using "a prose type style" of writing (Marie, interview). Marie described the reflective writing process as "a bit of looking back and a bit of looking forward" (Marie, interview). She felt that the process helped her sort out the direction she wanted to take with her design ideas for the subject. She also mentioned in the interview that she felt positive about continuing to use the Reflective Framework to support her professional practice. So although, Marie was a reluctant reflective writer, prior to joining the subject, once she had used reflective writing strategies, Marie changed her opinion. For example:

I have sort of changed my opinion about reflections. Whether I use it in other areas of my work or whatever, I am not quite sure but it was really beneficial in [the] unit and I thought I might be able to use it in some of the units I have structured [for my teaching]. (Marie, interview.)

Although, Marie was not required to keep a professional portfolio for her job, she explained in the interview that the Reflective Framework would encourage her to keep reflective notes in the folders she kept for each unit of work, something she regarded as her professional portfolio. She tended to make notes on the material to remind her about changes she wanted to make, rather than reflections on how it went when she

taught the classes. A professional portfolio was not needed when she did performance reviews because her manager was generally aware of the work she was doing. Therefore, the professional portfolio (i.e., the labeled folders with reflective notes) she kept was more of a tool to support the improvements she was making to her practice. When asked about professional development and the use of reflection for her practice, Marie said she did not believe she needed to learn more about reflection to become more effective. This was mainly because she was happy to continue using the Reflective Framework to practice her writing technique. She believed that the more she practiced reflection, the more likely it would eventually become embedded in what she did, as well as becoming more automated and intuitive.

In summary, Marie's views and experiences of reflection changed as a result of her immersion in reflective writing for the multimedia design subject, and she was prepared to continue exploring reflective practice.

5.3.4 Summary of key findings for Marie

Marie demonstrated mainly Descriptive reflection, with Explanatory reflection and Supported reflection, but to a lesser extent. *Stating* was the most common type of reflection for Marie. However, at the Explanatory level of reflection, *Deciding* was also common. *Noticing*, *Personal*, *Professional* and *Self-Questioning* types of reflection were a feature of Marie's writing, and she also demonstrated *Goals*. Diagrams were integrated throughout Marie's reflections to illustrate her thought processes.

Marie had no previous experience with reflective writing, and on entry into the multimedia design subject was skeptical about the usefulness of the strategy for professional development. Even so, she used the Three-Step Reflective Framework in three out of four written reflections, and found it useful. Marie's written reflections were focused on a number of themes: her career, what she was learning, her design ideas and teaching approaches, the skills she already had, and also the skills she needed to develop. An important aspect of her professional focus was the pedagogy she wanted to use and the relevance for her students. The language used in Marie's writing

revealed her emotions about the process, and her ability to use self-questioning as a critical thinking technique. Marie's descriptions in the written reflections and supporting statements suggest she was very self-aware at both a personal and professional level, and dedicated to her students.

All three levels of reflection were present at the three steps of the framework, with Descriptive and Explanatory reflection evenly spread. The scaffolding provided by the Reflective Framework, and feedback from the subject lecturer assisted Marie to overcome challenges she experienced when writing the first written reflection. Marie enjoyed using the Reflective Framework, and found the prompting questions and tips very helpful, particularly in the initial stages of writing. At times, she did not find the prompting questions particularly relevant, but used them anyway.

As a result of the reflective writing strategies used by Marie in the multimedia design subject, her opinion about using reflection in her practice altered, and she was planning to continue to use the Reflective Framework in the future to keep reflective notes about her teaching.

5.4 Introduction to Nicholas

Nicholas was a multimedia developer and also a teacher in eLearning support at a technical and further education institution. His role was to train teachers in eLearning strategies and technical skills, and also to create material for teachers to use in their classes. As a result, Nicholas was able to provide the other participants with useful advice about multimedia. His prior experience with reflection was varied, and his tendency, professionally, as he explained in the interview, was to reflect "in his head" over the course of a day, rather than write his thoughts down. He preferred to reflect by entering into discussions with colleagues as opposed to writing about his experiences. He was an experienced blogger and felt competent in posting information on blogs. Nonetheless, he believed his experience with reflective writing was minimal because his writing for his blog was primarily news and information oriented with links to other websites.

Nicholas did not choose to use reflective writing when learning something new. He liked to find a useful “how-to-resource” such as a textbook or website and work through the exercises, as well as read about the topic (Nicholas, survey). He also opted for asking friends, or searching for answers online which he would read, then try. He said he found that a combination of reading and practical activity and exploration was the most useful for him. Therefore, Nicholas had limited experience with using reflective writing in his practice.

5.4.1 Nature of reflective writing and professional focus for Nicholas

Overall, Nicholas demonstrated similar proportions of Descriptive and Explanatory reflection in his writing for the written reflections

). A small amount of his writing in these assignments was measured as Supported reflection. No Contextual reflection or Critical reflection was found. Descriptive and Explanatory levels of reflection were found in similar proportions in each of the four assignments (R1, R2, R3 and R4) (see Table 24). However, in Written Reflection 1 (R1), Descriptive reflection was more frequent, and in Written Reflection 2 (R2), the situation was reversed. Nicholas did not use diagrams, mind maps or graphics to illustrate his writing.

Table 24: Nicholas - Levels of reflection in four written reflections (R1 to R4).

Level	Overall	R1	R2	R3	R4
Descriptive	46.7%	57%	38%	48%	43%
Explanatory	45.1%	39%	54%	42%	46%
Supported	8.2%	4%	8%	9%	11%
Contextual	0.0%	0%	0%	0%	0%
Critical	0.0%	0%	0%	0%	0%
Total	100%	100%	100%	100%	100%

At the Descriptive level of reflection, *Stating* was the most common type of reflection, followed in frequency by *Noticing* and *Deciding* at similar rates (Table 25). The following example illustrates how he wrote at this level.

When I have run workshops about using audio in the past, I've often *felt* that I didn't provide a rich enough body of information about the different types of audio files and how the different settings (bitrate etc) affect file size and sound quality. (Nicholas, Written Reflection 1.) (Coded as: Descriptive/Noticing.)

Table 25: Levels and types of Descriptive reflection and Explanatory reflection for Nicholas.

	Stating	Noticing	Deciding	Goals	Self-Quest			
Descriptive	42.1%	28.1%	28.1%	1.8%	0.0%			
	Deciding	Stating	Learning	Goals	Personal	Professional	Reactions	Self-Quest
Explanatory	38.2%	23.6%	12.7%	10.9%	5.5%	5.5%	3.6%	0.0%

In contrast, *Deciding* was the most frequent type of reflection at the Explanatory level and primarily concerned the design of the learning objects. This type of reflection was denoted by words such as: *going to*. For example:

I'm *going to* develop a resource for the audio/video workshops which allows me to cover the various file characteristics in the depth that I think is needed but which allows learners to dip into it at their own level. (Nicholas, Written Reflection 1.) (Coded as: Explanatory/Deciding.)

Stating types of reflection were also a relatively common type of reflection at the Explanatory level (Table 25). For example:

The purpose of this is to provide learners with a base level of knowledge about the wide variety of video formats that can be used in the online/digital environment. (Nicholas, Written Reflection 2.) (Coded as: Explanatory/Stating.)

Types of reflection coded as *Learning* and *Goals* were less frequently found than *Deciding* and *Stating*, and were found at a higher frequency than *Personal*, *Professional* and *Reactions*. The language used by Nicholas at the Explanatory level of reflection, made it easy to assign codes such as *Learning*. For example:

I've *learnt* to be more thorough in my testing process and to try to empathise more with the likely needs of learners for easy access to resources. (Nicholas, Written Reflection 3. (Coded as: Explanatory/Learning.)

Nicholas tended to integrate the personal and professional areas of his experience. Therefore, it was difficult to code *Personal* and *Professional* types of reflection as separate entities. Consequently, his language was used to determine the codes to be assigned to different types of reflection. In the following example, when Nicholas wrote about personal insights, he used words such as: *I'm still a little shaky*, *I feel*, *hope to learn* and *my skills*. Hence, his writing was coded as Explanatory/Personal.

I think that *I'm still a little shaky* on the best methods for embedding video (in particular dealing with cross-browser issues and embed versus object tags) so *hope to learn* a few things here, so *I feel* that this approach is still developing *my*

skills in multimedia design and production. (Nicholas, Written Reflection 2.)
(Coded as: Explanatory/Personal.)

In the next example, Nicholas' explanation was from a professional perspective.

I chose Windows Movie Maker as this is the video package available to teachers throughout [the organisation]. (Nicholas, Written Reflection 4.) (Coded as: Explanatory/Professional.)

Several other patterns emerged when writing at the Explanatory and Descriptive levels was compared. For example, *Stating* at the Explanatory level of reflection was less frequent than at the Descriptive level (23.6% c.f. 42.1%, respectively). This may be an indication that Nicholas' writing at the Descriptive level of reflection was less diverse than at the Explanatory level. *Stating* was a type of reflection where no specific focus such as *Learning*, *Deciding*, *Feelings*, and *Reactions* was evident. Also, *Deciding* was less commonly found at the Descriptive level compared to the Explanatory level of reflection (28.1% c.f. 38.2%, respectively). *Goals* were much less prevalent at both levels (Table 25).

At the Supported level of reflection, Nicholas referred to nine items of evidence to endorse his ideas. Three examples related to the readings in general (*Evidence Mentioned*), and six were referenced directly (*Evidence Identified*), as part of his critique of multimedia design and its connection to learning. For example:

... the broader understanding that I have already developed of strategies to add meaning to learning (e.g., visual analogies – Anglin et al., 2004), and to enhance the learner's ability to process information (e.g., text conventions – Hartley, J., 2004) have been particularly useful (Nicholas, Written Reflection 3). (Coded as: Supported/Evidence Identified.)

Nicholas made one statement about his reaction to the readings (*Reactions to Evidence*). Overall, a small proportion of Supported reflection was found. In addition, Nicholas'

reflective writing was spread almost equally across the Descriptive and Explanatory levels of reflection.

The professional focus for Nicholas was very much about how his design plans related to potential users of the learning objects. This was understandable as he was in a role which required him to support staff with eLearning. His role involved working with teachers to create learning resources for them, and he was also responsible for staff development training to build staff capability. For example:

Uptake of video (in particular) by teachers at [the organisation] has been hampered by the complexity and expense of the hardware and software required – however interest is steadily growing and I'll be running a series of workshops later in the semester which should be quite popular. (Nicholas, Written Reflection 1.)

Nicholas' writing demonstrated insight into his professional practice, in particular, his client group of academic staff. He described previous workshops he had run where he had not given participants “a rich enough body of information” (Nicholas, Written Reflection 1). Therefore, when designing his learning objects he was “wary of trying to do too much at once when the focus [was] really on producing a resource that allow[ed] learners to see how different settings affect file size and quality” (Nicholas, Written Reflection 1). Nicholas mentioned his teaching approaches and how they influenced his design considerations. For example:

The way that I've structured audio workshops in the past has been focussed on not spending more than 20 minutes or so on “talking content” before getting learners into activities.” This is probably why I haven't dwelled too long on audio file formats to date. The extra detail that comes into play when dealing with video (codecs, screensize etc) will only magnify this issue but I feel that it's important for learners to have a grasp of what the differences are and why they matter. (Nicholas, Written Reflection 1.)

Nicholas also wrote about his professional capability and how he was building on and extending his professional skills to up-skill himself in the area of multimedia design. For example:

I have created some basic animations in Flash in the past and have a small grasp of Actionscript for creating interactions, but am very interested in learning more about this – particularly in terms of producing simple games (Nicholas, Written Reflection 1).

Reasons for the cognitive approach he was taking in “shaping the knowledge that is presented to the learner in such a way that makes it more easily digestible” was an aspect of pedagogy he mentioned (Nicholas, Written Reflection 2). Games-based design for the learning objects was another area in which Nicholas became interested, as a result of exploring the literature about behaviorist approaches to learning. Nicholas used the literature to support his beliefs, and was able to weave in other perspectives he encountered in his reading. His writing was quite technical at times, particularly, when he referred to software and aspects of audio and video production. It was obvious in his written reflections that he was a high-end multimedia user, and confident about his professional practice. He was specifically interested in providing support to other staff in his organisation to help develop their capability with eLearning. His reflections indicated that he was located in a very busy work environment, where efficiencies needed to be made in terms of his multimedia project. Although, Nicholas mentioned in the interview that he tended to discuss issues and reflect on his work with colleagues, this approach to problem-solving about the learning objects was not mentioned in his writing. Conversely, he appeared to work through the issues associated with his practice and professional abilities in a more self-evaluative manner. For example:

I’ve learnt to be more thorough in my testing process and to try to empathise more with the likely needs of learners for easy access to resources (Nicholas, Written Reflection 3).

Time and skill were the main reasons that I didn't explore the interactive Flash hotspots option – I may yet look at this but ultimately I decided that I would rather do a simple task well (Nicholas, Written Reflection 4).

It is possible that Nicholas did engage in dialogue with other participants in the class, as a means of problem-solving in the subject, but this aspect was not measured, and was not recorded by him. In contrast to the written reflections, Nicholas' writing in the supporting statements was primarily Descriptive reflection as there were few explanations for his actions. He used the supporting statement template but not the table for describing the media he chose. He provided a significant amount of detail about what he had done and his decisions, using a first-person narrative style. He also cited a number of references to the literature in the supporting statements, demonstrating Supported reflection. For example:

This object primarily uses text and video to convey the bulk of the information. I have also used a graphic of scales as a background image as an analogy (Anglin & Cunningham 2004) for the need to find balance in choosing various settings in video creation. (Nicholas, supporting statement 1.)

Nicholas used the section about learning context and purpose to bring the reader's attention to the potential users of the learning object and the professional relevance of the resource, both for himself and his clients. For example:

This learning object is aimed at teachers with a modest level of computer literacy but little to no experience in the use of online video (Nicholas, supporting statement 1).

Later on, Nicholas wrote more of an explanation about the relevance of the learning object for the users. For example:

This object would also be something that learners could revisit in their own time as it will be placed into a ... course in [the Learning Management System]. This

could potentially be structured in such a way as to allow for a completely self-directed learning approach. (Nicholas, supporting statement 1.)

In each of his supporting statements, some explanation was given about the reasons for his choices, and the process he underwent during the design process. He presented this chronologically, particularly, in the media production section. For example, in supporting statement 2, he recounted the steps he took when creating the elements of a game using 3D modeling. Although, the language and terminology was reasonably technical, he described the design process clearly, and the reader was given the impression of ‘watching over his shoulder’. When Nicholas described the technical aspects of his work, for example, the software he chose for media design and media production, he conveyed a breadth of skills and knowledge, and also confidence in the way he wrote about the software. He also supported his writing with references to the literature and concepts on which he had based his work. The number of references to evidence increased, with each of the three supporting statements, from two to four to six references, respectively. Nicholas found the framework for the written reflections helpful in guiding him to write the supporting statements. Although the structure in the two types of assignments was different, “the reflection had probably shaped [his] ... thought process” (Nicholas, interview).

In summary, Nicholas’ style of writing in the supporting statements was predominantly a description of the process, with some reflection and explanation about his actions and decisions. A degree of Supported reflection was found. Conversely, his writing in the reflection assignments was almost equally Descriptive reflection and Explanatory reflection. Again, Supported reflection was found. Nicholas was focused on reflecting about multimedia design for his professional role, and the benefits of this for users.

5.4.2 Nicholas’s use of the Three-Step Reflective Framework

Nicholas used the Three-Step Reflective Framework consistently for all four reflection assignments. Nicholas remarked that he found the structure of the Reflective Framework logical for writing reflections, in particular, the prompting questions. They

were relevant to his situation and helped him to arrange his thoughts so he could examine his actions and what he had learned. In describing his process when preparing reflections, Nicholas said in the interview that he tended to write down his thoughts and then slot them into each of the three steps. He did this rather than write something directly within each of the steps of the Reflective Framework. When asked how he used other parts of the framework, such as the tips and the diagram depicting the three steps, he stated that he did not refer to them when preparing the written reflections. Nicholas described how his writing became “more concise through each step”, and he generally had less to “say” for Step 3 than for the other steps (Nicholas, interview). In Step 1, he tended to write more expansively, and then analyse what he had written at Step 2. He outlined how the last step flowed on naturally from the other two steps, and this helped him to order his actions, in the form of goals. Nicholas also commented that the structure of the Reflective Framework helped him to ‘sharpen’ his ideas.

Descriptive reflection was most common at Step 1, and Explanatory reflection at Step 2 (Figure 20). The number of units of Descriptive and Explanatory reflection at Step 1 and Step 2 matched Nicholas’ account about how he wrote to fit the framework. The volume of writing decreased with each step (Figure 20). All three types of reflection were markedly lower at Step 3. There was no Contextual reflection or Critical reflection found.

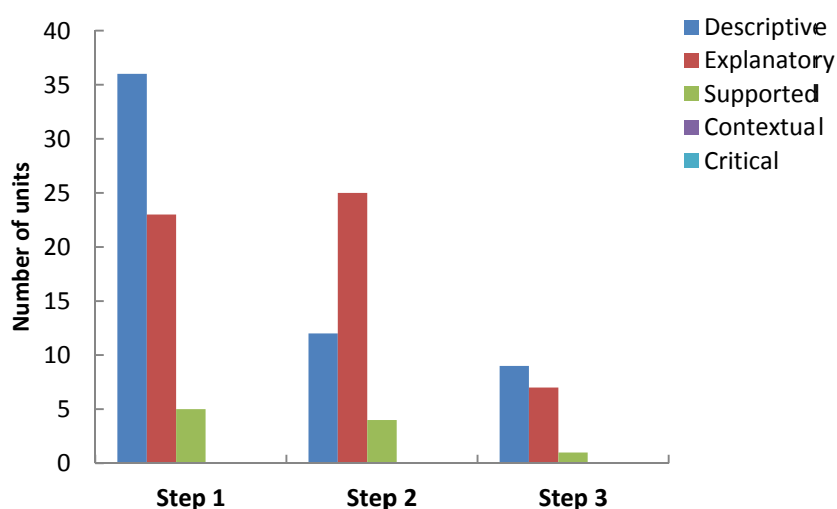


Figure 20: Nicholas - Number of units of reflection at three steps of the Reflective Framework.

Each proportion of Descriptive and Explanatory reflection was relatively similar at Steps 1 and 3 (Figure 21). Supported reflection was evenly distributed across all three steps

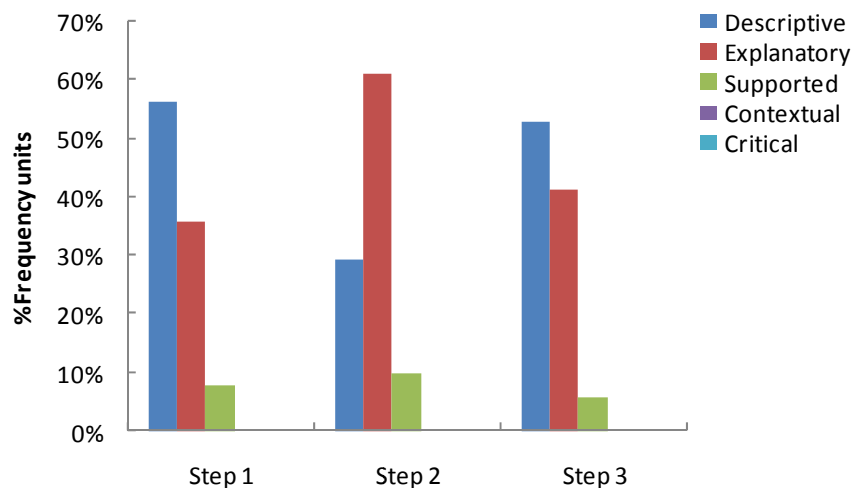


Figure 21:
Nicholas -

Levels of reflection as % frequency at three steps of the Reflective Framework.

Therefore, it was apparent from the findings that the way in which Nicholas used the Three-Step Reflective Framework varied for the three steps. In the next section, the historical context for Nicholas’s reflective writing, and how he used reflection during the subject, plus his prospects for reflection in the future are outlined.


5.4.3 Reflective writing – Nicholas’s views and experiences, and future use

Nicholas initially regarded reflection as “potentially useful as a way of examining methods and fleshing out ideas” (Nicholas, survey). In the interview, Nicholas talked about his blogs and how he had used them. For example: “my personal blog is pretty much just ... anything interesting that I’ve seen or heard or done, and I might sort of describe that and you know any thoughts I’ve got about it” (Nicholas, interview). He also kept a professional blog to broadcast links to websites. Although, he said his personal blog had some “reflective qualities”, he did not feel it was critically reflective (Nicholas, interview). Nicholas also said in his interview that he had kept up to five blogs off and on since 2003. One of them was started for use in the multimedia design

subject, where the research was conducted, and he also used a blog in another subject he was studying in his degree. He used the blogs to keep notes and summaries, and to record his thoughts about the many articles he was reading. Therefore, blogs were a feature of his approach to professional learning. However, written reflection was not usually a choice for Nicholas when engaging in reflective practice. For example: “a lot of my reflection is probably more intellect, you know more just sort of mental, I don’t know if I use written reflection to drive it, I just sort of let it stew around” (Nicholas interview).

He also said he tended to document processes in his work rather than reflect in written form on his professional performance, and this was probably because he was not required to reflect on his work for performance review. Although, he explained, “It’s something that I probably should do, it would come down to time” (Nicholas, interview). Nicholas did not find that the process of reflecting in the written reflections was useful for helping him with his designs. For example: “I think it stimulated ideas for future projects, but in terms of the actual design I was probably more influenced by my existing knowledge and the reading that I did”(Nicholas, interview). He said that although he tried to write reflectively about the readings, he felt that he “probably reflected more on the things that ... were more foreign to me” (Nicholas, interview). Nicholas also indicated in the interview that when he wrote reflectively, he generally found it easy to select what he was going to write, and he tended to analyse his ideas and information as he wrote. This meant he did not find it difficult to get started when writing reflectively, nor did he find it demanding to use reasoning in his writing. Reflection helped when he had completed a learning object because he then had an idea about how to improve it. He did not believe reflection occurred when he “was actually creating it” (Nicholas, interview).

Nicholas found the feedback from the lecturer affirmed his design ideas, but did not support his reflective writing. He regarded reflection as a personal activity. For example: “the process of reflection is probably more personal ... being able to analyse what you’ve done and look at your reasons and try and give them some kind of grounding in theory ... make connections to the theory ... as well as looking at what

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we've learnt" (Nicholas, interview.) However, Nicholas did find the Reflective Framework supported him in preparing the supporting statements, because "the supporting statements had their own set of questions and kind of prompts which I tended to go with I think that the reflection had probably shaped my thought process" (Nicholas, interview).

Nicholas did not believe he would change how he documented his work, and use more reflection as a result of taking the multimedia design subject. He preferred to think things through without constantly writing down his thoughts and ideas, though he was planning to contribute more regularly to a blog in a reflective manner. He also believed he could apply what he had learned about reflection in the multimedia design subject. Reflection, Nicholas said, was not particularly motivated by professional need or portfolio requirements, but was more a personal need. "I do feel that I do already reflect ... it is ... much more random and so [the Reflective Framework] would probably make it more effective.... I can see reflection being useful when I'm trying to problem solve" (Nicholas, interview). Although, Nicholas indicated in the interview that he was not required to put together a reflective portfolio for his job, he felt he had sufficient resources to put one together if the need arose.

5.4.4 Summary of key findings for Nicholas

Nicholas had previous experience with using blogs for recording information but was not skilled at reflective writing when entering the subject. Nicholas' reflective writing demonstrated Descriptive and Explanatory levels of reflection with a small proportion of Supported reflection. The most common types of reflection at the Descriptive level were *Stating*, *Noticing*, and *Deciding*. *Deciding* and *Stating* were foremost at the Explanatory level. Nicholas professional focus concerned the design of resources appropriate for his role as a multimedia developer. He also alluded to challenges in his professional practice surrounding, the use of technology, time constraints, and the application of what he was doing to his work.

Nicholas found the Three-Step Reflective Framework useful, and wrote each written reflection before dividing them to fit the three steps. Writing at the Descriptive level of reflection was highest at Step 1, and Explanatory reflection was most common at Step 2. All types of reflection were at a lower frequency at Step 3. Descriptive reflection was most common in the supporting statements. Nicholas was respectful of reflection and reflective writing in the interview. He could relate to their value in professional learning; however, he preferred to document the processes in which he was engaged in his professional practice through other means, rather than reflecting on them. For instance, he tended to reflect by thinking and by entering into discussions with colleagues rather than writing things down. As a result of the strategies for reflection which he had used in the multimedia design subject, Nicholas intended to write more reflectively on a personal blog in the future.

5.5 Introduction to Teresa

Teresa was an instructional designer with an educational background, and her role was to “design and develop online learning courses and subjects” (Teresa, survey). She described her professional practice as the provision of “instructional design to short, online, knowledge update subjects for those working in the X industry (ie., X advisors)” (Teresa, Written Reflection 1). She was clear about the reasons for taking the multimedia design subject. For example: “I entered this field with a strong background in education; which has helped me a lot, however multimedia design is my weakness” (Teresa, Written Reflection 1).

Teresa had no previous experience keeping a journal for professional purposes. The support or methods Teresa primarily used for learning were other people, rather than keeping a journal. Therefore, writing was a method she used, but in an instructional sense rather than for reflective practice. Teresa found that when she was learning “something new on the computer”, she learned best when someone sat alongside her and guided her stepwise, explaining that this way she could receive clarification, as she went and while making notes (Teresa, survey). She did not like learning in isolation because she liked to get an immediate response when she had questions or challenges,

as opposed to the delay associated with interactions via discussion boards or email. Teresa also indicated she was a sequential learner. For example: “With distance learning, I like the material to be presented in a way that's easy to process (i.e., in a logical sequence), and she, “learn[ed] best by doing things, rather than reading about them” (Teresa, survey). Although, Teresa did not appear to be a reflective learner, she felt she was a thinker. Therefore, Teresa did not feel the need to record either her thoughts, or write about her work. Therefore, Teresa entered the multimedia design subject with no experience in reflection or a desire to use reflective writing.

5.5.1 Nature of reflective writing and professional focus for Teresa

Teresa was found to write primarily at the Descriptive level of reflection in the written reflections (Table 26). A quarter of her writing was at the Explanatory level, and she also exhibited a low frequency of Supported reflection. Contextual reflection and Critical reflection were not found. Teresa predominantly wrote at the Descriptive level of reflection in all four reflections, and the frequency increased with each one (Table 26). Supported reflection was found in the first two written reflections, but not in the others.

Table 26: Teresa - Levels of reflection in four written reflections (R1 to R4).

Level	Overall	R1	R2	R3	R4
Descriptive	71.3%	58%	57%	76%	78%
Explanatory	25.5%	35%	36%	24%	22%
Supported	3.2%	8%	8%	0.0%	0.0%
Contextual	0.0%	0.0%	0.0%	0.0%	0.0%
Critical	0.0%	0.0%	0.0%	0.0%	0.0%
Total	100%	100%	100%	100%	100%

Stating was the most frequent type of reflection at the Descriptive level (Table 27). *Noticing* and *Deciding* were found at a lower but similar rate. Teresa wrote a series of

statements about what she had been doing when creating the learning object. For example:

I found a vector image site (Vector-images.com) and found several images of toys that were all in the same style. I re-sized these and added them about the ‘room’ on the bedroom background graphic for the first html page. I then created the second html page and added the bedroom graphic, minus the toys. (Teresa, Written Reflection 4.) (Coded as: Descriptive/Stating.)

Table 27: Types of Descriptive reflection and Explanatory reflection for Teresa.

	Stating	Noticing	Deciding	Goals	Self-Q			
Descriptive	45.5%	25.3%	24.7%	1.9%	0%			
Explanatory	Stating	Deciding	Personal	Professional	Self-Quest	Learning	Reactions	Goals
	36.5%	28.6%	11.1%	6.3%	6.3%	4.8%	3.2%	3.2%

Therefore, the pattern in Teresa’s writing at the Descriptive level of reflection was very much her stating what she was doing, without a particular emphasis on specific aspects of her experience, such as her feelings, thoughts, decisions and what she was learning.

At the Explanatory level of reflection, Teresa also demonstrated the *Stating* form of writing most frequently (Table 27). Explanations about her decisions (*Deciding*) were the second most common form of writing; a similar pattern to her writing at the Descriptive level (Table 27). In her writing at the Explanatory level, Teresa commonly demonstrated a process of looking forward (*Deciding*), by using language, such as *I need to*. For example:

So having considered my professional weaknesses and areas for improvement in my work, I have made the following *decisions*:

I need to think more carefully about what a learner gets out of an interactive experience; I need to learn some new technical skills, particularly using Flash, Camtasia; I need to consider how the media I currently use in my job can be presented in a way that provides more efficient learning. (Teresa, Written Reflection 1.) (Coded as: Explanatory/Deciding.)

Writing from a personal perspective (*Personal*) was twice as frequent as instances of *Professional* reflection at the Explanatory level. There was also evidence Teresa acknowledged what she was learning (*Learning*), and that she used a reflective self-questioning (*Self-Questioning*) process. For example:

Perhaps there are ways to organise the audio used in our courses to make it easier for the user to gather what information they need (Teresa, Written Reflection 1). (Coded as: Explanatory/Self-Questioning.)

Writing about goals (*Goals*) was uncommon at both the Descriptive and Explanatory levels of reflection (Table 27). Seven instances of Supported reflection where literature was cited were found (*Evidence Identified*). For example:

(Hartley 2004) points out textual features to improve readability which I'll try to incorporate into my design (Teresa, Written Reflection 2). (Coded as: Supported/Evidence Identified.)

Therefore, Teresa exhibited mainly *Stating* at both the Explanatory and the Descriptive levels of reflection. Decision-making (*Deciding*) was at a lesser frequency, and similar at both levels of reflection. Supported reflection was found but at a low level. The primary professional focus for Teresa related to the technical side of her practice, particularly, software she was using to design and create the learning objects. She focused on the process undertaken and the technologies she used. Teresa was well aware of both her professional strengths and limitations regarding education and multimedia design.

For example:

I think the use of colour in this learning object clearly links the content to the step in the process, provides some visual interest, and helps the user know where they are at in the tutorial. But after experimenting with embedding video in a Flash file I decided that this was a bit beyond my capabilities for now. (Teresa, Written Reflection 3.)

Teresa provided very little background information about herself, though she did allude to previous occupations and her current role as an instructional designer. She provided some description about her professional practice, and the skills she needed. For example:

How to use multimedia to engage students in learning is integral to my job, yet an area I need learn about (Teresa, Written Reflection 1). Flash is a program which I've always put in the too hard basket, but an understanding of how it works would help me a great deal in designing Flash activities (Teresa, Written Reflection 2).

Teresa also referred to the design process in the context of her workplace, by describing the way in which audio in the form of podcasting could be used for distance learners. Therefore, it was evident from her writing that she was aware of the benefits of technology for learning, and the needs of the end users. Teresa interweaved descriptions about her need for professional development with practical and theoretical considerations about design, and she did this in a logical and analytical manner. She stated the issue, demonstrated reasoning about it, referred to evidence from the literature, and wrote about how she would seek solutions. Therefore, Teresa wrote frequently about the direction she was taking with professional development, as well as the challenges she was encountering in the design process. This tendency in her writing indicated the responsibility she felt to pursue the development of her capability and skills. Teresa carried a thread about learning new software (Flash) through the first three reflections.

It was evident in Teresa's writing that the decisions she was making in the design process were strongly focused on the technical, not only in the choice of software, but also in the steps she was taking when building the learning objects. In her writing, Teresa appeared to base her ideas about design on learning theory and the needs of users, stating: "On top of this, listening to so much content at once is cognitively demanding" (Teresa, Written Reflection 2). She also explained several technical aspects about the design process which she had considered in terms of usability. For example: "I decided to use vector graphics for the toys as these can be re-sized without affecting the resolution of the image" (Teresa, Written Reflection 4).

A lot of detail was provided in Written Reflections 2, 3 and 4, in particular, about the process Teresa undertook when constructing the learning objects. For example, in Written Reflection 2, Teresa described how a Flash activity worked and the difficulty she was having with the feedback feature. All of Teresa's written reflections were interspersed with visual material to support the technical descriptions, for example, Figure 22.



Figure 22: Teresa - Colour matching left hand 'graphic' navigation and right hand content.

Although, Teresa described aspects of challenge in her work, such as personal difficulties she was facing in using particular software, and learning issues with the way materials were currently designed, she did not appear to focus on constraints. Instead, she concentrated on outlining the solutions she had found and the way forward. The main professional constraints which Teresa wrote about were related to the software challenges she faced, and these included two aspects: her existing skills; and the

shortfalls in her skills which she appeared to become more aware of during the design process. Her professional perspectives were very much from a technical standpoint, with some emphasis on principles of design for learning. Overall, Teresa wrote from a technical perspective, and described a series of events in a logical manner. She expressed awareness of her professional strengths and the confines of her capability, particularly, in the use of software applications, and multimedia design and creation. Explanations and evidence for effective design were also described in the supporting statements.

For example:

Provides the content about SOAs [statements of advice]. Complexity of the text was reduced and text is delivered in small chunks (one topic per html page) to reduce cognitive load on learner. Reducing load on working memory assists learning (Miller 1956: in Colvin Clark & Mayer 2007). (Teresa, supporting statement 1.)

Teresa provided rationale for her design approaches, and the main body of writing in the supporting statements was at the Descriptive level, with a low degree of Explanatory reflection found. There were ten citations from the literature, indicating Supported reflection was also present. In the second supporting statement, Teresa wrote about her decisions, providing a step-by-step account of her approach. She also described some challenges she encountered, and insights she gained from the exercise. Therefore, Teresa demonstrated the ability to problem-solve and work through a challenge using reflective writing.

In the interview, it became clear that Teresa had been unable to distinguish between the writing she prepared for the written reflections and supporting statements. For example: “I wasn’t sure what I was writing in my reflective assignments was stuff that I should have been putting in my supporting statements. Whether I was crossing over too much” (Teresa, interview). Therefore, Teresa did not appear to have knowingly written in a more reflective manner in the written reflections. The approach in the written

reflections indicated that Teresa was someone who presented problems and processes in a step-wise and logical fashion, using mainly Descriptive reflection. Her use of the Reflective Framework may help to explain this situation, and is addressed in the next section.

5.5.2 Teresa's use of the Three-Step Reflective Framework

Teresa used the Reflective Framework in Written Reflections 2, 3 and 4, but not the first assignment. In addition to the framework headings, she also added her own headings, such as: *Steps I've taken so far to achieve this*; and *My learning goals*. These headings were used to break up the writing. It was also evident in the content of her writing that she had used some of the framework questions for each step. For example, at Step 1, she wrote about the decisions she had made in response to questions from the Reflective Framework. Also, at Step 3, she wrote: "Throughout the process I have learnt"; and this was probably in response to the question posed for that step. However, it was less obvious, when analysis of her decisions, actions and reactions was undertaken, how she responded to the questions in the Reflective Framework for Step 2. When interviewed, Teresa said that she found the prompting questions and headings in the Reflective Framework helped her to write the reflections, and they guided her to write in each of the steps. Apparently, she wrote most of the material at Steps 1 and 2, and less for Step 3, and found that having to write about what she was doing and what she learned "really forced [her] to think back" and to reflect (Teresa, interview).

Teresa also stated that the Reflective Framework was useful because "if I didn't have that, I wouldn't have had a clue really what to put" (Teresa, interview). Teresa included diagrams and pictures of her work to illustrate her reflections, and in the interview she commented on the tips in the framework being responsible for encouraging her to do this. She also indicated that she preferred to write using the steps of the Reflective Framework rather than mixing her writing. Teresa mostly found the prompts relevant, and did not use those which were not. She did not mention the reason for not using headings from the Reflective Framework in her first written reflection assignment. At all three steps of the Reflective framework, Teresa wrote primarily at the Descriptive

level of reflection, and this was particularly noticeable at Step 1 (Figure 23). The number of units of Descriptive and Explanatory levels of reflection declined across the three steps (Figure 23). Supported reflection was present to a low degree at Steps 1 and 3, but not at Step 2.

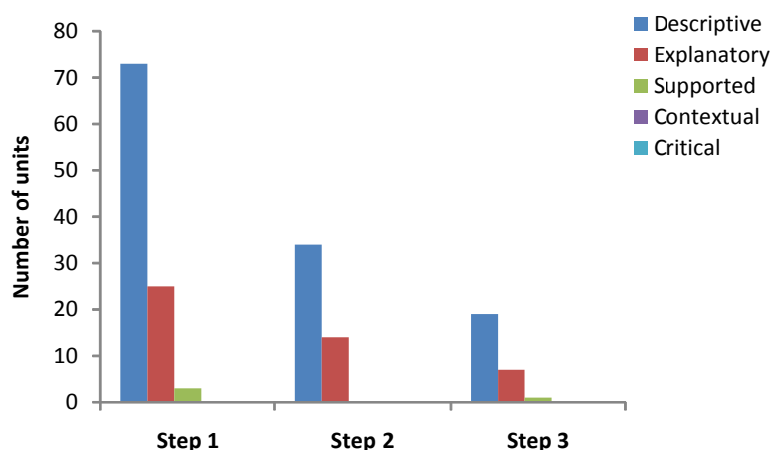


Figure 23: Teresa - Number of units of reflection at three steps of the Reflective Framework.

Proportionately, the presence of Descriptive and Explanatory levels of reflection was consistent at each step with Descriptive reflection predominant (Figure 24).

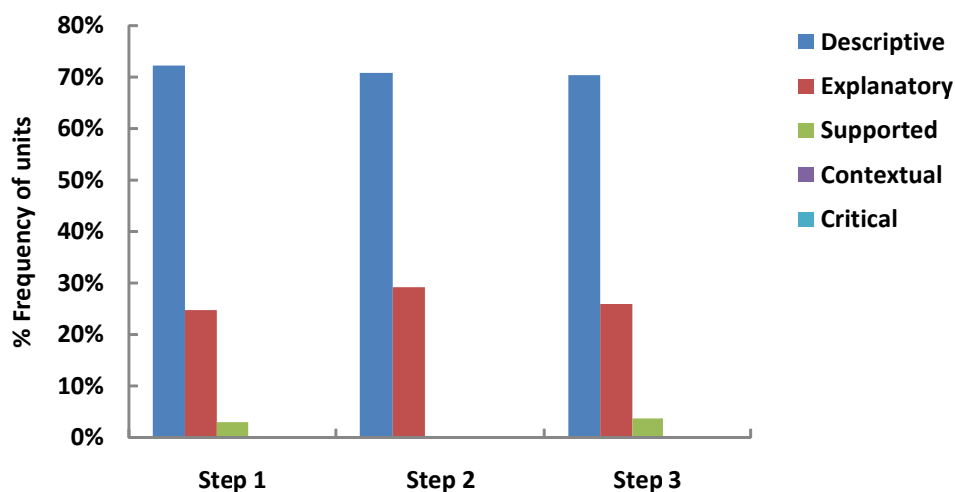


Figure 24: Teresa - Levels of reflection as % frequency at three steps of the Reflective Framework.

Teresa used the Reflective Framework in a manner which did not result in any particular level of reflection at any of the steps. Therefore, there were no specific aspects of the framework which appeared to influence the level of reflective writing. Teresa's views and experiences about reflection, and her intentions for using reflective writing in the future are described in the next section.

5.5.3 Reflective writing – Teresa's views and experiences, and future use

Teresa preferred to think rather than record her reflections, and talked in the interview about how she liked to think about things as she walked, or when she carried out other activities at home. She also responded that she felt it was important to reflect on professional practice, and thought she reflected intuitively without realising she was doing it. For example: "When I reflect on what I do, ideas come to me on how to proceed with things or do them better" (Teresa, survey). She had previously used reflective processes at work in the form of debriefs and talking with a mentor, but had never written anything down regularly about her professional practice. However, she had used reflection as part of performance review. Therefore, Teresa believed she did reflect, having used informal reflection strategies in the past, and some types of reflection in her work, but she had never written anything down in a structured way. For example:

... it is just easier for me to have thoughts pop in to my head at any particular time of the day with what I am doing rather than actually sit down and do something structured (Teresa interview).

Consequently, she found the process of reflective writing for the multimedia design subject quite awkward. She said initially she wrote quite loosely, and although the reflective writing process was not particularly hard, she still found it quite daunting. Previously, she had written explanations about her actions in letters, and felt this was a reflective process. However, Teresa realised that writing thoughts down in an informal way, such as in a letter, was quite different to what was required for the multimedia design subject. In the written reflections, she had to make sure her writing described

her thought processes clearly, so the lecturer could understand what was being read. Teresa explained in the interview that she felt there was more pressure in that type of reflective writing because it was an assignment and more detail was required.

Teresa used the Reflective Framework to help her reflect on her professional skills and set goals in the multimedia design subject, and found that the process helped her to link each reflection to the next one, and also to extend her skills. For example:

... each reflection did tend to link in to the next one ... also the reflection after the first one, the second reflection, I would be thinking back to my goals and where I needed to go next and each time it tended to extend on my previous. So the last time I tried working on these skills, this time I will go on to these things I just tried to field my skills throughout the assignments. (Teresa interview.)

Although, Teresa did not use the framework headings for her writing in the first written reflection, she said in the interview that she had used the Reflective Framework. For example: “I found that one quite useful, getting me to articulate what would stretch me more and what areas I needed to work on” (Teresa, interview). Teresa said, because she reflected primarily in her head, the process of writing down her thoughts, (which she did when using the Reflective Framework) did not make her reflect more. For example, she reflected on some of her design work with the subject lecturer, and found that in her writing she only summarized what they had discussed rather than reflecting further. Teresa also found the feedback from the subject lecturer assisted her to reflect as “she gave me suggestions on what would be some suitable tasks that I could apply my skills to” (Teresa, interview).

Overall, Teresa said she found the reflective process useful because it made her think about the theory underpinning the design ideas she was working on and helped to justify her ideas for the reader. However, Teresa found it tedious having to write down technical terms for the software she was using, and to provide detail about her design processes and learning. Although, Teresa agreed that preparing the reflections assisted

her to write the supporting statements, she admitted to feeling confused about the differences between them. Teresa did not regard the Three-Step Reflective Framework as something she would continue to use in the future to enhance her reflective practice, mainly because she did not want to be that particular. For example:

I couldn't see myself going back and reading my work again Perhaps if I was doing a reflection that wasn't an assignment, I would write things a bit differently. I would just write it so it was only for me to understand and it wouldn't be such a tedious process." (Teresa, interview.)

Therefore, although Teresa used the Reflective Framework for three written reflections, she did not regard the structure as particularly helpful for supporting her reflective practice. Therefore, this may explain the reason for the lack of variation in the levels of reflection at each step because she did not adhere to the guidelines.

5.4.4 Summary of key findings for Teresa

Teresa's reflective writing in the written reflections was predominantly at the Descriptive level of reflection, with a degree of Explanatory reflection, and a small amount of Supported reflection in the first two written reflections. Teresa displayed mainly *Stating*, *Noticing* and *Deciding* types of reflection. No Contextual reflection or Critical reflection was apparent. Descriptive reflection was also predominant in the supporting statements with a degree of Explanatory reflection and Supported reflection. Teresa was also unclear about the different writing approaches required for each type of assignment, although she did find that preparing the written reflections helped her to write the supporting statements.

Teresa's approach to reflective writing was primarily focused on the technical process of designing and creating learning objects for the multimedia design subject. This was particularly noticeable in her writing about her competency in using software. She provided limited background information about herself, professionally, and described the relevance of her designs for filling the gaps she perceived to be present in her

workplace. She also concentrated some of her writing on the direction she needed to take with professional development.

Teresa used the Three-Step Reflective Framework, including the prompting questions, for written reflection assignments two, three and four. Although, the framework assisted her to structure her writing, she did not feel that the writing process engaged her in any reflection further to what she had already undertaken in “her head” (Teresa interview). No particular level of reflection was apparent at any of the steps. Teresa had not used a formal reflection approach in the past, and found the reflective writing required for the multimedia design subject made the experience complex. She did not intend to use the Reflective Framework as a professional development tool in the future, for example, to help her with performance review, or to become a more reflective practitioner.

5.6 Introduction to the participant – Yonten

Yonten was an Information Technology programme coordinator who worked in schools. Part of his role was to supply computers and provide computer training for teachers. Yonten’s previous experience with reflection was minimal, and he had not previously used a journal. Even though Yonten was inexperienced in using reflection, his feelings and perceptions about using reflection professionally were positive. For example: “I think it will be very handy in justifying work undertaken; reviewing work done, to keep track of change in trend. It is a great idea.” (Yonten, survey.) Reflection was not an approach Yonten used when learning something new as he preferred to be told how to do things. Yonten responded in the survey that he would “ask and get some insight” from people who had previously done something he needed to learn. He utilised strategies such as asking others and reading the literature, and believed that asking others and being shown worked best for him. When Yonten started to study the multimedia design subject, he believed reflection was difficult to practice. Even so, he was interested in using reflective writing during his professional study.

5.6.1 Nature of reflective writing and professional focus for Yonten

Yonten wrote primarily at the Explanatory level of reflection in his written reflections, although Descriptive reflection became increasingly frequent with each assignment, apart from the final one (R4) (see Table 28). Supported reflection was less common. Critical reflection was the least frequent level of reflection found. Contextual reflection was not apparent. #

Table 28: Yonten - Levels of reflection in four written reflections (R1 to R4).

Level	Overall	R1	R2	R3	R4
Descriptive	41.8%	23%	44%	44%	60%
Explanatory	51.6%	71%	44%	56%	31%
Supported	4.1%	0%	11%	0.0%	6%
Contextual	0.0%	0.0%	0.0%	0.0%	0.0%
Critical	2.5%	6%	0.0%	0.0%	3%
Total	100%	100%	100%	100%	100%

Almost three times as much Explanatory reflection, in comparison to Descriptive reflection, was found in Written Reflection 1. Supported reflection was present in only two assignments (R2 and R4), as was Critical reflection (R1 and R4) (Table 28). Yonten's writing at the Descriptive level was dominated by the *Noticing* type of reflection, probably due to his propensity for describing his feelings and thoughts (Table 29). For example:

To my dismay, the end product resulted in something totally different from the initial concept and the idea I had. It isn't a very good feeling when having to compromise the supposedly good idea with the limitation of skills in handling tools and software. (Yonten, Written Reflection 4.) (Coded as: Descriptive/Noticing).

Stating was the next most frequent type of reflection at this level (Table 29). For example: “How I wish, if I could go on ‘playing’!” (Yonten, Written Reflection 3.) *Deciding* and *Goals* were found least often, and Yonten did not demonstrate *Self-Questioning* in his reflections (Table 29).

Table 29: Types of Descriptive reflection and Explanatory reflection for Yonten.

	Noticing	Stating	Deciding	Goals	Self-Quest			
Descriptive	60.8%	25.5%	9.8%	3.9%	0.0%			
Explanatory	Deciding	Stating	Reactions	Personal	Professional	Learning	Goals	Self-Quest
	25.4%	15.3%	15.3%	13.6%	13.6%	8.5%	8.5%	0.0%

The decisions Yonten made when developing the learning objects were described infrequently, and signified by the use of words such as *going to*. For example:

For the next learning objective, I am going to put myself to a test for another skill – handling audio. (Yonten, Written Reflection 3) (Coded as: Descriptive/Deciding).

In contrast, at the Explanatory level of reflection, *Deciding* was the most frequent type of reflection, and indicated by language such as *decided* and *wish to use* (Table 29). For example:

... I have *decided* to focus on the skills of creating animation in the field of IMM [interactive multimedia] development. I *wish to use* Flash in creating IMM and especially with the use of action scripts. (Yonten, Written Reflection 1.) (Coded as: Explanatory/Deciding).

Stating was the next frequent form of Explanatory reflection (Table 29). Yonten’s reflections at the Explanatory level were also about his reactions to the design process, and he used emotive language. For example:

This kind of *intimidating* and quite a *pessimistic* thought is basically due to superficial exposure to those finished product of Multimedia in the market. (Yonten, Written Reflection 2.) (Coded as: Explanatory/Reactions.)

Yonten also expressed his reaction to challenges when making design decisions. Generally, Yonten explained matters from both a personal and professional slant, and did this frequently. The difference between *Personal* and *Professional* types of reflection is illustrated in the next two quotes. For example:

As far as the use of the new tools is concerned, although it is intuitive in nature, I always learned better through demonstrations than self exploration (Yonten, Written Reflection 3). (Coded as: Explanatory/Personal.)

It has to be attributed basically to my background in teaching which enables me to decide on the level and type of information input under a topic for the lesson (Yonten, Written Reflection 3). (Coded as: Explanatory/Professional.)

Reflection about *Learning* and *Goals* occurred at a similar frequency, and were the least common types of reflection at the Explanatory level. *Self-Questioning* was not practiced at this level (Table 29). Yonten had a tendency to write long lists of what he had learned, and he did this in three written reflections. Some of these items were repeated word for word in more than one written reflection. For example, the following item was listed in three written reflections.

Unlike the visual and interface design, designing educational Interactive Multimedia is more than just getting the message across (Yonten, Written Reflections 2, 3 & 4). (Coded as: Explanatory/Learning.)

A possible explanation for this repetition is the insecurity Yonten mentioned with using reflection, and also the requirement to write in English which was not his first language. More detail about these aspects is discussed in Chapter Six. Despite the repetition of chunks of text, there were logical thought processes evident in Yonten's written reflections. For example, information about *Goals* was linked from one reflection to

another: “As per the goals that I have set for myself in the first reflective journal” (Yonten, Written Reflection 2); also, “To remind of the overall goals set for myself for taking this course” (Yonten, Written Reflection 3).

Five instances of Supported reflection were demonstrated, and although Yonten did not use citations in his written reflections, he did refer to the literature. Therefore, *Evidence Mentioned* was the main code assigned, with one instance of *Reactions to Evidence*. For example:

The literature also mention that designers may have laudable and innovative ideas, but if the product is not accessible and easy to use then the very objective of development of such a product is defeated (Yonten, Written Reflection 4). (Coded as: Supported/ Evidence Mentioned.)

It was overwhelming to know about the numerous considerations even in using just the type/text that a designer has to take care, let alone the other media (Yonten, Written Reflection 2). (Coded as: Supported Reflection/ Reactions to Evidence.)

Additionally, three instances of Critical reflection were apparent in Written Reflections 1 and 4. For example: “In the years to come through the track of using IT in education, the use of online resources and teaching-learning materials is only going to get compounded” (Yonten, Written Reflection 1). Yonten also expressed his awareness of how his new found expertise could potentially assist his career. He was also critically aware of the impact technology could have on users in his country if he created multimedia learning objects. Therefore, the professional focus for Yonten was very much about how knowledge in multimedia design could further his career, as well as about the discoveries he was making regarding his professional competence. At the outset in Written Reflection 1, Yonten wrote about his professional background as well as his past professional practice including his experiences and knowledge.

For example:

The skills that I have as a teacher is being under used with my present job responsibility of merely doing hardware distribution plans, procuring and distribution of computers. Since I have a background in teaching and as well as in the field of ICT, I feel I can be a good bridge between the technical experts and the subject specialist. (Yonten, Written Reflection 1.)

Yonten made connections between his professional development in the subject, and his professional role and future aspirations. For example, he believed that the use of interactive multimedia was the best solution for learning, and therefore, the knowledge he gained from the subject would enable him to lead a development team. Yonten also provided an account of the gaps in his competency in using software (e.g., PowerPoint). This included software with which he was familiar and learning to use more effectively, and new software. Therefore, the theme of *professional capability* emerged. For example:

... I have been trying to get myself around using Dream Weaver, which is intuitive but not easy. I hope I won't lose the focus on real essence of developing learning objects while trying to develop the skill for new authoring environment. (Yonten, Written Reflection 3.)

In the last written reflection, Yonten reflected further about his professional aptitude, using emotive language (*indicated in italics*). For example:

Looking back and reflecting on the last Learning Object that has been developed, I *do not feel very satisfied and confident*. The very fact of trying out the new authoring tool was *very intimidating*. *To my dismay*, the end product resulted in something totally different from the initial concept and the idea I had. *It isn't a very good feeling* when having to compromise the supposedly good idea with the limitation of skills in handling tools and software. The very fact of trying out the new authoring tool was very *intimidating*. (Yonten, Written Reflection 4.).

Additionally, Yonten wrote about the context in which the learning objects would be used. He mentioned how his design choices might impact on the end users, particularly in relation to their capabilities when using technology. He also wrote about learning and design theories, and the connotations for end users in how he approached the task of designing and creating learning objects. For example:

As a designer, having very innovative and laudable ideas will remain useless if the finished product is not accessible and not user friendly in the sense of being it easy to use (Yonten, Written Reflection 4).

Overall, much of Yonten's reflection was related to his professional learning. This included what he had learned about multimedia design and creating learning objects, his insights into pedagogy and software and media. Yonten's approach in the written reflections mainly related to the multimedia design process and his reflections on it. In contrast, in the supporting statements, Yonten included mainly explanations (demonstrating Explanatory reflection) about his actual designs, as opposed to how he was feeling about the process. He also demonstrated Descriptive reflection, but to a lesser degree. No citations or mention of theories from the literature were included, and therefore, no Supported reflection was present. For the supporting statements, Yonten used the template, except for the table which he created anew. Reflective writing at the Explanatory level of reflection was found particularly in the sections about learning context and purpose regarding the learning object, and also in the section on media design. Yonten used reasoning, analysis and explanation in his writing (as indicated by the words in italics). For example:

For this learning object the authoring tool used is Microsoft PowerPoint. The *reason for choosing* PowerPoint is that, the concept dealt in the lesson is basically just factual information input such as definitions and technical terms which could be just presented in the form of text and images. Besides, the simplicity of the authoring tool was more appropriate *because* the lesson doesn't have any processes oriented concept which could require high level

animation software to demonstrate and simulate. (Yonten, supporting statement 1.)

Yonten also explained how his designs and the content of the learning objects were suitable for potential users, and this was acknowledged more frequently in the supporting statements compared to the written reflections. For example:

The shades of blue colour are always associated with being cool and this will prevent the learning object from looking intimidating and repelling ... graphics are to help the learners to have smooth interaction and navigation within the application.... The main aim of the audio is to lighten up the aspect of supposedly difficult subject matter. (Yonten, supporting statement 3.)

The detail which Yonten provided about the learning objects in the three supporting statements was not mentioned in the written reflections. This suggests that he saw the two assignments as quite separate. Therefore, it appears likely that the Reflective Framework influenced Yonten's approach to reflective writing. Also, Explanatory reflection was most common in both the written reflections and supporting statements.

5.6.2 Yonten's use of the Three-Step Reflective Framework

Yonten used the Three-Step Reflective Framework for all four written reflections. He used the framework as it was designed, and wrote only as much as would fit in the physical space provided for each step in the electronic file. It was noticeable that Yonten closely followed the headings at each step, particularly at Step 3 where he wrote long lists of what he had learned. Yonten explained that he felt the steps in the framework overlapped. Despite this he found the framework useful. For example:

It was very useful and I am actually keen to use it ... [and], make it mandatory for myself to practice this very often. Like regularly in my work place as well. I find it very interesting and helped a lot. (Yonten, interview.)

Step 1, according to Yonten, was “a little bit tricky ... because it was mostly done just on feelings so there wasn’t much of a Critical aspect ... trying to look in to yourself, that helped a lot” (Yonten interview). He said he looked at the prompting questions regularly because they helped him to make sense of what he was writing and clarify his experiences, and this gave him direction. However, he found the relevance of the prompting questions variable, mainly due to his professional role not being related to teaching and learning. For example: “I was trying to position myself in my present professional position or role and at times some were not really relevant” (Yonten interview). Yonten said he did not use the tips provided in the framework, and it was noticeable that he had not done this, because, apart from one diagram, he presented his reflections predominantly as text.

Descriptive reflection was found at the highest rate at Step 1, and Explanatory reflection at Step 2 (Figure 25) as expected. Supported reflection was found only at Steps 1 and 2. Critical reflection occurred at Step 2 only. The volume of writing at each step decreased as well as the number of units of Descriptive reflection and Explanatory reflection (Figure 25).

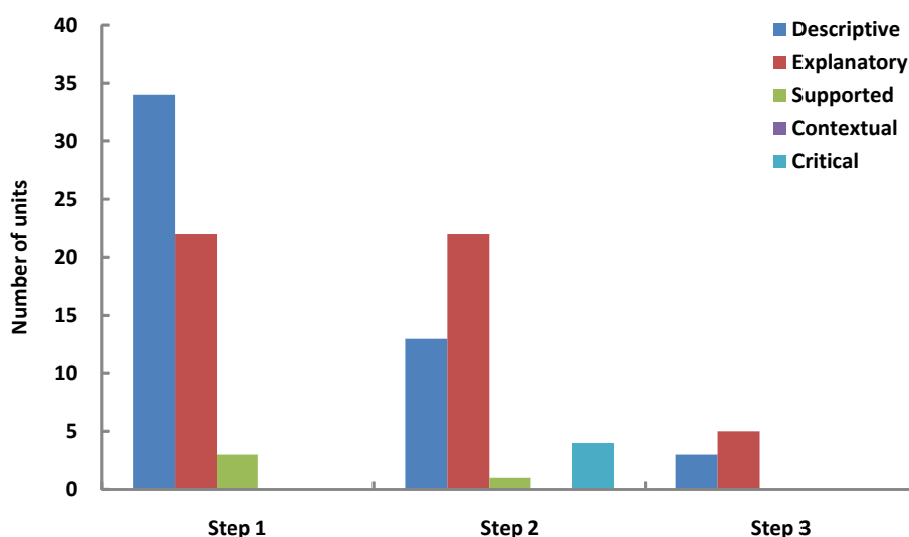


Figure 25: Yonten - Number of units of reflection at three steps of the Reflective Framework.

In contrast, the proportion of Explanatory reflection increased with each step whereas Descriptive reflection and Supported levels of reflection decreased (see Figure 26). Therefore, Yonten may have developed his approach to Explanatory reflection further with each step.

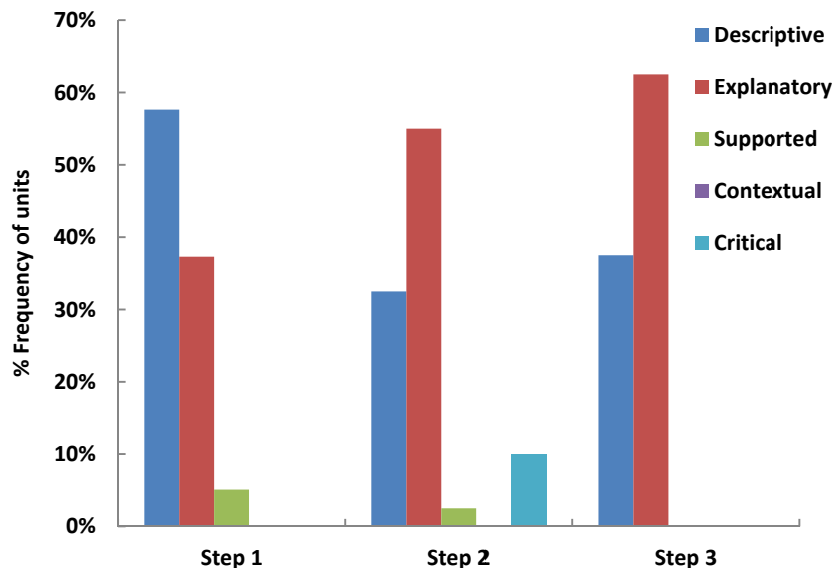


Figure 26: Yonten - Levels of reflection as % frequency at three steps of the Reflective Framework.

Overall, Yonten used the Reflective Framework consistently, and this manifested in the pattern of Explanatory reflection which increased with each step. In the next section, Yonten's views about reflection and his experience with reflective writing in the multimedia design subject, and his intentions in the future are described.

5.6.3 Reflective writing – Yonten's views and experiences, and future use

Yonten's lack of experience at reflecting when he started the multimedia design subject meant he found it difficult to complete the written reflection assignments because he felt self-conscious expressing his thoughts. For example:

... it was quite difficult, at times it was quite tricky ... especially writing for ... a subject [which] is going to be ... reviewed by the others ... you have ... inhibitions, ... you feel you might offend or sound rude (Yonten interview).

His reticence may have been partly due to being used to thinking at a subconscious level, professionally, rather than deliberately reflecting on what he was doing and why. As previously discussed in Chapter Two, the Literature Review reflection and reflective writing are skills that require guidance and practice. Yonten was also used to debriefing with colleagues when something had gone wrong, and was not used to reflecting on his professional performance with mentors or managers. However, he tended to reflect automatically on a personal level to try and understand why something had occurred. He had never written down his reflections. Yonten said he found it easier to record what he was feeling because he felt it was less restricting than more formal ways of describing what was happening. When writing the reflections for assessment he did not like going back over what he had written to analyse what he had done, preferring to write it correctly the first time.

At first, he found it hard to write something as he felt he had not learned enough about multimedia design, or done enough to write about. As he progressed through the subject, and with each learning object he designed, he found it easier to write his reflections. This occurred because as he learned more, read the literature about design theory, and saw the need to extend his skills, he had more to write. He found that through using reflective techniques in the subject, clarification of “strengths and weaknesses” occurred because weaknesses were usually ignored (Yonten, interview). For example: “We simply look at what we can do and what we are good at” (Yonten, interview). Yonten said he felt that reflection had enlightened him by making him more aware. For example: “when you reflect, you open up things for other possibilities as well” (Yonten, interview). Reflective writing helped him to think differently, that is, from more perspectives than just a linear one. During the subject, he found the Reflective Framework so helpful that he had told his peers about it, and showed them how to use it for the subjects they were taking which required reflective writing. Yonten found the feedback from Penny helped him to reflect as it encouraged him to make links between his designs and his professional work, and assisted his multimedia knowledge. Before receiving feedback, he had taken one approach with his designs, and afterwards he was able to view them from different perspectives.

Yonten was very enthusiastic about continuing to use the Reflective Framework to help him professionally. He thought it might help his time management if he took time out to reflect, as it helped him to clarify things and put them in perspective better. He felt his opinion about the use of reflection as a professional tool had changed. For example:

I used to think like a reflection is just thinking about myself and I used to think why should ... I reflect. I know what I am thinking, I know what I am doing, why should I go over it, ... after you use the reflection you really analyse yourself and what you are capable of and the environment you are in and what is your expectations, so it is a whole lot of insight that you get with this reflective thinking. (Yonten, interview.)

Yonten had started a blog since completing the multimedia design subject which he was going to use to help him professionally to “reflect as to how [he] could manage the stress or manage [his] time and [he] wanted a place to give outlet to all these emotions or the feelings since and [he] found the best way is to get a blog up and [he] did try actually” (Yonten, interview). He believed that in the future, he would put together a professional portfolio as it had been mandated by the government that employees had to demonstrate their performance in order to get promotion. It would also assist him to record his successes and contributions.

Overall, Yonten had moved from a position of not using reflective writing in his work, because he had not known it could be helpful, to one where he had found using the Reflective Framework helpful to the extent that he shared it with peers and intended to continue to use the framework to help him professionally. He had started keeping a professional blog to help his time management and so he could have a way to express himself which would help to alleviate stress in his work.

5.6.4 Summary of key findings for Yonten

In the written reflection assignments, Yonten wrote predominantly at the Explanatory level of reflection. However, the fourth written reflection contained much more Descriptive reflection than the others. Yonten demonstrated a small amount of

Supported reflection where he mentioned evidence, but he did not cite any references. He also demonstrated a low frequency of Critical reflection. Although, Yonten had no previous experience with reflective writing, and found it challenging at the start of the multimedia design subject to write about his feelings, *Noticing* was a common type of reflection found at the Descriptive level. In contrast, at the Explanatory level of reflection, Yonten wrote mainly about his decisions. Yonten's professional focus was very much on his professional capability and his professional learning, in particular, challenges posed by multimedia design, and how his learning could benefit his career.

In the supporting statement assignments, Yonten provided reflective explanations about his designs demonstrating mainly Explanatory reflection. Yonten used the Three-Step Reflective Framework for all four written reflections. He wrote more descriptively at Step 1 than Step 2, and the proportion of Explanatory reflection increased with each step. Yonten's reflective writing approach differed between the written reflections and the supporting statements, suggesting he had adhered to the Reflective Framework for the reflections. Yonten found the Three-Step Reflective Framework very useful, and intended to continue to use it for reflective practice.

5.7 Introduction to the participant – Ruth

Ruth was an educational designer with 1.5 years of experience in her current role. In this position she provided academic staff support including assistance with curriculum design. Ruth was taking the multimedia design subject to support her professional role. Over the years, Ruth had tended to reflect in writing using a variety of approaches in both electronic and handwritten formats, for example, a diary (in her teenage years), scrapbooks, a learning log, portfolio, blog, and post-it notes. Ruth expressed her preference in the survey, by stating, "I have used many types but find electronic most useful". Ruth was familiar with the concept of reflective practice, and had kept an academic journal for three years, specifically for professional development she had undertaken. Although, Ruth had previous experience with using reflection for professional development, it was not a formal strategy she used when learning something new. Instead, her preference was to "break it down and diarise the

timeframe” using a calendar and an electronic notebook as support for her learning (Ruth, survey). Generally, the way she liked to learn: was to “read a lot, and listen to other people” (Ruth, survey). When Ruth previously studied a unit about reflection as part of a higher degree, she discovered how powerful reflection could be for professional development. Consequently, Ruth entered the multimedia design subject and the research with extended experience in reflection and reflective writing, and a strong belief in her ability to reflect.

5.7.1 Nature of reflective writing and professional focus for Ruth

The Descriptive level of reflection was found at three times the frequency of Explanatory reflection in Ruth’s written reflection assignments (Table 30). Ruth also exhibited a relatively high proportion of Supported reflection, particularly, when compared to Explanatory reflection. No Contextual reflection or Critical reflection was found. Very little of Ruth’s writing included reasons for her actions and the processes she was engaged in (as required for Explanatory reflection). Written Reflection 2 (R2) was particularly low in Explanatory reflection. In the fourth assignment (R4), the amount of Descriptive reflection was significantly higher than in the other written reflections. Ruth exhibited relatively high proportions of Supported reflection, in Written Reflections 1 and 2, and then the frequency lessened. The frequency of Frequencies of Descriptive reflection and Explanatory reflection in Written Reflection 3 (R3) were relatively similar, a contrast to the other assignments (R1, R2 and R4) (Table 30). A characteristic of Ruth’s writing was how she used lists more commonly than prose. *Stating* was a common type of reflection in Ruth’s writing, particularly at the Descriptive level (see Table 31).

Table 30: Ruth - Levels of reflection in four written reflections (R1 to R4).

Level	Overall	R1	R2	R3	R4
Descriptive	61.4%	59%	61%	54%	80%
Explanatory	22.8%	23%	14%	40%	18%
Supported	15.8%	19%	26%	6%	2%
Contextual	0.0%	0%	0%	0%	0%
Critical	0.0%	0%	0%	0%	0%
Total	100%	100%	100%	100%	100%

Ruth often wrote incomplete sentences. For example:

Problem-based learning - The hype from the lecturers is they would like to undertake Problem-based learning as a ‘teaching method’. Need to find this out.
(Ruth, Written Reflection 1.) (Coded as: Descriptive/Stating.)

The *Noticing* type of reflection was frequently found at the Descriptive level of reflection (see Table 31). For example: “My thoughts were instantly focused on the possibilities of using 3D virtual to give a more visual imagining to the students on the landscapes of the different regions in X” (Ruth, Written Reflection 2). Ruth’s reflections at the Descriptive level also demonstrated patterns of *Deciding*. For example: “Will have to investigate further, although wish someone would explain it to me” (Ruth, Written Reflection 1). Also, *Self-Questioning* was used as a reflective technique at this level (Table 31). For example: “What can I do to create a change?” (Ruth, Written Reflection 4). *Goals* were not reflected on at the Descriptive level. However, *Goals* were included at the Explanatory level (Table 31).

Table 31: Patterns of Descriptive reflection and Explanatory reflection for Ruth.

	Stating	Noticing	Deciding	Self-Quest	Goals			
Descriptive	38.4%	33.3%	18.2%	10.1%	0.0%			
	Deciding	Stating	Reactions	Learning	Personal	Professional	Goals	Self-Q
Explanato	29.1%	21.8%	10.9%	10.9%	9.1%	7.3%	7.3%	3.6%

Deciding was exhibited more frequently at the Explanatory level than at the Descriptive level of reflection (29.1% c.f. 18.2 %, respectively) (see Table 31). For example:

I have made the *decisions* to purely ... on learning objects primarily for the challenge to learn something new myself and for the benefit of the teaching and learning (Ruth, Written Reflection 3). (Coded as: Explanatory/Deciding.)

Stating was also a common type of reflection at the Explanatory level. For example:

The push for problem based learning could be done without a lot of multimedia, however, the lecturers would like the project really interactive (Ruth, Written Reflection 3). (Coded as: Explanatory/ Stating.)

Ruth also expressed the types of reflection coded as *Reactions* as well as *Learning*. These types of reflection were found at similar frequencies. For example:

My anxiety about having to design a complex learning environment increases, and I am beginning to ... teach myself Flash and Quicktime ... I find it really difficult (Ruth, Written Reflection 1). (Coded as: Explanatory/Reactions.)

Personal and *Professional* types of reflection were relatively uncommon. *Goals* and *Self-Questioning* were also found to a low degree at the Explanatory level of reflection.

For example:

My questions that develop are can I develop this rich media in time for June or next semester, where a preliminary program is necessary? (Ruth, Written Reflection 3). (Coded as: Explanatory/Self-Questioning.)

Additionally, 41 instances of Supported reflection were found in Ruth's written reflections. Three instances referred to the need to think about other perspectives, as well as ideas she obtained from research and from her reading (*Evidence Mentioned*). Twenty-three instances were directly referenced from the literature (*Evidence Identified*).

For example:

Another interesting titbit about visuals is that visuals are more effective with audio narration where scientific explanations are needed (Kalyuga, Chandler, and Sweller 2000; Mayer, 2001) (Ruth, Written Reflection 1). (Coded as: Evidence Identified.)

Eight instances were demonstrated where Ruth expressed her reactions to the evidence (*Reactions to Evidence*). For example: “In particular, I enjoyed Brookfield’s (1995) reflective lens, and how important is it to understand others’ perspectives” (Ruth, Written Reflection 1). Seven instances supported what she had learned from the literature (*Learning from Evidence*). For example: “Incorporating some of Hartley's points, the design needs to be consistent, guided by the content and don't use too many colours” (Ruth, Written Reflection 2).

Although, Ruth presented many different perspectives on design from her reading, she did not manage to connect them together, and critique them in relation to her own perspective about design. Therefore, Ruth’s analysis of much of the information from the literature, her perspectives and the influence of the material on her practice remained unclear. She did not demonstrate dialectic reflection (defined as Contextual reflection in this study) as expected, considering her previous experience with reflection and the number of other’s viewpoints from the literature she included in her writing. Nevertheless, Ruth’s design ideas appeared to be strongly based on evidence from the literature and included learning theory.

Six themes about her professional focus became apparent on closer analysis of Ruth’s writing: professional background, professional context, methods used to build and extend professional skills, professional capability, professional learning and application to practice, and theory-based challenges. Ruth mentioned the reasons her skills were needed to help her in her role as an educational designer. For example:

The construction of units through ICTs can be time consuming for lecturers who do not have a background in the technology. Aside from this challenge,

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lecturers in [subject one] and [subject two] find they have a 50% failure rate (Ruth, Written Reflection 1.)

Much of Ruth's writing was set in her professional context, and closely connected to the learning she needed, to be able to implement multimedia design in her role. She wrote about her design and software skills, including her progress in learning about design theory, and the development of her new software skills. For example:

My background so far is in learning and teaching with an understanding of how to implement pedagogy in ICTs. My background is minimal in multimedia and [I] am slowly learning the fundamentals of HTML, Dreamweaver, Photoshop, Flash. I wish to understand good design principles and improve on my understanding of designing rich media for effective learning. (Ruth, Written Reflection 1.)

From the outset, in Written Reflection 1, Ruth mentioned her anxiety about learning new software, something she found really difficult. Technical challenges in the construction of the learning objects, and Ruth's challenges with software were mentioned frequently. For example: "My problem is that I am still finding Flash too hard and I need to have someone show me more on Dreamweaver" (Ruth, Written Reflection 4). Additionally, information about her professional role and responsibilities in relation to multimedia design was woven throughout Ruth's writing, and it was evident that she was very aware of the end users. In Written Reflection 1, she wrote about a project on which she was working as an educational designer to assist lecturers to develop materials for problem-based learning. Her worries included how she could develop units which could deliver interactive content, while adhering to pedagogical principles. Although, she had an awareness of what was needed, she wrote that she felt her starting skills in both design and multimedia were inadequate.

In the second written reflection, Ruth wrote mostly about developing content for the learning objects she was creating, and brought in evidence from the literature to support her design ideas. She mentioned challenges with her supervisor's support of the work

she was doing on a project with staff. Again her writing was directly associated with her professional role, and she demonstrated awareness of her weaknesses. She also kept the reader informed about the reasons for her decisions, which focused on her professional learning and the target users in her workplace, and she demonstrated this in Written Reflection 3. For example:

What has helped to progress my understanding is that my job is leading towards developing learning objects for the faculty and that I am interested in the concept myself. I have made the decisions purely on learning objects primarily for the challenge to learn something new myself and for the benefit of the teaching and learning in the faculty which is very traditional in its approach. (Ruth, Written Reflection 3.)

By the final written reflection Ruth's writing was rushed and disjointed. There was an emphasis on two areas: technical jargon associated with audio and images, and her progress with the software she needed to learn to support her multimedia designs. She wrote a mixture of items about the way in which content for the learning object would be arranged, also the books she had bought, and the courses she intended to take. Therefore, unsurprisingly, the fourth written reflection was found to contain predominantly Descriptive reflection, much less Explanatory reflection, and a low amount of Supported reflection.

Overall, Ruth's approach to writing from a professional perspective was very much directed towards the challenges she was experiencing with multimedia in relation to creating learning objects for her workplace. Whereas, Ruth's writing in the written reflections included a degree of Explanatory reflection and Supported reflection about the design process, the supporting statements consisted mainly of description because little in the way of explanation was provided. However, in the supporting statements there were nine citations from the literature, indicating a degree of Supported reflection.

Ruth used the framework provided for the supporting statements, and customised it with her own headings. For example, in supporting statements 2 and 3, she added several

headings: *Justify reasoning behind design decisions*; *Description of the production process including the technical issues encountered and solutions*; and *Notes about practical implications for implementation*. However, even in the section headed, *Justify reasoning behind design decisions*, the level of explanation and analysis was low. For example:

The WebPages were designed using a hierarchical site diagram that encouraged ‘chunking’ of information.... The reasons justifying this approach are as follows: Hierarchical diagrams are easier to understand and get around without getting lost in the site. Using hypermedia is probably more suitable for the advanced designer and can confuse the user. (Ruth, supporting statement 3.)

As can be seen, Ruth did not explain why hierarchical diagrams were easier to understand, nor did she say why the use of hypermedia was something an advanced designer would use, or why its use could confuse users. Headings in the media design table were changed from: *Media*; *What*; *Why* - to - *Media Type*; *How is it used?* *Judgment of its’ use from a learning or teaching perspective*; *Recommendation for improvement*. Even so, there was little explanation for why Ruth decided on the design of the learning objects and produced them in the way she did. For example: “An audio describing the water balance process would definitely enhance the learning object”, and, “Real photos of the crop roots and porosity of soil would enhance the understanding” (supporting statement 2.) These examples help to illustrate the absence of reasoning in the supporting statements.

Design and learning theory was the main focus for Ruth in the supporting statements, rather than the technical challenges posed by the software and her professional capability, topics which were described extensively in the written reflections. Similarly, Ruth included evidence to back up her writing in the supporting statements. Therefore, Supported reflection was present along with a degree of Explanatory reflection, and mainly Descriptive reflection. In comparison, in the written reflections there were twenty-three citations (c.f. nine in the supporting statements), a low degree of Explanatory reflection predominantly about her decisions, and mainly Descriptive

reflection using *Stating* and *Noticing* types of reflection. Therefore, Ruth appeared to write more academically in the written reflections as evidenced by the higher number of citations.

5.7.2 Ruth's use of the Three-Step Reflective Framework

Ruth used the Three-Step Reflective Framework for Written Reflections 1 and 3, but not the others. Ruth wrote this about her use of the framework: “right in the beginning and towards the end” and “I think it was just a time thing” (Ruth, interview). Although, Ruth said, she found the Reflective Framework good and thorough, it took her more time to use than she preferred, and she felt it was time consuming to go through all the questions. For example:

I used a bit of it and I found it was pretty long to use. I liked how it was in two sections (an area that you could actually write and that was very handy because you can look at that as an example and then you can do your own) and that you gave an example to follow. I found that really helpful. (Ruth, interview.)

As well as the headings from the framework, Ruth also inserted her own headings. For example, in Written Reflection 1, she added two headings: *The Learner* and *The lecturers*, under the Step 1 heading: *Take notice and describe the experience*. She also broke up her writing with questions which appeared to also be used as headings. For example, in Written Reflection 1, under the Step 2 heading (*Step 2: Analyses of the experience*) she added three extra headings (shown in bold, below). For example:

How much multi-media?

‘It is not the surface features of a visual that illustrate chance or motion in time over space.’(Clark and Mayer) Transformational graphics.

What does the lecturer want them to do?

Problem –based learning or authentic tasks. What is the difference?

Authentic tasks explore the ‘synergies’ that exist between the learners, task and technology and how they are engaged in an authentic learning setting.

The evaluation tool. How much evaluation is needed?

Pre development

During the evaluation

Post evaluation (Ruth, Written Reflection 1.)

Ruth said she particularly liked one heading from the framework: *What you do, feel, think, need, what decisions did you make?* She found the prompting questions good, and also the tips because they encouraged her to include diagrams and illustrations, something she would not have thought about otherwise. She said she referred to the Three-step Reflective Framework diagram frequently, and preferred this to the actual writing template.

At each step, Descriptive reflection was found more frequently than other forms of reflection. At Step 2, a higher number of units of Descriptive reflection were found, compared to Explanatory reflection and Supported reflection (see Figure 27). Instances of Explanatory reflection occurred more frequently at Step 1 than at the other steps. This finding is contrary to expectations that there would be more Descriptive reflection at this step. Supported reflection occurred at a higher rate at Step 2, and it is evident in Figure 27 that the volume of writing at Step 3 was a lot lower than at the other steps, and only at the Descriptive and Explanatory levels of reflection.

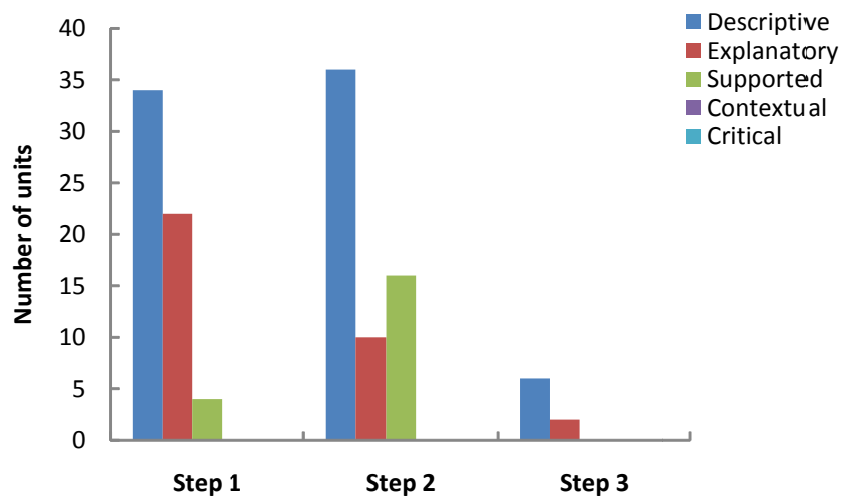


Figure 27: Ruth - Number of units of reflection at three steps of the Reflective Framework.

In contrast, the proportion (%) of reflection at the Descriptive level increased at each step, Explanatory reflection decreased, and Supported reflection increased at Step 2, surpassing Explanatory reflection (Figure 28).

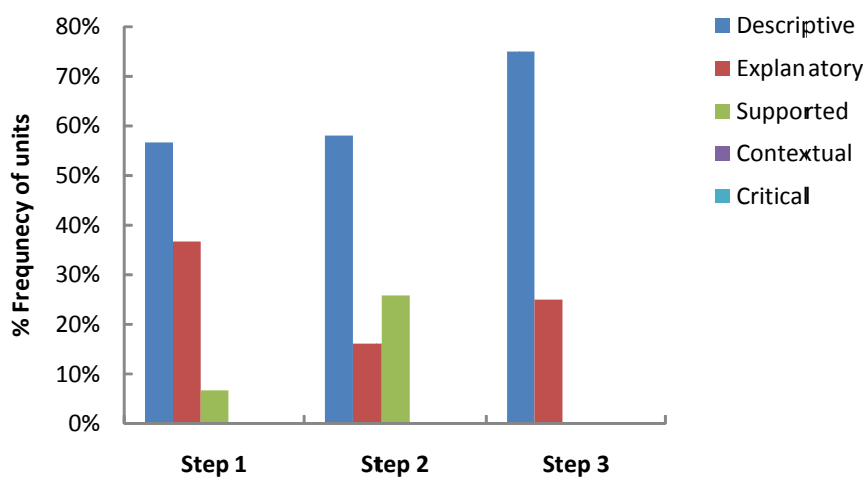


Figure 28: Ruth - Levels of reflection as % frequency at three steps of the Reflective Framework.

It was not clear if the framework influenced Ruth's reflective writing, mainly because Descriptive reflection was the predominant level of reflection across the three steps.

Also the frequency of Descriptive reflection at Step 2, and the frequency of Explanatory reflection at Step 1, was contrary to expectations.

Ruth's preference for her own method of reflective writing, and the changes she made to the headings, may have influenced her use of the framework, hence the results which were contrary to expectations. Ruth's views about reflection and her experiences with reflective writing in the subject, and her intentions in the future are described in the next section.

5.7.3 Reflective writing – Ruth's views and experiences, and future use

Ruth was an advocate for reflective writing, and it had helped her personally and professionally in the past. For example: "I found the reflective practice, especially backing it up with theory can open things up a bit" (Ruth, interview). In previous reflective writing, which Ruth had done for a course of study, she had written about difficult working relationships by using story, analogy and humour, and found it enabled her to write freely. Ruth did not keep a professional journal for reflective practice at the time she was studying the subject because she worked in a very collaborative environment and tended to discuss her ideas with colleagues. Also, she thought journals were time consuming, and her thoughts came quicker than her ability to write things down. Part of this related to getting access to write on a computer, which she said was often not quick or easy enough for her. However, she wanted to do more reflective writing, professionally, and particularly when working on projects.

Ruth tended to use reflection more for "academic key learning areas", that is, "to show that you have done so much in teaching and learning and so much in management and so much in professional development", rather than for critical incidents because she felt it was not relevant in her job (Ruth, interview). Even so, Ruth described a specific approach she believed was important when writing reflectively.

For example:

Focus on the experience when you are writing. Focus on a Critical incident, take stock of what you have learnt about that incident, through to what development should I do to move on (Ruth, interview).

Ruth found that overall the reflective process helped her with designing the learning objects. She found the feedback from the subject lecturer assisted her to clarify her ideas in the reflections. The reflective techniques used in the subject enabled her to write about critical incidents during the design process, and to discuss feelings and thoughts related to them. In this respect, Ruth felt the Reflective Framework was helpful. When writing her reflections for the multimedia design subject, Ruth used both the Reflective Framework and “Brookfield’s reflective lens”, a method she had previously used, which entailed a process of reflection from four different perspectives (Ruth, Written Reflection 1). Ruth believed the Reflective Framework could be scaled down to make it quicker to use for reflective writing. She thought it would be helpful for individuals who were inexperienced in using reflection in their practice. For example:

I guess it was good for people who have never used the reflective practice before. I think it is a good guideline and yeah, there is enough detail for people to pick out what they want to use from it, that’s very good (Ruth, interview).

Ruth did not intend to use the Reflective Framework to help her to develop her reflective practice, for example, for a professional portfolio. The requirements for performance review were “black and white” and output oriented (Ruth, interview). Also, her managers would think reflection was “a lot of waffle” as they worked in a scientific framework of research-based practice, and also “I am more looking at ticking the boxes right now” (Ruth, interview). Ruth also felt she only had time to complete competency requirements. As a result of her previous experience with using reflection, Ruth said she did not feel that she needed to know any more about reflective techniques

if she was going to use more reflection professionally, as she felt she had a good grounding in it, and felt “pretty comfortable doing it” (Ruth, interview). In the future, Ruth did not intend to use the Three-Step Reflective Framework for reflective writing as she preferred other methods.

5.7.4 Summary of key findings for Ruth

Although, Ruth had previously used reflective writing, two-thirds of her writing was at the Descriptive level of reflection, and over the course of preparing the four written reflections, she wrote increasingly at the Descriptive level of reflection. Ruth exhibited a relatively high level of Supported reflection, overall, particularly in comparison to Explanatory reflection. Although, Ruth presented multiple perspectives, she did not integrate the ideas with her perspectives, which would have taken her writing to a Contextual level of reflection. Nor did Ruth demonstrate Critical reflection in her writing.

Stating and *Noticing* types of reflection were the most prevalent types of reflection at the Descriptive level, and *Deciding* and *Stating* were most common at the Explanatory level. *Self-Questioning* was present at both levels of reflection. However, *Goals* occurred only at the Explanatory level. The professional focus for Ruth related to her experiences with learning new software, and the challenges she was encountering with multimedia. She wrote predominantly in her professional context, and was mindful of the end users of the learning objects but not deeply focused on them. Content and media for the learning objects was her primary concern. Descriptive reflection was also foremost in the supporting statements, and there was a degree of Explanatory reflection and Supported reflection.

Ruth used the Reflective Framework for two of the written reflection assignments. More Descriptive reflection was found, overall, and also at Step 2 in comparison to Step 1, and more Explanatory reflection was apparent at Step 1, which was opposite to expected results. Ruth regarded the Reflective Framework as too long with too many prompting questions, and time was a factor which prevented her using it each time she

prepared a written reflection. Although, Ruth intended to engage in more professional reflective writing when taking part in projects, she did not feel the need to use reflection in other areas of her practice, or to use the Three-Step Reflective Framework. She preferred to use her own techniques for reflection.

Contrary to expectations that previous experience of reflection would assist Ruth in preparing the written reflections, this did not appear to inform her use of reflective writing in the multimedia design subject. Overall, in the written reflections and supporting statements, Ruth wrote predominantly at the lowest level of reflection, that is, Descriptive.

5.8 Introduction to the participant – Nabil

Nabil had experience working as a teaching assistant in a university, and three years of experience as a teacher at primary school level. His subject areas were science and mathematics. He was taking the multimedia design subject to extend his teaching abilities in the use of instructional design and technology, and as part of a master's degree. Nabil stated in the survey that he was not experienced in using reflective writing as a professional strategy. Conversely, in the interview, Nabil mentioned that he had used reflection in one of his other post-graduate subjects where he was required to keep a journal. He expressed his thoughts about reflection as, "It's a great step to reflect what you have done, especially to achieve the essential aim, for example, improve your work" (Nabil, survey). When he approached new learning, Nabil believed that getting actual experience was helpful, as was reading a range of books and accessing others' experiences. Nabil found that accessing references was useful for his learning as well. Reflective techniques were not included in the approaches Nabil preferred to use when learning something new. Although, Nabil had practiced journaling for a brief period of time previously, he felt the practice of reflective writing was relatively new to him when he entered the multimedia design subject.

5.8.1 Nature of reflective writing and professional focus for Nabil

Descriptive and Explanatory levels of reflection were evenly distributed across Nabil's written reflections (see Table 32). A small proportion of Supported reflection was evident in three reflections, and although, he mentioned what he was reading, he did not include citations. Contextual reflection and Critical reflection was absent from his writing. The frequency of Descriptive reflection changed very little in Written Reflections 1 to 3, and increased in the last assignment. Noticeably, Supported reflection was considerably higher in Written Reflection 2 compared to the other assignments. (See Table 32.)

Table 32: Nabil - Levels of reflective writing in four written reflections (R1 to R4).

Level of reflection	Overall	R1	R2	R3	R4
Descriptive	45.2%	44%	43%	44%	54%
Explanatory	47.1%	51%	35%	51%	46%
Supported	7.7%	5%	22%	4%	0%
Contextual	0.0%	0%	0%	0%	0%
Critical	0.0%	0%	0%	0%	0%
Total	100%	100%	100%	100%	100%

At the Descriptive level, Nabil demonstrated primarily, *Noticing* and *Stating* types of reflection, and a quarter of his writing was coded as *Deciding* (see Table 33). Nabil described his experiences with some awareness, and expressed his feelings about the challenges he encountered when designing and creating learning objects. For example:

The greatest challenge in creating this learning object was in using more than one software such as PowerPoint presentation and Macromedia Flash Player, and the second challenge was in writing sentences with simple words to help students and public audiences understanding the main concept of the

appeared to be in explaining the reasons for his decisions. Nabil's decisions related to the learning objects, the end users, and his profession, and at the Explanatory level of reflection Nabil seemed to be focused on writing about his decisions relating to issues he encountered in his practice. Nabil also exhibited a fifth of his writing as *Personal* and *Professional* reflection. He mentioned *Learning* to a low degree. Again, Nabil did not practice *Self-Questioning*, and Goals were found to a low degree. He also wrote infrequently about his reactions to the design process, and this type of reflection was coded as *Reactions* (Table 33). Additionally, twelve instances of Supported reflection were found in his writing. At this level, Nabil mentioned the subject readings and what he was reading (*Evidence Mentioned*), and also what he learned from the readings (*Learning from Evidence*). For example:

Based on my reading and what I have learned, instructional design may help students to engage their thinking which leads them to construct knowledge and enhance understanding (Nabil, Written Reflection 2). (Coded as: Supported/Learning from evidence.)

No direct references were made to evidence (*Evidence Identified*). Therefore, Nabil did not follow the instructions in the Subject Outline (University of Wollongong, 2007, Appendix 3) to include references from the literature.

A feature of Nabil's professional focus was his attention to the needs of potential users of the learning objects. Themes which also emerged in his writing included his teaching philosophy, role, and his aspirations and learning preferences. His writing portrayed enthusiasm and a positive approach regarding the designs. Nabil wrote about the challenges involved when designing and creating learning objects, with regard to his skills, the content, and the users. For example:

... improve my skills of using pictures and animations to drive learner's attention with an appropriate way. Also, I will try to avoid unnecessary graphics in the learning object. In addition, I will try to promote my skills in word-processing of the learning object. (Nabil, Written Reflection 3.)

When Nabil described how the learning objects he was designing would benefit the end users, he mentioned the usefulness of the resources for his teaching. Nabil's pride in his involvement in the teaching profession was expressed in his written reflections. For example, approximately half of his first reflection described his professional background. He outlined his reasons for entering teaching, and the approach he had taken to improve his practice. For example:

This level of education requires a lot of skills and particular deal with students to make the subject easy and flexible. Therefore, I decided to promote my skills of teaching and select the perfect way to teach students. Firstly, I asked experienced teachers who have experience in teaching field and have a lot of effective skills of their teaching. (Nabil, Written Reflection 1.)

From the start, Nabil referred to the use of technology in his professional role as a teacher and wrote: "I thought this technology will help me to improve my teaching in the classroom and help students to understand the subject" (Nabil, Written Reflection 1). Nabil described his reasons for taking the multimedia design subject. For example:

Based on the above, I believe that technology is very important in the classroom to improve teaching work and help students to understand in the classroom, so I am currently doing master's degree of information technology in education (Nabil, Written Reflection 1). (Coded as: Explanatory/Personal.)

Overall, Nabil demonstrated his awareness of what was needed for his students, and he mentioned them frequently in his written reflections. Additionally, Nabil wrote about four other professional areas: his teaching experiences, his skills in teaching, the use of technology for teaching and learning, and his skills in multimedia. He intended to explore the literature to find design ideas which "improve[s] my teaching and enhances students' understanding (Nabil, Written Reflection 2). He found it challenging to select "proper pictures, text and animations" to create the first learning object, and to write information for students which was simple enough to assist their understanding (Nabil,

Written Reflection 3). Nabil wrote about the specific professional skills he needed to develop. For example:

After I received the feedback for the first learning object, I will try to improve my skills for how to use pictures and animations. Based on the above, I probably will use Flash or Photoshop for the next learning object to see how my skills improved in using pictures and word-processing. (Nabil, Written Reflection 3.)

This example illustrates that Nabil felt he learned something from the feedback he received from the lecturer. He did not explain specifically what he learned in any depth, but it appeared to have influenced the direction he decided to take. The way in which Nabil demonstrated what he was learning professionally was often related to the reading he was doing in the multimedia design subject. However, as none of his writing was referenced, he could have been expressing his opinions based on his previous experiences prior to taking the subject. For example:

Moreover, instructional design may increase interactive capabilities in the classroom such as increasing the interaction between students and the instructional content, increasing the interaction between students and the teacher or the instructor, and increasing the interaction among students themselves (Nabil, Written Reflection 2).

Sometimes, as in the following example, Nabil explicitly stated what he learned during the process of designing the learning objects.

Because of using PowerPoint presentation and Macromedia Flash Player, I indeed felt that my skills were improved in Graphics software. For example, I have learned how to use images and text in specific subject to draw student's attention as well as attract them to the subject. In addition, I have learned how to use animations in correct way to avoid distracting for the learner. (Nabil, Written Reflection 4.)

This piece consolidated his writing from an earlier reflection, in which he had referred to what he needed to learn based on his professional role and professional development. For example:

I thought this form of presentation will help students to understand the contents of the subject as well as enhance my skills of Graphics software and promote my skills in teaching (Nabil, Written Reflection 3).

Additionally, Nabil wrote about the dilemma caused by his professional aspirations to be skilled in the use of multimedia for the classroom, and he did this over several reflections. Hence, Nabil demonstrated the ability to make connections between his practice experiences. Overall, Nabil wrote about his learning and expressed strong beliefs about the use of technology for teaching and learning.

In contrast, the approach in the supporting statements was principally Descriptive reflection with a low degree of Explanatory reflection. Nabil used the framework provided, and also added some headings. For example, sections titled *Goal and objective* and *Implication of this learning object* were added into the section headed by: *Learning context and purpose*. However, the reasons for choosing particular media were not explained, instead he wrote statements, such as “This picture is presented to directly drive the student's attention to the main concept of learning object” (Nabil, supporting statement 1).

Again (as in the written reflections), Nabil did not appear to follow the guidelines provided by the subject lecturer, to prepare a supporting statement that reflected on the learning object, and why it was designed in a particular way. One of the criteria for the supporting statements was to provide the reasons for design decisions. This lack of explanation for his actions is further illustrated by the manner, in which, he wrote about the challenges he encountered when designing and creating the learning objects; he did this descriptively without providing justification. For example:

... the greatest challenge in creating this learning object was in using video and audio including images and text via [the] RealPlayer program. Most images

were drawn from different websites in the Internet. Furthermore, the second challenge was in writing sentences with simple words to help students' understanding of the main concept of the learning object. (Nabil, supporting statement 3.)

Nabil did not cite or mention literature in the supporting statements, and therefore, no Supported reflection was demonstrated. Consequently, Nabil's writing in the supporting statements was predominantly at the Descriptive level of reflection with a low degree of Explanatory reflection apparent. This differed to the written reflections where both Descriptive reflection and Explanatory reflection were found at similar rates, with a degree of Supported reflection.

5.8.2 Nabil's use of the Three-Step Reflective Framework

Nabil did not use the Three-Step Reflective Framework in any of his reflection assignments. Therefore, it was not possible to determine how Nabil reflected at each of the three steps. However, in the interview, he said, he found the framework useful and used it to help him structure his writing. Nabil felt that the steps of description and analysis helped him to make connections between his reflections and his designs. Although, the prompting questions helped him to decide on a suitable design and provided him with an opportunity to express his feelings and decisions, it was not evident that he used the tips. For example, he did not set goals as suggested in the tips for Step 3, nor were diagrams or illustrations used. Therefore, it was not possible to determine whether the Reflective Framework influenced Nabil's writing. In the next section, Nabil's views about reflection and his experiences with reflective writing in the multimedia design subject are described, along with his intentions in the future.

5.8.3 Reflective writing – Nabil's views and experiences, and future use

Professionally, Nabil had only used reflection in the form of discussions with colleagues, and therefore, he was not an experienced reflective writer. He found the reflection process helped him to improve the design work he was doing. For example:

“I feel happy because my design, the second design was improved. So it was helpful and useful.” (Nabil, interview.) At first in the multimedia design subject, Nabil found writing the reflections very difficult, but it became easier the more he wrote and practiced. He also believed reflection was important not only for himself but also for his students. Nabil believed the feedback from Penny was useful. For example:

reflection, ... let[s] me write what I have learned and what I feel regarding my learning object, for example, and what I have to do in the future with the next learning object ... it was important to improve my work (Nabil, interview).

He also believed that the reflective process helped him to prepare the supporting statements. Nabil said he intended to use the Reflective Framework in his workplace, in the future, to help both students and teachers he worked with to reflect on their practice. He saw reflection as a new form of literacy for his profession. For example:

... when I go to X and finish my degree, accomplish the degree, I will come back and try to use this new form of literacy. Like use reflection for the students and for the teachers as well to improve our knowledge. (Nabil, interview.)

Nabil said he believed that collaborative reflection would be useful as well. He was also intending to keep a reflective professional portfolio, in the future. Another interesting comment Nabil made in the interview was that he felt reflective writing became easier and more intuitive with practice. Although, Nabil did not use the Reflective Framework for writing his reflections, he indicated in the interview that he planned to use the framework to develop the professional portfolio.

5.8.4 Summary of key findings for Nabil

Explanatory and Descriptive levels of reflection were most commonly found in Nabil’s written reflections, with a degree of Supported reflection. Contextual reflection and Critical reflection were not evident. *Noticing*, *Stating*, and *Deciding* were most common types of reflection at the Descriptive level, with *Deciding*, *Personal*, and *Professional* reflection most prevalent at the Explanatory level of reflection. He wrote

little about, either what he had learned, or his *Goals*, and *Self-Questioning* was not practiced. Nabil's professional focus was on the benefits of interactive learning objects for teaching and learning, and he placed emphasis on end users. His instructional design skills and technology skills were also important factors for him, professionally. The supporting statement assignments primarily demonstrated Descriptive reflection. Nabil did not demonstrate use of the Three-Step reflective Framework; however, he said in the interview he used the framework, and intended to use it professionally to develop a portfolio. Since practicing reflective writing for the multimedia design subject, Nabil was enthusiastic about using reflection as a learning strategy for both himself and his students.

5.9 Summary

Overall, the individual case studies demonstrate a wide range of ability in reflective writing, and diversity in the approaches taken by participants. Although, Critical reflection was the highest level of reflection reached by participants, this occurred at a low frequency, and was demonstrated by only two participants. Descriptive reflection and Explanatory reflection was most common. Supported reflection where literature was cited was not found in all participants' reflections, indicating a degree of inexperience with academic writing. All the participants demonstrated they had the ability to reflect on their practice, and were able to articulate their professional learning. These aspects are discussed in depth in the next chapter.

6 CHAPTER SIX: DISCUSSION AND CONCLUSIONS

6.1 Introduction

In this chapter, the outcomes from this research study are discussed in light of the wider body of research on reflection, professional learning and reflective practice. The implications for practice and areas for further research are included, and the chapter ends with a summary of the discussion and concluding remarks. Three research questions are discussed:

1. How do educational practitioners reflect when writing about their experiences?
2. What do educational practitioners focus on when writing reflectively about their learning and practice?
3. How does scaffolding support reflection on professional learning and practice?

Each participant in this study demonstrated a unique approach to reflective practice while engaged in the multimedia design subject. Scaffolding was provided in the form of the Three-Step Reflective Framework, which guided participants to reflect on their experiences in a specific manner, and assisted them to record and critique their thoughts, feelings, decisions, learning and actions. Each participant underwent an individual process using reflection on their practice, and what is regarded as reflection-for-action (Reid, 2004), because they were encouraged to describe what they learned and to set goals for their practice during the subject. The intention was to assist them to develop skills for reflective writing, and future reflective practice in their professional areas. The writing which participants produced indicates that previous experience with reflection and journaling did not appear to influence the reflective learning process in the subject. All participants demonstrated that they achieved some level of reflective learning during the course of study.

In this study, the term ‘effective reflection’ was used to describe a process of reflection leading to reflective practice. Therefore, reflective practice occurred when professionals engaged in making decisions for action, and demonstrated reflective learning which generated changes to their immediate and future practice during the subject. The definition of reflective practice developed in this study did not include critical reflection whereby professionals critiqued their practice in light of historical and socio-political contexts or social justice issues, and differed in this regard to the work of some other researchers such as Fook and Gardner (2007). The dimensions of reflective practice considered for this study are discussed at length in Section 2.6. Instead, professional learning was regarded as an important component of reflective practice in this research study, and involved reflective processes which led to learning with relevance for professional practice. The next three sections contain the discussion of the outcomes of the research under each research question.

6.2 How do educational practitioners reflect when writing about their experiences? (Research question 1.)

Five levels of reflection (Descriptive, Explanatory, Supported, Contextual and Critical) in participants’ written reflections signified their engagement in a reflective process about practice. Further evidence came from their focus on writing about their capability, learning and practice.

6.2.1 Patterns of reflection

The high frequency of Descriptive reflection and Explanatory reflection most commonly exhibited by participants in their writing, fits with others’ findings that lower levels of reflection are easier to achieve (e.g., Hatton & Smith, 1995; McCollum, 2002). A process known as “deliberate learning” also appeared to be present, and was probably demonstrated through the reflections when participants wrote about what they needed to learn (Boud et al., 1985, p. 18). Their learning involved reaching their primary goal of designing and creating learning objects for the multimedia design subject. The

sequence in participants' writing, at the Descriptive and Explanatory levels of reflection, had similarities to the reflective process described in Boud et al.'s (1985) model: revisiting experiences, describing them, thinking about what happened, deconstructing the events or situation, and evaluating what happened and what they were doing. This process of reflection is claimed to lead to learning, and is described as an "intellectual and affective activity in which individuals engage to explore their experiences" (Boud et al., 1985, p. 19). When practitioners engage in their experiences in this manner, this is claimed to lead to the synthesis of new knowledge and insights into practice, and is the reflective process underpinning the term 'effective reflection' used in this study (Boud et al., 1985). Therefore, it appears that the participants were most likely engaged in an effective process of reflecting.

In this study, the first level of reflective writing, defined as Descriptive reflection, was expected to be a descriptive account of the experience requiring an element of 'looking back' or reflecting about the experience. Description when prompted at Step 1 of the Reflective Framework was regarded as the beginning of the reflective process. However, the high frequency of writing at the Descriptive level, which was measured as *Stating* because it indicated what occurred without providing rationale, decisions, or emotional responses, may indicate that this type of writing was actually non-reflective, and could be defined as descriptive writing, similar to that reported by Hatton and Smith (1995). According to these researchers, descriptive writing does not contain reflection about the experience because it refers to "description of events that [occur]" or involves a "report of literature" with "no attempt to provide reasons/justification for events" (Hatton & Smith, 1995, p. 48). According to their definition, reflective writing does not occur until the next phase, defined as descriptive reflection, when "justification for events or actions" accompanies the description, and this is defined as Explanatory reflection in this study (Hatton & Smith, 1995, p. 48). Therefore, it could be argued that actual reflective writing in this study was only present at the Descriptive level when participants exhibited writing categorised as *Noticing*, *Deciding*, *Self-Questioning* or *Goals* because this type of writing required engagement in the reflective process. This differentiation between descriptive writing and descriptive reflection was not made

during the analysis phase. However, the likelihood that the presence of writing coded as *Stating* was an indication of descriptive writing as opposed to descriptive reflection was considered during the interpretation phase of examining the data. Awareness of this issue and this type of writing needs to be considered in further investigations of reflective writing. Consequently, adjustment to the Levels of Reflection taxonomy may be required.

6.2.2 Writing for new understanding

When participants in the research recorded their practice experiences in written form, they were not only preparing the experience for review, they were also creating a permanent record, which is considered useful in case further enquiry is needed (Boud & Walker, 1998). The act of recalling their experiences may have assisted them to notice the event more clearly and acknowledge their feelings at the time, and subsequently realise, as maintained by Boud et al. (1985), “what responses prompted [them] to act” (p. 27). Recounting their experiences may also have raised awareness about the reasons particular actions were chosen or why they reacted in a particular way, and as such are claimed to be an important part of the reflective process (Boud et al., 1985). Noticing, according to Mason (2002), is not only regarded as “learning from experience” which “informs future practice” (p. 29), it is also referred to as “something that happens to us” (p. 30), and meaning practitioners may not notice an event unless it has direct relevance to them. However, the act of noticing is not guaranteed even when a conscious attempt is made to do this because noticing requires effort and this requires discipline (Mason, 2002). This view is also supported by Tremmel (1993) who successfully guided students to pay attention to their practice experiences by writing about them.

It appears that participants did make an effort to engage in the act of noticing because at the Descriptive level of reflection *Noticing* was the second most common type of reflection. Although, it was not possible to accurately estimate exactly how participants were specifically “attending to feelings”, as described by Boud et al. (1985, p. 29), suffice to say, based on the frequency of the *Noticing* type of reflection in each

participant's reflections, they were doing this to some extent. Boud et al. (1985) believe that this phase is necessary before practitioners can gain insights and move on to a new level of reflection. Considering all participants also wrote prolifically at the next level of reflection (Explanatory) this appears to have occurred. The analysis and justification of their experiences in the reflections, which frequently led to decisions for action or learning is similar to the "re-evaluating experience" phase of reflection (described by Boud et al., 1985, p. 29) which may result in new theoretical knowledge. This process has similarities to the definition of reflective practice in this study where professional learning and decisions for acting in practice are an outcome of effective reflection.

Another term for the re-evaluating phase of reflection has been described by Schon (1983) as putting another frame around the experience, in other words, re-framing. This process was not only measured as Explanatory reflection in this study but also as Supported reflection. Therefore, at these two levels, participants analysed their experiences and developed new understandings. They did this through an examination and justification of their feelings, actions and the existing knowledge they held, and by forming new perspectives. The frequency of Supported reflection, although relatively low in comparison to the Descriptive and Explanatory levels of reflection, indicated that participants were to some extent weaving theoretical concepts and others' perspectives into their writing. This process was also regarded as 'stepping back' from the experience where judgments about the experience were made, and explanations were sought through a process of analysis of different perspectives (this was labeled as Supported reflection in this study, and dialogic reflection by other researchers, such as Hatton and Smith, 1995). During dialogic reflection, connections are claimed to be made by professionals between practical aspects of the experience, their personal perspectives, and the theoretical underpinnings of their knowledge (Hatton & Smith, 1995). Participants in this research did not commonly demonstrate this skill in their reflections at the Supported level, nor did they display an in-depth understanding of theory, either from their view or from alternative views.

Overall, in participants' writing there was little reflective activity measured (using the Levels of Reflection taxonomy) beyond the Supported level of reflection, apart from a low degree of Critical reflection where the application of knowledge was mentioned, and a description of how practice might change as a result of social or political influences in a specific context. The application of knowledge used in the definition of critical reflection in this study is associated with the changes a practitioner may make to practice. This finding is partly congruent with the belief by Fook and Gardner (2007) that critical reflection is an examination of the cultural, historical, social and political aspects of an experience or incident, and the power relationships therein. However, power relationships were not addressed in the critical reflection demonstrated by participants in this research. Critical reflection is also described by Fisher (2003) as the capacity to identify and articulate assumptions in socio-cultural contexts, and "imagine other possibilities" (p. 317). The indicators in Fisher's (2003) framework, and components of Fook and Gardner's (2007) definition, are similar to the explanation of critical reflection in this study.

Engagement in critical reflection is considered a necessary process for reflective practice, as it leads to changes in professional practice as a result of a 'shake up' of assumptions which practitioners carry, as well as altered belief structures and "changed awareness" (Fook & Gardner, 2007, p. 16). Critical reflection is claimed to be difficult to achieve (e.g., Harford & MacRuaric, 2008; Hatton & Smith, 1995; Minott, 2008; Moon, 2006), and this was shown to be the case in this study. Also, no one perspective or definition of critical reflection is apparent in the literature and differing views exist. Although, critical reflection is regarded as necessary and integral to transformative learning and reflective practice (Brookfield, 2000; Fook & Gardner, 2007; Mezirow, 2000), transformative learning is not necessarily an outcome of critical reflection unless a practitioner's assumptions change as a result of the critical process (Brookfield, 2000).

It is possible that critical reflection (when defined as a change to assumptions and beliefs about using reflection for practice – see Fisher, 2003) manifested as an outcome of using the Reflective Framework, and not when they were using the framework.

Participants were encouraged to critique the Reflective Framework during their interviews, and were asked about its usefulness in supporting reflection, and reflective practice. Certainly, in this study all the participants changed their views about using reflection and reflective writing for learning, and this appears to have occurred as a result of using the framework for preparing written reflections. Therefore, it appears that the participants changed their perceptions about using reflection for professional learning and practice by the end of the subject, and the majority intended to continue using the framework to support their reflective practice.

It was apparent from the literature that more advanced writing skills and reflective dispositions are needed for practitioners to write at a deeper level of reflection, and in a more advanced manner such as that required for dialectic and critical reflection (named as Supported reflection, Contextual reflection and Critical reflection, in this study) (Hatton & Smith, 1995; Rodgers, 2000a). These aspects are discussed in the next section.

6.2.3 Indicators of reflective ability

The way in which participants connected with their professional learning and practice, used self-questioning techniques, expressed emotion and feelings, and critiqued others' perspectives in their reflective writing were found to be important indicators of the ability to practice reflection.

6.2.3.1 Professional learning and reflective practice as indicators

The results suggest that the ability of participants to engage in professional learning for reflective practice were important indicators of an ability to reflect, and this contributed to the quality of their reflective writing. Practice in this study included experiences and learning associated with practice in the subject and also in the workplace. This view supports practice as an embodiment of the whole person, or practitioner, which cannot be separated because "dispositions, motives, feelings and ideas of themselves" make up practice (Boud, 2010, p. 29). The educational context in which participants' practiced

was varied, with teachers, educational designers, and educational technologists and developers taking part in the study. Consequently, each participant brought unique personal and professional perspectives to the experiences they reflected on, as they designed and developed learning objects in the multimedia design subject.

Professional learning was signified by the manner in which participants wrote about what they had learned, although, the extent to which they did this varied. Nevertheless, the act of reflecting was in itself believed to be a process which led to learning (Boud et al, 1985; McAlpine & Weston, 2000; Moon, 2004). Engagement in reflection as expressed in their reflective writing was evident for all participants. Therefore, based on evidence that reflection leads to learning (Boud & Walker, 1998; Boud et al., 1985; Moon, 1999, 2001), it was concluded that reflective learning was leveraged through the preparation of the written reflections, supported by the Reflective Framework.

Evidence of metacognition provided further evidence for reflective learning associated with professional learning. Also, evidence that metacognition during the reflective writing process occurred was demonstrated through self-questioning, goal-setting and their descriptions of learning. The use of self-questioning, as previously mentioned, is a strategy commonly used for metacognitive regulation, and is known to be an important component of reflection and learning (Livingston, 1997; McAlpine & Weston, 2000). Awareness of the learning process is one dimension of metacognition, and is demonstrated by planning learning activities and setting cognitive goals, monitoring understanding, and evaluating achievement of learning goals (Livingston, 1997).

When participants reflected on what they knew by using self-questioning, in effect, they were demonstrating self-evaluation of their learning goals (Livingston, 1997). Although, not all participants wrote questions to themselves in their written reflections, they all indicated in the interviews that they used the prompting questions in the framework to aid their reflective writing. Therefore, self-questioning was a technique, supported by the framework, that all the participants used even when the presence of questions was not found in their writing. Using higher level reflective techniques such as monitoring is not considered to come easily to practitioners, because lower level

cognitive processes are less challenging to engage in, when learning (Graham & Phelps, 2003). Therefore, the ability to set realistic learning goals, regarded as an essential part of the metacognitive reflective process, is not necessarily a skill which practitioners' commonly demonstrate (Graham & Phelps, 2003). The presence of written goals in the participants' reflection assignments, use of the framework prompting questions and descriptions about their learning can be considered as evidence that a metacognitive process was used by all the participants when reflecting about their practice in the subject.

Consistent with a metacognitive approach, participants wrote in a way which demonstrated they were thinking ahead, and had awareness of the directions they needed to take. Their decisions were based on their awareness of their existing skills and knowledge about designing learning objects, as well as what they did not know and needed to learn, and therefore, they appeared to have the ability to evaluate and control their learning (Livingston, 1997). Participants more commonly wrote about their decision-making processes, than their specific goals and future actions. Some participants were particularly adept at setting their learning goals, and integrated self-questioning into their writing about decisions and goals as part of self-evaluation. By the end of the subject, some participants were exhibiting reflective capability at a metacognitive level. The dimensions of metacognition, as demonstrated by participants in this research, are regarded as an important component of learning (Hartman, 2001; Schraw, 1998; Wilson, 1999), and are believed to be integral to developing skills for reflective practice (Ward & Cotter, 2004).

The extent to which decisions were made and the goals participants set for themselves was also examined. This was considered necessary as “processes of monitoring and decision-making” are regarded as “essential for building knowledge” and as a metacognitive course of action associated with reflection (McAlpine & Weston, 2000, p. 62). Additionally, some participants were monitoring their actions through critiquing the skills they possessed, and linking this to the decisions they were writing about. Participants were engaging in professional learning and also reflective practice because

they were writing about and critiquing their stages of learning and capability in the subject. Therefore, processes, such as the way in which participants monitored their learning and practice, and wrote from a professional practice perspective, also indicated they were reflecting about practice in their writing.

The reflective process appeared to be stimulated by the need to know more about the theory of multimedia design, and the aspects of practice associated with designing and creating learning objects. In their writing, participants expressed some uncertainty about their knowledge in the subject, and expressed a need to understand more fully the topics they were learning about, and also a desire to change and improve their practice. This type of stimuli which tend to cause a degree of discomfort are considered necessary to foster reflective processes that lead to practitioners learning about practice (Boud et al., 1985; Boyd & Fayles, 1983; Dewey, 1933).

Therefore, evidence of professional learning and reflective practice was an important indicator of reflective capability as expressed in participants' reflective writing. This was demonstrated by their engagement in effective reflective processes, such as monitoring, self-questioning, and decision-making about learning, all of which are linked to metacognition.

6.2.3.2 Self-Questioning

Several researchers have shown that the use of self-questioning encourages reflection on practice (Borrell-Carrió & Epstein, 2004; Lemon, 2007; Samuels & Betts, 2007). The use of self-questioning as a reflective technique was another indication of reflection manifesting in participants' writing. Self-questioning was a relatively rare occurrence in the writing exhibited by the group, nevertheless, all the participants admitted in the interview that they used the prompting questions in the framework. The use of such a questioning technique is claimed to have the potential to lead to changes in practice (Boud & Walker, 1990), and is another indicator that participants were likely to be engaging in reflective practice. Self-questioning is regarded as an important part of a practitioner's skill set, enhancing their ability to learn from experience, and enabling

them to act (Boud & Walker, 1990). The use of this technique is claimed to enable fresh perceptions about practice to be uncovered through a form of dialogue with oneself; an approach which is conducted by conversing, through writing, about one's ideas and thoughts, and others' views (Stevens & Cooper, 2009). This is similar to the approach taken by participants in this study.

The creation of questions (regarded as self-questioning in this study) exhibited by some participants in the study was unexpected, and possibly occurred due to the structure of the Reflective Framework, which contained guiding questions. Participants were not asked in the interview about their reasons for using the self-questioning technique in their writing, and how the framework influenced this. Even so, self-questioning is regarded as a necessary component of reflective practice because it is claimed to stimulate emotional engagement with practice experiences (Boud & Walker, 1991). Although, self-questioning is known to stimulate the reflective process, and is regarded as a form of dialogue with oneself, it is not regarded as effective as professional dialogue between colleagues, particularly when a person is inexperienced in their knowledge (Teekman, 2000). Although, the subject lecturer, in this research, engaged in oral dialogue with the students, and they engaged in dialogue with each other, this was not analysed in this study. Instead, the written feedback which Penny provided on participants' reflection assignments was investigated for its effect on the reflective process. However, the effects of this written dialogue between Penny and the participants, and the connection with self-questioning were not investigated in this study. It is possible, if the two strategies of self-questioning and dialogue are combined that the outcome may be very valuable, and this is supported by a number of researchers (e.g., Alger, 2006; Hume, 2009; Macdonald & Hills, 2005; McDrury & Alterio, 2002). Hence, this is an area for further research.

Therefore, it could be useful to deliberately stimulate self-questioning as part of a structured process similar to that used by Fisher (2003), rather than leave it to chance, and this is an area requiring further research. Questioning, as a technique, has previously been used by several researchers to deepen reflection (e.g., Borrell-Carrió &

Epstein, 2004; Hume, 2009; Lemon, 2007; Samuels & Betts, 2007). In some cases, it took the form of structured questions (Hume, 2009; Samuels & Betts, 2007), and in other situations practitioners were encouraged to generate their own reflective thinking questions (Borrell-Carrió & Epstein, 2004; Lemon, 2007). A study, to investigate these aspects of questioning, and the link to emotional engagement and critical reflection, would be a helpful contribution to the body of knowledge about reflection. The ways in which emotional engagement impacts on reflection is discussed next.

6.2.3.3 Emotion and feelings in reflection

In this study, emotional engagement in the reflective process was expected as evidence of reflective practice. It has been shown that if emotional responses are leveraged during the reflective process, new perspectives can be articulated, and the scope of professional learning and practice is extended (Donaghy & Morss, 2007). As already established, the use of questioning techniques can stimulate an emotional response and deepening of reflection (Donaghy & Morss, 2007; Fisher, 2003; Teekman, 2000). To be able to write in an emotional way, Taylor (2006) proposes that practitioners need to have insight and the capacity to reflect. Even so, the expression of feelings may not come naturally, and may require guidance if insights about experience are to be developed (Boud et al., 1985). All participants demonstrated some form of emotional expression in their writing, at the Descriptive, Explanatory and Supported levels of reflection (e.g., *Noticing*, *Reactions*, and *Reactions to Evidence* – types of reflection). Therefore, participants in this study who demonstrated these types of reflection appeared to have some capacity for reflecting.

However, opinion is divided about the need to harness emotion during the reflective process. For example, Teekman (2000) claims that in general, basic cognition and reflection (thinking and making sense) which is absent of emotional engagement, does not lead to changes in practice because of the lack of deep reflection. However, she does believe practitioners who reflect, regardless of how they do it, are more likely to monitor their performance and become more aware of their knowledge (metacognition), and as previously established this is associated with learning. Graham and Phelps

(2003) also claim that the use of emotion is a necessary part of learning, in the affective domain as well as metacognitively. This connection between emotion and metacognition was found when reflective journaling was used to assist student teachers to develop awareness about themselves as learners (Graham & Phelps, 2003). Therefore, it seems likely that participants, in this study, who demonstrated the presence of emotion in their writing, and other aspects such as using self-questioning and setting goals were exhibiting learning at a metacognitive level. A combination of reflection at a deep level, and reflection which addresses emotions and feelings, and develops metacognition, is claimed to instigate learning which leads to change (Boud et al., 1985; Graham & Phelps, 2003; Mezirow, 2000; Moon, 2004; Teekman, 2000). The ability to do this is associated with reflective practice as is the capacity for considering others' perspectives.

6.2.3.4 Critiquing multiple perspectives

Capacity for considering others' perspectives is one of the criteria commonly used to describe and differentiate between basic reflection and advanced reflective ability. For example, Ward and Cotter (2004) define dialogic reflection as a higher form of inquiry where others' perspectives are mulled over, resulting in new insights. Similarly, Hatton and Smith (1995) claim dialogic reflection occurs when an experience is explored "using qualities of judgments and possible alternatives for explaining and hypothesising", and critical reflection involves "reference to multiple perspectives" (p. 48). In the true sense of the term, the ability to critique multiple perspectives is strongly connected to critical reflection.

However, evidence of reflective writing where multiple perspectives were considered was either not found (i.e., Contextual reflection), or present to a low degree (i.e., Supported and Critical reflection). Being capable of understanding multiple perspectives is a skill, which is known to benefit from guidance (Freese, 2006). However, this dimension of reflection was not part of the subject design. The Reflective Framework did not prompt this activity, and guidance for critiquing multiple perspectives was not in the written feedback participants received from the subject

lecturer. Time pressure may also have been a factor which inhibited the participants' exploration of multiple perspectives in their writing. It is well known that finding time to write reflectively, and managing the responsibilities associated with professional practice, can impact on a practitioner's ability to engage in reflection (Frost, 2010; Harris, 2008; Heath, 1998). Although, participants realised that reflection took time to do, some were unsure of the worth of it, and this may also have constrained their level of activity to reflect on others' perspectives in relation to their practice in the subject.

The low frequency of higher levels of reflection in the study may also have been due to participants' insufficient skill and propensity for reflection. According to Fisher (2003), there is a link between reflective capability and the quality of reflective writing. In this study, there did not appear to be a connection between the quality of participants' initial written reflections, and the level of skill in reflective writing they had on entry to the subject. In hindsight, previous experience with reflective writing was not a reliable predictor of reflective capability. However, practice in reflective writing did appear to influence the development of reflective capability as the subject progressed, and the quality of reflective writing in participants' written reflections altered.

It is possible that the improved quality of participants' written reflections may have been due to the development of reflective dispositions. A number of reflective dispositions manifested through the written reflections. Participants all demonstrated *Noticing* when describing and reflecting on their experiences, and they were able to express their feelings in writing. They also demonstrated the ability to evaluate their practice, problem solve, and set goals. Self-questioning was used, and some were better than others at taking others' perspectives into account. Metacognition was apparent in the way they learned, and they were able to examine their beliefs and assumptions in readiness for changing practice. As such, the participants appeared to have a number of reflective dispositions regarded as necessary for reflective practice. Reflective dispositions have been shown to influence the capacity for reflection, and it is considered worthwhile to foster them (Fisher, 2003; van den Boom et al., 2007).

Even though several reflective dispositions were apparent, a capacity for critical reflection and considering multiple perspectives (according to the definition of critical reflection reported by Fisher (2003)) was not commonly found. This is not unexpected, as it appears that practitioners are more inclined to engage in analysis of a variety of situations, comparing them to their own experiences or perspectives, rather than engaging in stronger criticism of different perspectives in a broader professional context (Hatton & Smith, 1995). Therefore, dialogic reflection (with similarities to Supported and Contextual reflection in this research) may be more easily attained, as it tends to be a more cautious exploration of “why things occur[ed] the way they [did]” (Hatton & Smith, 1995, p. 46). Also, inquiry can occur in cycles of “situated questions and action”, and “consideration for others’ perspectives” rather than critique (Ward & Cotter, 2004).

The frequency of several types of reflection at the Explanatory level indicated that participants in this research study were engaging in analysis and comparison of their experiences. Therefore, according to the definitions provided by Hatton and Smith (1995), and Ward and Cotter (2004), participants were probably engaging mainly in dialogic reflection. For example, their writing contained explanations of personal views and skills, and also justification of professional perspectives. Others’ perspectives were used to illustrate points and back up decisions at the Supported level of reflection. Supported reflection was the highest level of reflection demonstrated by all participants. Perhaps with extra scaffolding, Contextual reflection and Critical reflection may also have been more frequently found.

Overall, the quality of the participants’ reflective writing became apparent in the levels and types of reflection in the written reflections. Other indicators of the presence of reflection in their writing, such as self-questioning, the ability to acknowledge and express feelings or emotion, consider others’ perspectives and demonstrate the capacity to monitor learning (metacognition) also emerged. A capacity for writing about the learning process and about practice is claimed by Fisher (2003) to eventually lead to critical reflection. The development of reflective dispositions in participants did appear

to be an important factor which was linked to the approach taken by participants when writing their reflections.

6.3 What do educational practitioners focus on when writing reflectively about their learning and practice? (Research question 2.)

Participants focused on three areas in their reflections: *professional capability*, *professional learning*, and *professional practice*. Participants situated their reflective writing in contexts, specific to practice, when discussing their professional backgrounds, experiences and knowledge, and their professional roles. Practitioners who connect to their practice context during reflection are claimed to be more likely to learn about practice (Boud & Walker, 1998; McDrury & Alterio, 2002). When participants presented different perspectives about practice, some focused on their immediate concerns about the practicalities of multimedia design and others located their reflections in a wider professional context, critiquing general attitudes in the profession and their responses to them. Even so, all participants emphasized how they intended to apply the new knowledge they were gaining in the subject.

When participants critiqued their skills for practice, this type of reflection came under the theme, *professional capability*. This focus on skills is regarded as an early step in the reflective process, and is defined as technical reflection (Hatton & Smith, 1995; Valli, 1997). However, the technical approach to reflection is not regarded as adequate for effective reflective practice, because of its superficial nature (Valli, 1997). Technical reflection is regarded as an “instrumental response to specific situations”, and claimed to be low level reflection because it does not alter a practitioner’s perspective about practice (Ward & Cotter, 2004, p. 250). However, in this study, no differentiation was made between writing concerned with skills, and the level of reflection. If participants described their skills this was regarded as Descriptive reflection, and if they provided explanations associated with the skills, their writing was categorised as Explanatory reflection. Additionally, if participants referred to evidence from the

literature when writing about their skills, this was coded as Supported reflection. Therefore, it was the way in which participants reflected on the skills rather than the fact they mentioned skills which was important.

6.3.1 Professional learning and implications for practice

Professional learning in this study acknowledges that understanding, new knowledge, skills, and insights are gained through reflection, potentially leading to the achievement of professional goals. Participants had access to interact with each other and with the subject lecturer, but the implications of this type of support was not investigated. Therefore, support for reflection and reflective practice relied on the scaffolding provided by the Reflective Framework, and the written feedback participants received from their lecturer as this was the focus of this study.

Participants in this research study contributed to a professional learning system as a result of their enrolment and engagement in the multimedia design subject. According to the professional learning system described by Hoban (2002) social interaction and participation in structured activities which are relevant to practice can change practitioners' perspectives. Hoban (2002) takes a systemic approach to professional learning, integrating the examination of professional practice with a number of factors, for example: self-analysis, reflection, values and culture, professional goals, feedback, and discourse within a community of practice. Although, discourse with others was not measured in this study as this was beyond the scope, according to the lecturer it occurred naturally through the subject activities as students supported each other. Therefore, these interactions and discourse with the lecturer suggest areas for future research. They were required to examine their professional practice as part of designing and creating multimedia learning objects for the subject. All participants demonstrated evidence in their writing that they were doing this. For example, they wrote about their choices of learning object and how they would be relevant for the area in which they worked. Most participants also wrote about the skills they either had or needed, if they were to be able to create the learning objects. Therefore, as mentioned previously, they were involved in a process of monitoring their abilities and decision-making for

practice, and this was evident in their writing. As a result they were building knowledge about multimedia design and the ways in which it related to their practice.

The act of monitoring learning and making decisions is claimed to be necessary if knowledge is to be constructed from experience (McAlpine & Weston, 2000). These researchers reported on findings where six expert teachers demonstrated the ability to act on decisions they made as a result of monitoring their practice. Therefore, the teachers learned from reflecting on their actions in the classroom. The way in which participants in this study wrote about their decisions and actions aligns with McAlpine and Weston's (2000) findings. Participants considered their actions in the multimedia design subject and also related this to their professional practice in the workplace.

Reflective writing about their actions was provoked in this study by genuine problems related to practice, and given the freedom to design learning objects relevant to their practice situations. Therefore, particular circumstances prevailed to stimulate reflection, and this is considered to be crucial for meaningful learning (Moon, 2004). She believes that the learner needs ill-structured problems and challenges, and must want to, or need to, understand the concepts surrounding the new material (Moon, 2004). In the multimedia design subject, participants were faced with complex problems to solve when creating their learning objects. Nonetheless, participants tended to base their design work on familiar material or concepts. Additionally, in this study participants were encouraged to reflect on their prior experience and knowledge about multimedia design through the prompts in the Reflective Framework, and the feedback from the subject lecturer. Therefore, as part of the reflective process, participants were influenced to examine both familiar and new problems from different perspectives, and to utilise different approaches, a strategy that has been shown to lead to new learning (Moon, 2004). Although, the participants were faced with a well-structured problem (to design and develop multimedia learning objects) as opposed to an ill-structured problem, the way they approached the task was ill-structured. This was because they could choose methods applicable to their situation and practice, rather than being told exactly how to do it. The task was evidently challenging for all of them, as indicated in

their writing. Therefore, according to Moon's (2004) view, the conditions were right for stimulating reflection and professional learning. Additionally, participants all had some degree of extrinsic motivation to develop an understanding of multimedia design if they were to do well in the subject. There were assessments they had to complete in order to pass.

Reflective writing was an integral part of the instructive process and was assessed. To get students to engage in reflection for professional learning when students are skeptical assessment may be a necessary motivating factor (Pee et al., 2002). In this study, the necessity to submit reflections for marking meant all participants had to prepare written reflections even if this went against their learning preferences, as they indicated in their responses to the survey. Also, intrinsic motivation is important for effective instruction and learning (Martens, Gulikersw & Bastiaensw, 2004). By being able to complete tasks which were useful and relevant to their practice, the participants in this research were more likely to embrace the new learning (about design and reflection). The requirement to reflect on their design activities added a further dimension to participants' learning, and provided circumstances which were ideal for reflective professional learning.

Overall, participants demonstrated they were engaging in professional learning which contributed to reflective practice. For example, they were designing learning objects for use in their professional roles, and as a result engaged in activities which had specific relevance to their practice. Through this engagement they were acquiring new knowledge, assimilating it, and applying their learning to specific contexts in practice.

6.3.2 Reflective practice

Clearly participants were reflecting about professional practice. It appears from the themes which emerged (e.g., *professional capability*, *professional learning*, and *professional practice*) that the Reflective Framework influenced engagement with practice experiences through the reflective writing process. Participants also situated their reflections within specific practice contexts. However, they were reflecting

primarily within an academic context as opposed to their usual professional role. The professional focus described and analysed by participants was varied, and included topics such as issues in the wider profession, description of past events, and an examination of immediate challenges and concerns in their practice in the multimedia subject. The act of writing down reflections was unfamiliar to most participants. Some felt constrained because of this, and also because their writing was assessed. Nonetheless, there was evidence that participants were reflecting effectively and learning from their experiences, and as a result engaging in reflective practice.

Generally, reflective practice is described as “on-the-job performance resulting from using a reflective process for daily decision-making and problem-solving” (Larrivee, 2008, p. 341). Participants were in a position to do this and to demonstrate this process in their written reflections, and all of them definitely did this. Indicators of reflective practice, include not only a practitioner’s “repertoire of knowledge, dispositions, skills, and behaviours”, but also the extent, to which reflection is used (Larrivee, 2008, p. 341). Consensus is that interventions, which scaffold development of reflective skills for advanced and “higher order reflection” (“where teachers examine the ethical, social and political consequences of their teaching”), are necessary (Larrivee, 2008, p. 342). Furthermore, “permission to judge the work of established authors”, is regarded as necessary for “higher order academic learning” to occur (Ash, Clayton & Atkinson, 2002, p. 56). In the multimedia design subject, participants were expected to engage in this sort of higher order learning and demonstrate this through critiquing others’ research, ideas and theories in relation to their perspectives about multimedia design.

Although participants in this research referred to theoretical evidence, in their written reflections, they did not engage in critical analysis of others’ views and research. This reticence to critique others’ work, according to the subject lecturer, may have been due to a lack of confidence in their knowledge of the field. In an interview, the subject lecturer indicated that although participants were engaged in decision-making and problem-solving for the multimedia subject, this was out of their usual professional context, and some of them were not experienced in critical analysis. The academic

context, in which they were situated, may have influenced their reflective behaviour in a number of ways. In the first instance, the assessment of reflective writing may inhibit engagement with practice experiences because students feel obliged to censor what they write (Boud & Walker, 1998). The expression of “intensely personal reflections” about practice experiences is also claimed to prevent students from engaging in reflection about their experiences (Pee et al., 2002, p. 583).

From another perspective, Boud and Walker (1998) report that students who challenge the status quo and the profession or educational procedures may be fearful of being marked down, and this also restrains their reflective writing about practice. Consequently, they censor their writing and do not fully engage with practice experiences leading to reduced opportunities for learning (Boud & Walker, 1998). Therefore, the approach needs to be relevant to practice and appropriately structured so students feel protected (Pee et al., 2002). This reticence and a lack of theoretical knowledge about the subject may explain the reason for the absence of Contextual reflection in participants’ written reflections since for this level of reflection they were required to consider others perspectives about multimedia design and critique them from a firm understanding of the concepts. Since the participants were studying the subject for professional development their understanding of the subject, was likely to be less than expert.

Also, their experience in reflective writing was virtually non-existent, apart from one person who had limited familiarity. According to their interviews, the participants were more concerned with the practical business of multimedia design, and becoming familiar with reflective writing, and they were motivated to please the lecturer. This in itself may have inhibited their desire to challenge others’ theories and reflect at a deeper level. Although, participants in this study expressed their diffidence about their writing being assessed, there was evidence they were somewhat inhibited initially. Nonetheless they felt comfortable engaging in reflection through using the Reflective Framework, and felt positive about the structured approach used to support their reflective writing. Additionally, all participants provided evidence in the written reflections that they were

engaging with practice experiences and learning about the multimedia design subject. This indicates that their learning about practice was not compromised even if they found the reflective writing process somewhat daunting. Overall, a structured reflective writing process that was assessed was desirable for this group of practitioners.

The participants were demonstrating that they were engaged in such a process when they wrote about the difficulties they were encountering in the multimedia design subject. Commonly in practice, reflection is stimulated where there is a problem to solve, or an issue to explore which challenges practice (Cowan, 2006). As a result, the practitioner is likely to undergo a process of reasoning during which feelings or experiences, or both, are examined to try and make sense of the problem or situation (Boud et al, 1985; Cowan, 2006; Moon, 2001). This is usually done in an attempt to learn from the experience so that appropriate action can be taken (Bulman, 2008; Moon, 2004). However, the links they made to their professional work environments were tenuous. Furthermore, any evidence of a commentary on professional work-related actions, and the relevance to the process they were undertaking in the subject, was rare.

The absence of direct professional links was possibly because their reflections were directly related to the subject they were studying, rather than their professional roles. This is not entirely unexpected because it is accepted that learning from experience generally relates to the environment in which practitioners are situated at the time (Boud & Walker, 1998). So although, participants had to draw on their professional backgrounds to choose suitable material to create, their immediate concern was to describe the processes they were undertaking for the subject. Also, participants were predominantly focused on decisions they were making about technology and pedagogy in their designs. Although, it could be argued that they were reflecting on their practice in the multimedia design subject, this often had an indirect connection to their current work practices. Therefore, most participants were not generally making decisions which had any direct impact on them professionally in their day to day professional lives. Even though, the outcomes of the reflective process used by participants were not

always directly relevant to their work situations, they were always relevant to their specific contexts.

According to Boud and Walker (1998), it is necessary to personalise the processes of reflection to encourage reflection relevant to the contexts in which practitioners work, and to take into account the variation between individuals' experiences. As a result, Boud and Walker (1998) do not support the use of 'paint by numbers' or "mechanistic" (p. 204) forms of reflection, and advocate that teachers focus on processes for reflection which create unique learning events. Although, the Reflective Framework provided structure and guidance for reflection, there was scope for participants to reflect in their individual context using a process unique to them. The step-wise process encouraged by the framework guided three stages of thinking about practice similar to those favoured by Boud et al., (1983) as explained in the theoretical framework. The framework was not discipline-specific and the prompting questions were relevant to a range of practice situations. The variation in topics about which participants' were writing, and the difference in emphasis each placed on their areas of practice and learning are indicative that the structure provided by the framework was flexible. Also, participants were able to customize their use of the Reflective Framework.

Additionally, participants wrote about how their practice changed as a result of examining their actions and learning in the multimedia design subject. Therefore, the theme - *application of professional learning* – also emerged strongly during thematic analysis. However, the Critical level of reflection was only measured in the work of two participants, which demonstrates the importance of examining the data in multiple ways. To be able to apply what they learned professionally, participants were expected to undertake a process of reflection whereby they changed their assumptions as a result of what was learned, and acted to put it into practice. In other words, when writing about how they would apply new learning to practice, participants were demonstrating what was defined as critical reflection in this study.

Also, it can be argued that participants' writing provided evidence of their engagement in reflective practice and professional learning. In this study, professional learning was

associated with reflective practice and is defined in Section 1.6.3. The definition of reflective practice used in this research study does not explicitly describe critical reflection, but it does acknowledge the use of effective reflection and metacognition, constituents regarded by Parsons and Stephenson (2005) as necessary for reflective practice. Furthermore, participants' written reflections contained evidence they were reflecting on practice, engaging in professional learning, and demonstrating effective processes of reflection. Therefore, their reflections led to outcomes such as decisions about action, the achievement of goals and changes to practice in the subject. As such, participants in this study did engage in reflective practice during the subject, and this was successfully scaffolded by the Three-Step Reflective Framework.

Overall, the participants focused on four professional areas: professional capability, professional learning, professional practice, and professional context. When reflecting on their capability, the participants critiqued a number of factors: the usefulness of what they were learning in relation to their area of professional practice; the links between the subject and the expertise they required in their professional discipline; and also how the knowledge they were gaining would extend their professional skills. Therefore, participants were demonstrating criticality about their practice in the multimedia design subject, and making connections to their professional roles, and also thinking about how their new knowledge would be used in practice. Further evidence that participants were engaging in professional learning and reflective practice is demonstrated by various quotes in participants' case studies, in Chapter Five.

6.4 How does scaffolding support reflection on professional learning and practice? (Research question 3.)

The Three-Step Reflective Framework used to scaffold participants' writing about their learning and practice along with assessment activities and written feedback was useful for assisting participants to write reflectively during the subject. Evidence for this is multifaceted as discussed previously. In brief, the levels and types of reflection in their writing extended beyond description and indicated that reflective learning was

occurring. Participants wrote in a manner in the written reflections that could be linked to the framework in various ways, for example, they described and critiqued their professional learning and practice and this was evident in the themes that emerged. Information from the participants' and subject lecturer's perspectives obtained during the interviews also confirmed that the framework supported participants' reflections about practice in the subject, and encouraged reflective practice.

This study has verified that any kind of reflective writing is likely to have more success if supported through structure and guidance (Rodgers, 2002b; Yancey, 2009). It has been already been argued that the use of reflective activities or tasks to encourage reflection or reflective writing are necessary if a level of reflection deeper than superficial description is going to be obtained (Hatton & Smith, 1985; Moon, 2004; Tsangaridou, & O'Sullivan, 1994; Ward & Cotter, 2004). The findings from this study confirm that this is the case. Also, this finding is similar to others' work where frameworks have been used to support reflection (e.g., Hatton & Smith, 1995; McCollum, 2002; Sparks-Langer et al., 1990). There is no doubt that integration of the framework into the subject, as a tool for preparing assessed work, was instrumental in assisting participants to extend their writing from superficial description to deeper forms of reflection. Participants appeared to move through the three stages of Boud et al.'s (1985) model on which the framework is based, demonstrating engagement in a deliberate and prolonged reflective process where they recalled and deconstructed their experiences and constructed new knowledge. The reflection exhibited by participants was mindful and included self-evaluation of feelings, decisions, understandings and actions for practice supporting the definition of reflection for this research and the theories on which it was based (e.g., Boud & Walker, 1990; Boud et al., 1985; Rodgers, 2002b; Tremmel, 1993).

The stepwise process in the framework appeared to influence participants' writing, as they engaged in rationalisation and deeper explanations about their activities as each step progressed, especially when the framework appeared to be used consistently. Carefully designed questions and prompts were found by participants to encourage them

to think about their practice and what they wanted to achieve, and there was clear evidence that this happened in the way they wrote their reflections. All participants demonstrated reflection on particular aspects of their practice and focused on their professional capability and the learning they were undertaking. Therefore, professional learning as defined in this study was demonstrated, although not all participants acknowledged their professional goals. This finding aligns with the work of Kwakman (2003), and Parsons and Stephenson (2005) on which the definition of professional learning is based. According to the definition of reflective practice for this study, the framework also supported effective reflection, metacognition and the development of decisions for action, reflective learning, achievement of goals (in most cases) and changes to immediate and future practice. Therefore, the findings of this research fit with the views of Hatton and Smith (1995), and Parsons and Stephenson (2005).

Overall, the findings suggest that the Reflective Framework and the written activities in the subject enhanced participants' ability to write reflectively. However, the framework did not strongly support the exploration of theoretical understanding or stimulate critical reflection. In other frameworks the requirement for supporting evidence is more explicit. For example, at Level 5 in Sparks-Langer et al.'s (1990) framework there is an expectation that an explanation with principle or theory is given as the rationale. Also, Rodgers (2002b), in phase three of her framework, expects an "analysis of experience: learning to think critically and create theory", which implies reference to theoretical evidence (p. 244). Therefore, the framework could be improved by including specific instructions to provide references to the literature and evidence of theoretical arguments.

Similarly, more instruction in the framework appears necessary to support critical reflection. Even so, the lack of Critical reflection exhibited by participants may be partially due to the researcher's interpretation of participants' writing. A comparison with Pee et al.'s (2002) study may help to explain this possibility. Pee et al. (2002) partially used Hatton and Smith's (1995) definition of critical reflection to analyse students' reflective writing in a study investigating the reflective abilities of dental therapy students. The students were asked to complete ALE (A Learning Experience)

worksheets (based on Johns' questions) to recount their clinical experiences in practice, some of which were regarded as sensitive events. In this worksheet, the students were asked to "briefly describe what happened" and to "describe their feelings at the time", and explain why the incident was "worthy of reflection" (Pee et al., 2002, p. 577). They were also asked about their strengths, and the learning they believed was necessary as a result of revisiting the experience. However, Pee et al. (2002) focused only partly on Hatton and Smith's (1995) definition of critical reflection, considering only the socio-political context and ignoring multiple perspectives. In this research study, the focus was on the full definition of critical reflection described by Hatton and Smith (1995) with additions such as how learning was intended to be used.

The levels of reflections were ascertained by "peer judges", who were students without any formal knowledge of reflection (Pee et al., 2002). Additionally, the measures of reflection appeared to be subjective as the student judges were asked for their opinion about the level of reflection using Hatton and Smith's framework (Pee et al., 2002). Critical reflection was found in 64% of the students' worksheets compared to 86% dialogic reflection and 100% descriptive reflection. The frequency of critical reflection is very high compared to the findings reported by Hatton and Smith (1995). However, Hatton and Smith (1995) measured units of each type of reflection, which was also done in this study, instead of measuring the presence of each level of reflection as done by Pee et al. (2002). Therefore, the findings are not comparable, with this research and with Hatton and Smith's (1995) study on which Pee et al.'s (2002) work is based. Therefore, Pee et al.'s (2002) findings appear to be an unreliable indicator of the proportion of critical reflection apparent in the students' work. A comparison of Pee et al.'s (2002) study with this research, and Hatton and Smith's (1995) study indicates how the frequency of critical reflection can vary when different expectations for critical reflection are in place.

Another explanation for the link between the degree of critical reflection and use of the Reflective Framework is that participants who were destined to be more skilled at reflective writing were inclined to use the Framework systematically because they were

self-regulated learners. Self-awareness is associated with students' ability to undertake learning tasks because they are able to monitor their learning progress and understanding, and actively plan strategies for completing them (Gynnild, Holstad, Myrhaug, 2008). Engineering students who were self-regulated learners were found to "possess the motivation and skills to conduct their own learning", and as a result engaged in deeper learning than peers who were more dependent on tutor input (Gynnild et al., 2008, p. 158). The framework in this study was provided to scaffold reflection, but its use was optional, therefore, requiring a degree of motivation to engage with it. The subject lecturer said in the interview that she intends to introduce compulsory use of the Reflective Framework, at least initially. She believes participants in this research study engaged more effectively in reflection in comparison to students in previous classes she had taught, as a consequence of the availability and use of the Three-Step Reflective Framework.

It is also possible that participants who paid closer attention to the detail provided by the Reflective Framework did so because their writing was to be assessed. More discussion about the effect of this factor on reflection can be found in Section 6.5.3. Another benefit of the intervention is that the three steps and prompts assisted participants who had language barriers. The clarity and the simple instructions provided structure and direction. Other researchers also report low levels of reflection in writing when barriers such as language and low level writing skills, create challenges with writing in an unfamiliar language (Wong et al., 1995). In this study, feedback from the majority of participants indicated that the Reflective Framework supported rather than hindered their reflective writing, particularly for participants who had no previous experience with reflective writing.

6.4.1 Evidence for using a framework to support critical reflection

Practitioners are claimed to need encouragement to engage in critical reflection and examine the socioeconomic, historical, cultural, political, moral and ethical factors associated with their experiences, and also the values, beliefs and attitudes relating to

their profession (Graham & Phelps, 2003; Sparks-Langer & Colton, 1991). It is clearly not sufficient to assume that professionals intuitively know how to reflect critically on their experiences (Fook & Gardner, 2007). Indeed, this research study has demonstrated that clear guidelines to support a process of critical reflection are necessary, and perhaps a more specific heading at either the 2nd or 3rd step in the Reflective framework may be more successful in initiating critical reflection.

However, methods for teaching critical reflection are unclear, and are claimed to be problematic because the concept is difficult to define, monitor and assess, and not easily identified (Smith, 2011). For example, variation exists about whether “self-reflection, or challenging one’s own belief system” should be included (Larrivee, 2008). Nonetheless, critical reflection is regarded as an important component of reflective practice, and progression towards thinking “critically about oneself, one’s assumptions, and one’s teaching” is considered a desirable goal (Larrivee, 2008, p. 345). Although, the need for reflective tools and strategies to support the development of critical reflection is recognised, the form these should take is not altogether clear (Smith, 2011). Strategies such as reflective writing and collaborative discourse have been suggested, along with informing practitioners about the theory of critical reflection (Smith, 2011). A model for teaching critical reflection, which recognises that different forms of critical reflection exist, has been suggested by Smith (2011). The model has four components:

1. Personal thoughts and actions - “recording one’s own perceptions, judgements, reactions and behaviours in relation to an issue or practice”;
2. Interpersonal reflection – “paying attention to the relationships that are central to the history and undertaking of a particular activity”, and “group dynamics that influence decision making in any given context”;
3. Contextual reflection – “examining how established concepts, theories and methods inform and influence practice”; and

4. Critical reflection – “examines the limitations placed around thinking or practice by bringing issues of power into focus” and “political, ethical and social contexts” are considered.

Smith’s (2010) model illustrates the potential for changing how critical reflection is viewed, and the dilemma which currently exists. It appears there are a range of factors necessary for critical reflection to be accomplished. Perhaps, if participants’ writing in this research was measured against these four components, a greater degree of critical reflection may have been found.

However, even before practitioners can begin to engage in reflection, let alone critical reflection, evidence suggests that they require guidance and an understanding of reflective practice (Parsons & Stephenson, 2005; Pedro, 2005). The most significant problem to date in teaching is that existing frameworks for reflection are designed to describe the reflective process, but are unable to assist practitioners in identifying or recognising the qualities of reflection that are needed to improve practice (Ward & Cotter, 2004). Learning from practice is more likely to occur when practitioners’ awareness about reflection is changed, and reflective strategies are used regularly in practice (Fook & Gardner, 2007; Pedro, 2005). In this study, participants’ perceptions about the benefits of reflection expressed as reflective writing were changed by using the Reflective Framework to prepare their written reflections. They were also able to envisage the benefits of using reflective strategies for future practice, and wanted to learn more about reflective approaches.

Similarly, another group of professionals (pre-service teachers) developed a greater understanding of the concept of reflection and enhanced their perceptions of reflection for practice when guided. Pedro (2005) found that the student teachers not only began to understand the concept of reflection, but were also willing to use a number of reflective strategies (e.g., “self-reflections, verbal reflections and written reflections”) in their study and also in the classrooms where they taught (Pedro, 2005, p. 60). Also the student teachers confirmed that they were continuing to learn about reflection, and that it was assisting them in their practice (Pedro, 2005, p. 60).

In this research, raised awareness about the meaning of reflection for practice was apparent. This occurred through participants' acknowledgement that the Three-Step Reflective Framework guided them to reflect on their practice, and was a technique several of them intended to use in the future. Participants also became more aware of how they were thinking about their feelings, and they also recognised how they were learning, making decisions and taking action. However, it was not possible to gauge the degree to which the framework was directly influential in changing their everyday professional practice in the workplace. Perhaps if participants had also been writing about actual use of the multimedia objects in their teaching or other workplace experiences, the direct relevance of the framework in changing that practice could also have been measured as an adjunct to the research. Therefore, further research is needed to measure the impact which the Reflective Framework has on the practice of reflection in the work environment.

6.4.2 The role of feedback in reflection

Facilitation of the reflective process is viewed as important for assisting practitioners to engage in higher levels of reflection (Harris, 2008). Facilitation may take the form of structured frameworks or direct feedback on the practitioner's writing. As part of the feedback process, Socratic questioning can be very effective when used to encourage practitioners to think more deeply (Harris, 2008). In this research, the subject lecturer (Penny) used questions to stimulate participants' critical thinking by encouraging them to question their activities, set goals, and to think about the effect of their decisions on the recipients of their work and the practical applications of their creations. The direction and pragmatic feedback provided by Penny was designed to help participants make links to their professional contexts, and was directly relevant to their practice.

Facilitation in the form of feedback from a colleague or mentor who uses questioning is a strategy regarded as influential in research into assisting reflective practice (Alger, 2006; Hume, 2009; Macdonald & Hills, 2005). Questioning techniques are claimed to help professionals to develop new perspectives through guiding them to address

negative feelings (Boud & Walker, 1991; McDrury & Alterio 2002). Consequently, practitioners are able to break down barriers to learning by becoming more aware about themselves as learners, and as a result construct new knowledge (Boud & Walker, 1991; Lemon, 2007).

The areas of practice which the lecturer scaffolded: technical, resources and information, subject knowledge, and reflection, emerged as themes in the feedback. Some participants acknowledged that the feedback helped them to reflect more deeply and broadly. However, there was varying opinion about the support that the lecturer's feedback could provide for actual reflection, as some believed it was not directly supportive of the reflective process itself. Even so, most participants believed that they were encouraged to look at others' perspectives and to take different views into consideration. Therefore, the feedback provided by Penny was supportive in a range of different ways. Overall, the use of reflective processes for professional learning and practice were deemed as important by all participants. They all intended to carry on with practicing and developing their skills in this area to enhance their reflective practice.

6.4.3 The role of the portfolio

The design portfolios which participants developed were personalised compilations of their professional learning. Ownership of the portfolio is regarded as important when developing a portfolio for reflective practice, and provides motivation to engage in the process (Barrett & Wilkerson, 2004; Ring, Weaver & Jones, 2008). Throughout the development of the portfolios, the subject lecturer provided support and encouragement, and participants were expected to include reflective evidence of their practice. Support for this aspect of portfolio development is recognised by a number of researchers (e.g., Boud & Walker, 1991; Butson, Cook & Kardos, 2009; Moon, 2001; Spronken-Smith & Stein, 2009).

Interest in the use of portfolios (especially ePortfolios) for professional development is increasing, and the development of reflective evidence is now recognised as an

extremely important component “given that many e-portfolio practitioners and researchers understand reflection as the connective tissue for the intellectual work and exhibits we see in electronic portfolios, the next generation of electronic portfolio research is likely to focus on questions around reflection” (Yancey, 2009, p. 33). Also, it is claimed that scaffolding and feedback in an electronic environment is essential if students are to develop the reflective learning skills they need to transfer knowledge into different contexts (Yancey, 2009). Although, ePortfolio was not a term used in the subject, several components relevant to ePortfolios were in use. For example, the preparation of digital material (artefacts) and reflective evidence about learning and practice was undertaken, and also integrated with tasks for the subject and assessed. This process was similar to the design of ePortfolios described by Granberg (2010) in a review of ePortfolio use over an eight year period.

The Reflective Framework, in this research, was an important influence in supporting the construction of reflective evidence in participants’ Design portfolios, and consequently similarities with others’ work in the field of ePortfolios have emerged. For example, Mansvelder-Longayroux et al. (2007) found that learning activities for ePortfolio development encouraged teacher education students to “describe[d] in their portfolios what they had done, what areas they had made progress in, what situations they had come across, how they dealt with them and what they had learned from them” (p. 60). This outcome parallels the findings in this research where evidence of professional learning was found.

In summary, the Reflective Framework was successful in providing scaffolding for reflective writing as it encouraged deliberate and mindful thinking, components of effective reflection, which led to evidence of professional learning and reflective practice in this particular group. Although, the framework successfully scaffolded Descriptive and Explanatory levels of reflection, other forms such as Supported and Critical reflection were not as prominent. Further work is needed to explore the meaning of critical reflection, and to investigate how improvements could be made to the framework to support this.

Additionally, this research has highlighted a number of factors which may impact on reflection and reflective writing, and these are discussed next.

6.5 Factors impacting on reflection

This research study has confirmed that reflection was a challenging prospect for the participants, and highlighted a number of factors impacting on the practice of reflection. For example, the act of reflective writing and the skills required to do it well, time for preparing written evidence of reflection, and preferences for reflection and learning – verbal dialogue versus written reflection, and assessment of written reflection. Reflective writing, in itself, was shown to be challenging, and the achievement of deeper levels of reflection, in particular critical reflection. Participants' preferences for learning also appear to influence how effectively they engaged in reflective writing. Each factor is discussed in turn.

6.5.1 Skills for reflective writing

The majority of participants had very little experience in using reflection or reflective writing in their professional lives. Therefore, the presence of low levels of reflection in participants' writing was similar to others' work where they reported that practitioners wrote at lower levels of reflection when they were unskilled or inexperienced in reflection and reflective writing (Gelter, 2003; Hatton and Smith, 1995; Moon, 2001; Valli, 1997). According to Stevens and Cooper (2009), reflective writing requires practice, direction and support. A misconception is claimed to exist that "writing was thinking" and "happened after [practitioners] have all their thoughts organised in their mind" (Stevens & Cooper, 2009, p. 49). This view is in conflict with Menary (2007) who regards writing as thinking; however, he does not stipulate the manner in which thoughts should be organised prior to writing about them.

In this study, writing provoked thinking in some cases, and is similar to a view put forward by Oatley and Djikic (2008), as one perspective among a number of arguments which need to be considered when "thinking about a theory of thinking as relevant to

writing” (p. 10). These researchers claim mental processing of information and conversion to written language involves complex psychological systems, including memory. Also, in this researcher study, it has been established that the act of reflective writing is associated with a special kind of thinking (i.e., reflection) similar to that defined by Dewey (1933), and requires engagement in specific processes if practitioners are to make meaning of their experiences (Boud et al., 1985). Although, participants were required to record their thoughts, their sequencing of thought processes during reflection varied, with some participants doing most of their thinking prior to writing, and others using writing as a stimulus to thinking.

In the researcher’s view, practitioners do need guidance to develop skills for reflecting on their experiences because it is known to be difficult to remember and record accurately what occurred, and to see the situation from different standpoints so that the components can be examined in a meaningful way (Boud et al., 1983). A number of researchers who recognise the challenges of getting practitioners to see others’ perspectives have developed frameworks to encourage them to do this, and they are mentioned in the literature review (e.g., Hatton & Smith, 1993; Fisher, 2003; Valli, 1997). Self-awareness is a skill that does not come naturally to everyone, and may require assistance to develop, a position supported by Schutz et al.’s (2004) work. Also, writing about an experience needs not just skills of recall and inquiry but also an aptitude to write well. This stance is also held by Moon (2004) who recommends using a series of carefully structured activities for this purpose. For the researcher, meaning from an experience is obtained when something is learned from the experience which fits with work by Moon (1999) and Boud et al. (1983). However, the practitioner must notice what happened in the first instance, and this is not always an easy thing to do. Hence, the work by Tremmel (1993) and Boud et al. (1983) was chosen by the researcher for the theoretical framework since these researchers also consider this dimension of reflection is important. In the preliminary study, it became apparent that those practitioners found it very challenging to critique what they had recorded about their practice. They found it relatively easy to describe what occurred, just as the

participants in the main study did, but they did not feel comfortable justifying or analysing what happened at a deeper level or at a critically reflective level.

Similarly, in the main study, although participants demonstrated that they were analysing their decisions and actions, they were 'hard pressed' to criticize others' views or knowledge in relation to their individual perspectives. In other words, they were unable to situate their experiences in the wider socio-political contexts of their profession or in the broader body of knowledge about the topics they were studying. The researcher believes that there is such a thing as effective reflection, and that professional learning to be useful for practice does need to include strategies that promote reflection. Such learning is more likely to equip practitioners with the ability to change their practice, and in the researcher's view this is the ultimate outcome of using reflection as a tool for learning.

Learning without reflection is like paddling on the surface, practitioners cannot learn to swim unless they are willing to enter the choppy and deeper waters of reflective practice.

The researcher also believes that critical reflection is not an intuitive act and needs careful guidance to come about. The frameworks developed by others, although designed to prompt this type of reflection are not always successful, and this indicates that more support than this may be needed. For example, dialogue with mentors and peers has been shown to be effective (Clouder, 2002; Ottesen, 2007). The researcher also believes that it is necessary to assist practitioners to develop specific dispositions for reflection, including the desire to use reflective strategies such as using a framework to write about practice. This view developed when it became apparent that openness to the concept of reflection was not present in all the participants, and needed the encouragement provided by the activities in an academic subject to occur.

Also, reflective strategies for learning including reflective writing about practice were not in common use by the professionals in the research group. Once the participants used the Reflective Framework to prepare several written reflections they changed their

views about reflection, and also about reflective writing, and in most cases this impacted on their future intentions regarding reflective practice. Therefore, the researcher maintains that practitioners do respond to guidance when they are given the opportunity to experience the benefits of a strategy such as the Reflective Framework. This the researcher believes also has additional benefits such as provoking the use of self-questioning, a technique associated with deeper levels of reflection.

From another perspective, based on Reid (2004) and Schon (1987), a proactive approach to inquiry is put forward, suggesting reflection-for-action which occurs when “the educator prepares for future action on the basis of his/her knowledge of what happened during a particular event and the reflection that occurred after that event (Reid, 2004, p. 5). Looking forward and setting goals for practice was also demonstrated by participants in this study who wrote clearly about their future actions in the written reflections. The fact that all participants believed, at the end of the subject, that the use of reflective techniques would help improve their practice, indicates there was understanding about the usefulness of the reflective process. There were also other factors which illustrated this commitment to reflection, and the presence of these factors drew attention to the quality of reflection in participants’ writing, for example their predisposition for reflective processes.

6.5.2 Preferences for reflection and learning

The perspectives held by each participant about using reflective processes for professional learning and practice was another factor which may have impacted on aptitude for writing at higher levels of reflection particularly, Contextual reflection and Critical reflection. Although, they all believed it was important to engage in some kind of reflective activity, if they were to develop their professional expertise, not everyone thought it was necessary to write things down in order to reflect. There was also some reticence to write reflectively due to the time it took. Also, engagement in verbal dialogue with colleagues and mentors was preferred to reflective writing in some cases. However, if reflective thinking and inquiry is to act as a prelude to learning, it is

suggested that thoughts are made more permanent by writing them down (Boud & Walker, 1998). Therefore, practitioners who are averse to reflective writing are believed to be less likely to practice the full range of skills needed for deepening learning.

The role of verbal dialogue in promoting reflection is well documented (Alger, 2006; Cowan, 2006; Donaghy & Morss, 2000; Nsibande, 2007). However, the use of this strategy for reflection was beyond the scope of this project, mainly because the subject was online, and opportunities for synchronous interaction were limited. Written dialogue, however, was used in this research, and took the form of feedback provided by the subject lecturer. The different perceptions participants had, about the act of thinking or talking versus writing things down, and writing for assessment, possibly influenced the way they wrote, particularly when participants were intimidated or challenged.

6.5.3. Assessment of written reflection

It appears that well-designed activities and assessment are needed if skills for reflective writing are to be developed. Overall, the response from the participants, in this study, about the ability of the framework to improve their writing and thinking in the subject and also their direction for professional development and time management, supports was found in others' research (Ash et al., 2005; Pee et al., 2002; Tsangaridou, 2005). Even though, some participants had preferences for dialogue and thinking over reflection and reflective writing, the quality of their writing indicated engagement in reflective processes as supported by the Reflective Framework. For some participants, assessment of their reflective writing was an inhibiting factor as were time restrictions, and may have impacted on the level of reflection demonstrated. Assessment of reflective writing is acknowledged in the literature as likely to inhibit a practitioner's ability to engage in reflective processes, and is claimed to affect the quality of the writing (Bulman, 2008; Moon, 2004). The insecurity instilled by assessing reflective

writing is an issue described by others, and a reason assessment is not favoured (Boud & Walker, 1998; Stevens & Cooper, 2009).

Reluctance to have one's thoughts reviewed was another reason reflective writing may not be readily engaged in (Stevens & Cooper, 2009). Some participants indicated when interviewed that reflective writing was challenging for them because they were unsure what was expected, and that it was intimidating to have their thoughts read by another person. It is claimed that reticence in writing reflectively may not only occur because others' are reviewing the work, but also because students or practitioners do not like to write down their thoughts, particularly when they are mandated as an assessment (Pedro, 2005). Students prefer not to write down their thoughts, according to Pedro (2005), who also found that if they did, they liked to have access to relevant activities to assist them. Also, the risk of "open[ing] up the possibility of students feeling that there is a 'right' way to engage in reflection on practice", may eventuate when using structured approaches and assessment (Parsons & Stephenson, 2005, p. 100). The ability to be able to write freely, and practice writing is known to enhance skills for reflective writing (Stevens & Cooper, 2009). Although, participants in this research found reflective writing challenging, they did regard it as a process which improved through practice. The written reflection assessments used in the multimedia subject gave the participants' opportunities to practice their skills in reflective writing.

Assessment of reflective writing is a recognised challenge when using frameworks and structured approaches for scaffolding reflections which are assessed, because the assessment of reflections or attaching a grade to students' journal writing may inhibit the reflective process (Holmes, 1997). Therefore, the provision of pre-determined criteria to guide students in their writing rather than grading it may be preferable, thus enabling students to express their reflections more freely (Holmes, 1997). This approach is more likely to prevent issues of subjectivity, control and power between teachers and students, and to protect the benefits of the reflective process, such as personal expression (Kennison & Misselwitz, 2002). Using a framework in the multimedia design subject to structure the written reflections was considered beneficial

by the subject lecturer who noticed an improvement in the depth of reflection demonstrated by her students. Certainly, the majority of participants found the structure provided by the framework was helpful, and all demonstrated engagement in reflective processes beneficial for reflective practice. Although, the ability to reflect can be developed through training in the use of “reflective languages” to express their experiences, it requires a degree of intrinsic motivation, as well as a willingness to engage in personal development (Law, 2004, p. 3370). Hence, it can be argued that the assessment of reflective writing is an extrinsic motivator and may not be appropriate for developing the reflective dispositions needed for reflective practice. The motivators for reflective writing were not examined in this research, and would be an interesting area to investigate.

6.6 Implications for practice

The results of this study suggest that the use of a simple three-step process could help other professionals to develop skills in reflective writing. This form of scaffolding appears to be particularly important for those professionals with little experience in reflection, particularly where there are language challenges, or when they are unsure what is expected of them, particularly at post-graduate level. Adequate scaffolding is needed for practitioners to be encouraged to discuss their viewpoints alongside multiple perspectives from the literature and engage in critical reflection. It cannot be assumed that professionals, even experienced ones, have the necessary skills to do this, or to reflect critically to extend their scope of practice to include socio-economic, political, historical, ethical and cultural issues. Modifications need to be made to the Three-Step Reflective Framework to encourage this to happen, and the reasons for this are explained next.

Some deficiencies were found in the functionality of the Three-Step Reflective Framework. For example, it was not specifically incident-based, nor did it specifically promote “cyclical framing and re-framing of problems” regarded as important (Ward & Cotter, 2004, p. 246). To do this, it is necessary to state the problem and how it was

dealt with, and then return to it again to think of different ways to handle it, or to look at it from different viewpoints. Even though the framework did not encourage participants to focus specifically on critical incidents, they were asked to describe their activities and decisions. The prompts, in the framework, asked participants to think how their actions and decisions helped their practice and their knowledge, and the effect these would have on their future practice. Some participants discussed decisions and actions relating to a specific issue in more than one reflection, and carried the thread of the problem through their writing, thereby demonstrating they were capable of re-framing problems even if this was not specifically guided.

Another aspect of reflection which many frameworks tend not to initiate is the development of multiple perspectives, and this approach manifests as dialogic and critical reflection (Ward & Cotter, 2004). It is known to be difficult to support practitioners to extend their analysis to the realm of critical reflection (Fook, 2007). The use of reflective activities or tasks to encourage reflection and reflective writing have been advocated as necessary if a level of reflection deeper than superficial description is going to be obtained (Hume, 2009; Law, 2004; Moon, 2004). There is evidence this was achieved by participants in this study to some extent due to the high frequency of Descriptive reflection and Explanatory reflection. However, the absence of Contextual reflection and the low frequency of Supported and Critical reflection indicate that the Reflective Framework was not sufficient to encourage and support these levels of reflection as measured by the Levels of Reflection taxonomy. However, indicators of critical reflection such as an awareness of their assumptions and beliefs about multimedia design (mentioned by Fisher, 2003) were found during content analysis, as was evidence of metacognition, a skill associated with critical reflection (McAlpine & Weston, 2000) and reflective practice. Further examination of the participants' writing using a different framework for analysis (e.g., Pee et al, 2002) may reveal more evidence of critical reflection, and this could be a further area of research.

It appears that the use of strategies such as the framework could be used to promote professional learning and reflective practice. However, the outcomes of the Reflective

Framework was used in authentic practice environments in the workplace are still not clear and need to be tested. Perhaps by using the intervention in an assessment setting the potential value was distorted. It is possible that practitioners might not devote the time to use the framework in a practice situation. Some participants in the study indicated that this was the case. Also, for some practitioners, it appears that reflective writing may be dependent on compliance to statutory body requirements, rather than on the intrinsic motivation of practitioners to engage in professional learning which is reflective. Participants in this study were provided with both stimuli and motivation for undertaking reflective processes through needing to increase their knowledge and skills in the subject, because to do this they had to audit their existing practice. However, the participants were also required to prepare reflections which were assessed. Reflective writing for compliance requirements is not the ideal situation for encouraging effective reflection as part of reflective practice because practitioners are under an obligation to produce outputs rather than engage in meaningful reflection about their experiences (Barrett & Wilkerson, 2004), and a prescriptive approach is likely to diminish creativity and individualization in portfolio development (Baldwin, 2006). The importance of context on reflection was also discovered, and the approach to reflective writing and the participants' professional focus was strongly aligned to their learning and practice. Consequently, each participant's case illustrates the unique manner in which each individual approached reflective writing about practice, and their responses to a scaffolded process.

6.7 Areas for further research

The outcomes of using reflective strategies such as the Three-Step Reflective Framework in the workplace still need to be tested in various ways. For example, it is still not clear how effective the framework might be for stimulating and supporting reflective practice within authentic workplace practice environments or with a broader population of professionals. It is necessary to explore, in a range of situations, whether reflective practice can be fully supported by the use of a modified Three-Step Reflective Framework. For instance, more specific prompts in the framework might encourage

higher levels of reflection such as Supported, Contextual and Critical reflection. For example, if specific prompts for critical reflection were used this could assist professionals to reflect on both positive and negative critical incidents from their practice experiences in a more advanced manner. Also, the use of a different framework to look for evidence of critical reflection might reveal a higher degree of this type of reflection. For example, an holistic approach to analysis such as that engaged in by Pee et al. (2002) where the content of the entire written reflection assignment is examined as opposed to analysing each unit.

Additionally, practitioners might revisit their experiences more fully, and explore their professional perspectives and beliefs in their reflective writing, if a facilitated dialogue with a mentor was used in conjunction with the modified framework. The use of questioning as a technique to deepen reflection could also be tested, either in the form of further structured questions provided by the framework, and/or a mentor, or as a process where practitioners were encouraged to formulate their own questions. Additionally, the role of feedback in reflection is a further area for research, particularly feedback which is structured and designed to deepen reflection.

There were several areas where the practice of basic reflection, critical thinking and critical reflection in direct relation to professional learning could be further investigated. A range of techniques could be trialed both alone and with the Reflective Framework, to determine how each approach could stimulate and support professional learning. For example, the use of strategies such as dialogue and peer support, combined with guidance from an experienced mentor, could be investigated both with the framework and without. This would enable a fuller understanding of the benefits of using different forms of scaffolding for enhancing professional learning, particularly when comparing the capacity of novices and experts. Alongside such investigations it would be helpful to explore definitions of reflective practice more fully, and investigate what sort of metacognitive processes are operating. Perhaps when professionals are aware of what they know or do not know, and learn to monitor their learning, they might engage more

fully in reflective practice. The role of using a framework to assist the metacognitive process could also be investigated.

Another area of research involves using accepted criterion to measure critical thinking and integrating it with prescribed use of the Reflective Framework. Although there were arguably some prompts which could stimulate critical thinking, the outcome of this was not measurable in this research. However, it would be useful to investigate the factors which assist this aspect of reflection.

Also, modifications to the taxonomy used to measure Descriptive reflection may be necessary in further investigations so that particular types of description can be distinguished from reflective writing. In the present study, units of writing were categorised as *Stating* where there was no specific emphasis on areas of practice, such as decisions or learning, nor any expression of feeling; and this type of writing was similar to the descriptive writing defined by Hatton and Smith (1995) in their study.

It would also be helpful to study the development of Learning portfolios and ePortfolios more specifically. That is, the entire process of planning and constructing the portfolio while using the Three-Step Reflective Framework for scaffolding the integration of reflective evidence. Additionally, the influence of digital information fluency on practitioners' abilities when compiling electronic portfolios and reflective evidence is an area which would be interesting to explore.

In this study, the quality of reflection was not compared with grades, and in future studies it would be beneficial to develop marking criteria for written reflections which enabled a comparison of outcomes such as grades for written reflections. Perhaps this could include an opportunity for students to self-assess their capacity for reflective writing.

6.8 Summary

There was no doubt that the Descriptive and Explanatory levels of reflection were favoured by participants in this research study. This outcome was congruent with

others' research. Other more complex levels of reflection – Supported, Contextual, Critical – were found to a lesser degree or were absent, as in the case of Contextual reflection.

For some participants, it was challenging to write about their feelings and emotions. Not everyone felt comfortable writing down their thoughts as they preferred to think in their heads or to discuss their practice with colleagues or peers. For some, the process of preparing reflections which were assessed was inhibiting. Due to the fact that the majority of participants had very little experience in writing reflectively, more specific prompts in the Three-Step Reflective Framework may be needed to stimulate higher levels of reflection. Participants may need to be specifically encouraged to examine and critique theory and multiple perspectives and discuss them alongside their beliefs and experiences.

Although, participants wrote about their experiences, they rarely revisited them in subsequent reflections. Other aspects of reflection associated with reflective practice such as critical reflection and self-questioning were rarely demonstrated. However, the degree of goal-setting in participants' writing, provided evidence they had some awareness of their performance and knowledge, and were operating at a metacognitive level. It was established that the framework was successful in enhancing participants' reflective practice because it supported effective reflection at the Descriptive and Explanatory levels of reflection. Also, a strong theme of professional learning emerged in the content of the reflections. This was associated with participants' writing about their professional background, skills, development and capability in the subject, as all these items had relevance to their professional practice. Participants also demonstrated they were gaining new knowledge and insights relevant to their practice, and this was a key component of professional learning as well as reflective practice.

All participants perceived the Reflective Framework to be a useful scaffold for their writing. However, specific evidence, such as Descriptive reflection at Step 1 and Explanatory reflection at Step 2, was only found for the two participants who used it consistently. Scaffolding in the form of feedback from the subject lecturer was also

beneficial in guiding participants to reflect, and assisted them in their decisions. However, it did not appear to have an influence on deepening their reflective writing. Overall there was evidence that the Reflective framework did have an impact on developing participants' skills in reflective writing and influenced their ability to evaluate their practice and make decisions for change.

This research study has demonstrated how important it is to scaffold the development of reflective ability, taking practitioners from a position of no experience in using reflective strategies for recording and reflecting on events in practice to one where they are able to demonstrate increasingly deeper levels of reflection in their writing. Scaffolding such as the Three-Step Reflective Framework had a direct effect on the quality of the participants' reflective writing. Dialogue in the form of written feedback was also important to encourage reflection on practice. Engagement in the reflective process was demonstrated in this study by the level and type of reflection, the participants' professional focus, and indicators of quality in the reflections: integration of professional learning and reflective practice, self-questioning for evaluating actions, the expression of emotion and feelings, and critique of multiple perspectives.

The way in which participants critiqued their professional skills and knowledge, and integrated a decision-making process into their writing, signaled their engagement in professional learning. Participants varied in the way they wrote about their experiences, with some putting more emphasis than others on describing their feelings and perspectives about practice. Nonetheless, everyone appeared insightful about their practice, and demonstrated this through self-evaluation and re-framing of experiences at the Explanatory level of reflection. Therefore, there was evidence to suggest, participants were engaging in reflective practice. Extra scaffolding is generally required to assist practitioners to develop the advanced reflective writing skills required for using self-questioning techniques, incorporating emotional aspects of practice and for critiquing a range of perspectives at higher levels of reflection (defined as Contextual and Critical reflection in this study). The definitions of reflection, and professional learning formulated for this study were found to be similar to others' views in many

respects. Furthermore, it is clear that reflection and learning are essential components of reflective practice.

Future areas for research indicate the need to trial the Reflective framework within the workplace to estimate the impact on reflective practice. This would remove the influence which assessment of reflective writing may have had on the outcomes of this research. However, it was not clear how practitioners could be motivated to use the framework in a practice situation. There was a possibility the framework could be used to support the developmental process of constructing electronic professional portfolios, a contemporary topic requiring further investigation.

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Appendix 1: Three-Step Reflective Framework Template

Three- Step Reflective Framework for ePortfolio

Step 1: Take notice & describe the experience - description of evidence

1.1. What do you do, know, feel, think, need?

Draw your attention to your recent activities, and record a basic description.

1.2 What decisions did you make?

What steps or actions did you take, and decisions did you make to get to your current level of ability/knowledge?

Prompts:

- Comment on what you have been doing, feeling, thinking, etc...
- Comment on what you know, need, etc...
- Consider how this topic relates to your professional career.
- Comment on whether what you already know helped you.
- Comment on initial reactions, ideas from your reading, researching, teaching experiences or simulations, etc...
- Indicate what helped you to progress.

Tips: Use a variety of methods e.g. descriptive text, audio, pictures, bullet points, diagrams etc.

Step 2: Analyse the experience - implications of decision/action, reaction

2.1 Why these decisions and actions?

Analyse your decisions and actions. Think about why they were useful and how they helped. This process will assist you to become a more active learner and a more effective practitioner.

2.2 What was your reaction?

Make brief notes on your intellectual, emotional and physical responses. This will help you better understand the way you learn and practice. This will help you in future to choose strategies that suit you.

Prompts:

- Think about what happened and why.
- Outline what you could have done better or differently.
- Indicate some strategies which may help next time.
- Did it cause you to rethink your ideas about teaching and learning.
- Comment on what worked and what did not.
- Think about how your actions and decisions may help your practice.
- Consider the links between learning theory and your teaching practice.
- Think about what you learned.

Tips: Be honest with yourself and use the information to get a clearer picture of how you learn. Use as many different ways as you can to illustrate your points e.g. audio, video, diagrams, pictures etc. [Remember in the eportfolio, you can prepare more than one draft of an evidence form, so you can reflect openly in one version and publish another version that does not contain your reflection.

Step 3: Take Action - Reflect on what you learned and how it will be used

3.1 What did you learn?

Record what you have learned from the process. This will help you become more aware of what you learned, how you will apply it, and where there are gaps in your understanding and knowledge.

3.2 How will you use this experience?

Plan how you can apply what you have learned or deduced. This process will help reinforce what you have learned.

Prompts:

- Indicate what you learned.
- How will this change or affect your future practice?
- Indicate what helped you to learn.
- Identify what you need to explore further or seek help with.

Tips: Be prepared to ask for help and spend extra time to fill in the gaps in your knowledge. Set yourself realistic goals, and indicate when you will achieve them.

Appendix 2: Ethics approval for Preliminary Study



INITIAL APPLICATION APPROVAL

In reply please quote: HE05/067

Further Enquiries Phone: 4221 4457

20 April 2005

Ms B.Hegarty
5 Cottle St,
RD 2 Waitati,
Otago,
New Zealand

Dear Ms Hegarty

I am pleased to advise that the Human Research Ethics application referred to below has been **approved**.

Ethics Number:	HE05/067
Project Title:	Using metacognitive strategies to support professionals in health and education disciplines to develop electronic portfolios
Name of Researchers:	Bronwyn Hegarty, Dr Susan Bennett, Dr Lori Lockyer
Approval Date:	14 April 2005
Expiry Date:	13 April 2006

This certificate relates to the research protocol submitted in your original application as modified in your letter of **10/04/05**. As a condition of approval, the Human Research Ethics Committee requires that researchers immediately report:

- proposed changes to the protocol including changes to investigators involved
- serious or unexpected adverse effects on participants
- unforeseen events that might affect continued ethical acceptability of the project.

You are also required to complete monitoring reports annually and at the end of your project. These reports are sent out approximately 6 weeks prior to the date your ethics approval expires. The reports must be completed, signed by the appropriate Head of School, and returned to the Research Services Office prior to the expiry date.

Yours Sincerely,

Associate Professor Rod Nillsen

Chairperson

Human Research Ethics Committee

cc: Dr Lori Lockyer, Dr Sue Bennett, Education

Appendix 3: Subject Outline

Subject Outline

EDGI931/2

Interactive Multimedia Design

Subject Code: EDGI931/2

Subject name:

Interactive Multimedia Design (and Project)

Pre-requisites/co-requisites: none

Credit points: 6 + 2

Offered: Autumn, 2007

Mode: Flexible

Teaching Team

Dr. Sue Bennett

(Subject coordinator & Lecturer)

Faculty of Education

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Consultation with any member of the teaching team is available by appointment or email as appropriate.

Autumn Session 2007, Flexible


Faculty of Education

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Disclaimer

The University attempts to ensure that the information herein is up to date at the time of production, however we reserve the right to amend without notice in response to changing circumstances.

Bronwyn Hegarty 

Subject details

Subject description (from the Handbook)

This subject explores the instructional issues important in the design of media resources for Web and CD-based multimedia educational materials. Students will have an opportunity to design their own multimedia treatments for concepts of their choice, and using the software tools available, develop these into small on-screen presentations.

Objectives

By completing the assessment for this subject, students will be able to:

- Identify the role of different media elements in a multimedia resource
- Critically examine current issues and research in interactive multimedia design and use
- Select and design appropriate combinations of media to present concepts for an educational setting
- Use media production tools and authoring software to develop these designs as learning objects

Assumptions

Internet technologies are essential for information access and communication in this subject. Students are expected to have a competent level of skill in using these technologies and have access to the Internet.

Attendance

This subject is delivered in flexible mode online. Students are not expected to attend class, but are expected to maintain contact with the lecturer and participate in online communications activities as detailed on the schedule and subject Web site. An optional workshop will be held on 3 March, 2007 from 9:30am to 3:00pm (approx) in Room 22.107.

Hours per week

It is expected that students will spend 2 hours per week for each credit point (931 – 12 hrs/wk, 932 – 2 hrs/wk).

Method of delivery

This subject is delivered online through a Janison Toolbox Web site. Please login at <http://www.uow.edu.au/educ/janison/>.

Readings and References

There is no required text for this subject. Readings and other reference material are provided on the Web site.

Software

Students can choose from a range of software tools they have access to. Software requirements will vary depending on the projects chosen by students. The instructor will provide advice on an individual basis as required.

IMPORTANT: Communication with your lecturer

You have several options for communicating with your lecturer. If you have a question about the subject you should post a message to the online discussion forum under the thread 'Questions about the subject'. This allows other students to benefit from your query. Personal questions and requests for extensions should be emailed to your lecturer directly. You may also make an appointment to talk to your lecturer by phone. Please note I am available on Mondays, Tuesdays and Wednesdays only. Also bear in mind that I may not be able to respond to your query *immediately* on those days, but will get back to you as soon as I can.

IMPORTANT: Research project

This offering of EDGI931/2 will be the focus for a research study into how we can support students to use reflective strategies beneficial to learning about design practices and concepts. All students will be invited to participate in the study voluntarily. The nature of the study and participation in it will be explained at the beginning of the session. All students, whether participants in the study or not, will have access to the same learning materials and supports.

Assessment guidelines

To pass the subject students need to ATTEMPT and PASS ($\geq 50\%$) ALL components. Marks will not be modified or scaled.

Students should refer to the “Guide to Assessment of Written Work” in the Faculty of Education Handbook for general assessment criteria. The handbook is online at <http://www.uow.edu.au/educ/>.

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%

Submission

Unless otherwise arranged, students should submit their assignments as specified on the subject Web site. Please ensure you have named your files so that they can be easily identified as your work. Within the document of all submitted assignments your name and student number must be clearly identified. Students should refer to the Faculty of Education handbook for specific information on faxed and mailed assignments.

Original Work

Assessment work submitted is expected to be original work created specifically for this subject. It is not acceptable to submit previous course projects as assessment for this one.

Acknowledgment and Plagiarism

In all cases students should appropriately reference source material. Please refer to the Faculty of Education Handbook regarding appropriate acknowledgment of. Students also should refer to the University of Wollongong’s policy on Plagiarism available in the University Calendar

(<http://www.uow.edu.au/student/calendar/rules/plagiarism.html>). 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. All assignments must be submitted by the due dates stated in this Subject Outline.

Late submission

Penalties may be incurred for late submission of assessment tasks. It is the student's responsibility to contact the subject coordinator regarding late submission circumstances and/or extensions.

Extensions

Students may apply to the subject coordinator for an extension to submit an assessment. Applications should be submitted in writing via email BEFORE the due date and a one week extension will be given (unless there are reasons provided for a longer extension).

Medical certificates

See the Faculty of Education handbook for details.

Future use of assignment work

Having access to the work of past students and classmates is an important resource in this program. As such we request permission to use your assignments as examples to other students. The assignment will clearly acknowledge you as the author, but all other personal details will be removed. Please advise your lecturer if you do not want your work to be made available to current or future students.

Assessment tasks

All of the tasks in EDGI931 involve you in the process of developing a design portfolio throughout the session. The tasks break down some of the tasks you would undertake in creating a portfolio:

1. Creating evidence of your design skills through practical activities which require you to create a variety of multimedia learning resources (in this case learning objects)
2. Writing supporting statements for each of the learning objects you create to justify your application of design principles by explaining what you have designed, why you chose to design it in that way and how you went about the process
3. Getting you to stop and reflect on your design process and its outcomes during the process

Each of the tasks are described in detail below.

EDGI931 Task 1: Portfolio of three learning objects

Due dates: See schedule

The purpose of this assignment is to enable you to apply some of the multimedia design principles you have learned in practice. You will develop 3 learning objects based on 3 different concepts of your choice, each with an educational purpose. You can choose any topic and any target audience.

The reason for asking you to design a learning object is that you are aiming to create a learning resources that is small, focused and polished. Look at the examples from past students on the subject Web site to see what this means.

Within your portfolio of learning objects you should demonstrate various combinations of multimedia (text, graphics, animation, audio and/or video) across the learning objects as appropriate to your skill level and background knowledge. If possible choose 3 different formats. For example, a Web site, a PowerPoint presentation, a Flash animation, a short digital video, a podcast etc. It's OK to use some pre-existing media resources (such as images from the Web etc.), but you should also create some of your own. There is no preferred format – the design is up to you!

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You should also aim to develop at least one new skill. In the short time we have in this subject it isn't possible to develop new production skills in all media. So choose something you would like to focus on. For example, develop your skills in animation using Flash or learn how to create digital video. Perhaps you have a new camera or piece of software you'd like to learn how to use. This assignment will give you the motivation! This is time to move out of your comfort zone, so pick something that is going to challenge you! You will be expected to learn the technical skills yourself, but your lecturer will help you with ideas for resources you might use.

Your lecturer can give you plenty of advice about this assignment, so please ask any questions.

Weighting: 30% (10% per learning object)

Format and Length:

This will depend on your topic and use of multimedia, but remember to keep your learning objects small and self-contained.

Assessment criteria:

Your learning objects should:

- Demonstrate appropriate use of a variety of multimedia elements
- Be appropriate to the content and the educational context of use
- Demonstrate re-use and re-development of existing material into an appropriate format and /or demonstrate the development of original components
- Maintain a consistent design throughout.

Submission instructions:

If your files are small (less than 1Mb), you can save your learning objects and supporting statements as a zip file and upload them to the Web site. If your files are large or you have a slow Internet connection, burn your assignment files onto a CD-ROM and forward to your lecturer.

EDGI931 Task 2: Supporting statement for each learning object

Due dates: See schedule

Each learning object must be accompanied by a supporting statement that reflects on your learning object, why you designed it in the way you did and how you developed it. Use the template on the subject Web site and examples to guide you. Explain where your ideas came from and make reference to any readings you have used. Clearly state where your media resources came from, ie. did you make them yourself or did they come from somewhere else?

Weighting: 30% (10% each)

Format and Length:

A supporting statement should accompany each learning object to describe the context of use and justify your design decisions. Each supporting statement should be at least 600 words in length.

Assessment criteria:

Your supporting statement should include:

- A clear description of the learning context
- The reasoning behind your design decisions and justification of them
- Description of the production process, including the technical issues encountered and your solutions
- Notes about any practical implications for implementation
- Clear identification of the source materials you have used to research and develop your media resources (in APA referencing style).

Submission instructions:

Save your assignment as a Word document and submit it through the Web site.

EDGI931 Task 3: Reflections on your design process

Due dates: See schedule

When you're designing something it's easy to become focussed on the particular project you're working on and not give yourself the opportunity to stop, take stock of what you are doing and why, and plan for what you need to do next. The purpose of this assignment is to raise your awareness of how you are approaching and working through your design tasks by asking you to stop and reflect at various times during the session. This will help you link the concepts you read in the literature with the ways you are applying those ideas in the design of your learning objects. It will also help you link what you are learning in the subject to the work you do as a teacher or designer in your professional life now or in the future.

Use the [reflective framework template](#) provided on the subject Web site to prepare your reflections. This will develop your reflective skills by taking you through a process that encourages you to be analytical rather than just descriptive.

You will submit your reflections four times during the session. Remember to provide citations for any readings you have drawn on and include a reference list at the end of your assignment.

Weighting: 40%

Format and Length:

Each reflection should be 600-800 words in length.

Assessment criteria:

Your journal should include:

- Explanation of the criteria which you have used to guide your analysis
- Description of the objectives and intended use of the resource
- Description of the use of media elements in the product
- Your judgement of the media use against your criteria with justification of your comments
- Recommendations
- Clear identification of the readings you have used.

Submission instructions:

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Submit your assignment through the Web site.

EDGI932 Task: Critical essay

Due Date: Tuesday, 28 May

Topic: What are the implications of the 'Net Generation' on the design of interactive multimedia learning resources?

This task requires you to submit an essay in which you critically analyse the current debate on the issue of the 'Net Generation' and consider what this phenomenon (if it indeed exists) means for those designing interactive multimedia resources.

Use the readings and articles provided as a starting point and then do your own research. You may use discussion of this issue in the popular press (such as newspapers, magazines and Internet sources) as a means of framing your argument or providing examples of popular perceptions of the issue. However, you must examine the academic and research literature as the primary basis for your work. Use the library's databases and search for online academic sources, such as conference proceedings.

Take care to be critical and sceptical of all sources. Ask about the evidence is advanced for arguments presented. Question the quality of the argument and its source, and differentiate between research findings, theoretical argument and rhetoric.

Remember to provide citations for any readings you have drawn on and include a reference list at the end of your assignment.

Check the subject Web site for examples of past student work so that you can see how others have approached this assignment.

Weighting: 100%

Format and Length: Word-processed document of 2000-2500 words in length.

Assessment criteria:

Your essay should:

- Provide a critical review of the current literature related to the essay topic

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- Put forward your position and support your ideas with argument and evidence
- Discuss counter arguments
- Clearly identify of the source materials you have used to research and develop your media resources (in the APA referencing style)

Submission instructions:

Save your assignment as a Word document and submit it through the Web site.

Schedule

This schedule gives a suggested timetable for study. The first part of the subject is devoted to reading and discussion. The remainder of the subject is for you to complete your own research and assignment work.

Week	Topics and activities	EDGI931 Due Dates	EDGI932 Due Dates
1 26 Feb	Topic: Introduction Saturday 3 March: Optional workshop, 9:30am – 3:00pm, Room 22.107		
2 5 Mar	Topics: <i>Putting media together</i> <i>Learning objects</i> Tuesday 6 March: Chat session, 7:30-8:30pm		
3 12 Mar	<i>Topic: Designing text</i>	Reflection #1 (10%) Due Monday 12 Mar	
4 19 Mar	<i>Topic: Designing images and</i> <i>animation</i> Tuesday 20 March: Chat session, 7:30-8:30pm		
5 26 Mar	<i>Topic: Designing audio and</i> <i>video</i>	Reflection #2 (10%) Due Monday 26 Mar	
6		Learning object and	

Week	Topics and activities	EDGI931 Due Dates	EDGI932 Due Dates
2 Apr		supporting statement #1 (20%) Due Monday 2 Apr	
Recess 9 Apr			
7 16 Apr	Tuesday 17 April: Chat session, 7:30-8:30pm		
8 23 Apr		Reflection #3 (10%) Due Monday 23 Apr	
9 30 Apr		Learning object and supporting statement #2 (20%) Due Monday 30 Apr	
10 7 May	Tuesday 8 May: Chat session, 7:30-8:30pm		
11 14 May		Reflection #4 (10%) Due Monday 14 May	
12 21 May		Learning object and supporting statement #3 (20%) Due Monday 21 May	
13 28 May			Critical Essay (100%) Due Monday 28 May

Appendix 4: Preliminary Study document - Portfolio Preparation

Document (PPD)

This sample shows the start of the document and two sections of the document on the next page. There were different sections to fill out for each part of the process from Stages 1 to 4.

You will use this document to help prepare your electronic portfolio (e-Portfolio) and will record some of your reflections here. Each section is aligned with the stages for e-Portfolio development described by the researcher.

Participant:#####

Facilitator (Researcher): Bronwyn Hegarty

Date: #####

Process: Each section has four parts: 1. Action; 2. Samples of feedback from peers and facilitator; 3. Reflections by participant; 4. Feedback from facilitator on your reflections. Fill in the blank rows for each section in response to guidance and questions from the facilitator. Record the feedback from peers and facilitator obtained via the Discussion Forum (DF) (peer feedback is optional). You can select items which you believe are most important and do not have to record everything.

Reflections: Your reflections are your responses to peer and facilitator feedback, and your responses to reflective questions posed by the facilitator on the online Discussion Forum, thoughts and feelings etc. Samples of the reflective process will be recorded by you in this document, and some parts will be shared on the DF. The facilitator only will have full access to your *Portfolio Preparation Document* during the process.

PPD continued: Stage One – Preliminary – Section i. Aim and Purpose: the what, how and why of the portfolio.

<i>Action</i> – Record aim and purpose of e-Portfolio	#####
Samples of feedback from peers and facilitator	#####
Reflections by participant: #####	
Feedback from facilitator on your reflections: #####	

Stage One – Preliminary – Section ii. Goals: the objectives for your e-Portfolio.

<i>Action</i> – List your goals	1. ##### 2. ##### 3. #####
Samples of feedback from peers and facilitator	#####
Reflections by participant: #####.	
Feedback from facilitator on your reflections: #####	

Appendix 5: Preliminary Study Document - Journal Log of Progress

This sample demonstrates the sections of the log which participants in the Preliminary study were asked to complete as they prepared their portfolios. This is a personal record of how you are progressing with the goals you set for your portfolio. The facilitator will provide feedback and suggestions.

Action – Fill out the sections as you develop your portfolio.

Journal Log of Progress	Date Started	Item		Date Completed
		Activities & Evidence - overview	Progress – report on what you have been doing	
Goal 1	#####	#####	#####	#####
Participant Notes: Indicate what needs to be done, changed, added etc.		#####		
Facilitator Feedback		#####		

Appendix 6: Stages for e-Portfolio Development and Associated Activities

The following instructions were provided to participants in the preliminary study. Use the *Timeline* provided in Blackboard to see when the following stages are estimated to occur.

Stage One - Preliminary

DF: Stage One - Preliminary

In this stage, you will decide on the aim, purpose and goals of your portfolio and discuss your values as a practitioner. You will use the Portfolio Preparation Document (PPD) to record these elements and begin to develop your reflections.

Steps:

- Decide on the aim and purpose of your portfolio, and set yourself three goals.
- Respond to the facilitator's questions on DF (*Stage One - Preliminary*).
- Record aim, purpose and goals on the *Portfolio Preparation Document (PPD)* – Sections i – iii. (Document saved as: *your name* Portfolio Preparation Document.).
- Post document on Discussion Forum (*Stage One - Preliminary*)
- Discuss your values as a practitioner on DF.
- Fill in relevant parts of *Stage One – Preliminary - Section iii. Values* in PPD.
- Submit completed sections of PPD to facilitator via Digital drop box.

Stage Two – Decisions

DF: Stage Two – Decisions

For this stage, you will decide on the activities you will undertake to achieve your goals, and the evidence you will need to develop for use in the portfolio. You will also explore the culture you work in, and get started on preparing the items (evidence) for your portfolio. Reflections will continue to be recorded in the relevant sections of the PPD.

Steps:

- Explore the culture you are working in by using the DF.
- Respond to facilitator's questions on DF (*Stage Two - Decisions*).
- Summarise some of the DF discussions and add your reflections to PPD - section *Stage Two – Decisions –Section 1. Culture*.
- Record changes to aim, purpose and goals, and reasons for changing them, on PPD along with your reflections –*Stage Two – Decisions – Section ii. Changes to aim, purpose, goals*.
- Decide on the activities, and the evidence to be used – use the DF to help with this.
- Record activities and evidence on your *Portfolio Preparation document*.
- Post document on DF (*Stage two – Decisions*).
- Add feedback to your PPD and your reflections.
- Prepare evidence for portfolio and continue to use DF for assistance.
- Add report and reflections on preparation process to PPD.
- Fill in PPD – section *Journal Log of Progress*.
- Submit PPD to facilitator via Digital drop box.

Stage Three – Content and Self-reflection **DF: Stage Three – Content and Self-Reflection**

This stage is where you will focus on both selecting items of evidence for inclusion in the portfolio, and on your responses to the processes involved in developing an electronic portfolio. A further series of questions will be used by the facilitator to help you with this stage, and the PPD and DF will be used intensively.

Steps:

- Select items of evidence to be used for your portfolio. (These may be samples of written work, graphics, video clips, audio etc.)
- Place samples on DF for peer and facilitator feedback.
- Respond to peers on DF as appropriate.

- Respond to the facilitator's questions on DF.

Record items and reflections on your PPD as appropriate, in each of the following three sections in *Stage Three – Content and Self-Reflection*:

Section i. *Reflection on Samples of Evidence* (record and reflect on samples of evidence selected for your portfolio);

Section ii. *Reflection on Progress* (provide a reflection on progress),

Section iii. *Other Reflections* (Summarise other reflections you want to record in response to questions from facilitator).

- Share selected reflections on the DF.
- Adjust aim, purpose, goals in *Portfolio Preparation Document (Stage Three – Content and Self-Reflection - Section iv.)* if necessary.
- Fill in *Journal Log of Progress* in PPD.
- Submit PPD to facilitator via Digital drop box.

Stage Four - Organization and Presentation **DF: Stage Four – Organization and Presentation**

In this stage, the final selection of digital content is prepared in a portfolio template. The reflective process continues using the DF and PPD. Finally, the electronic portfolio is displayed e.g. website, file, CD-Rom.

- Decide on the software you will use to construct your portfolio - use the DF to help with this.
- Select relevant content for your portfolio - use the DF to help with this.
- Construct your e-Portfolio using the chosen software programme.
- Use DF (*Stage Four – Organization and Presentation*) to recruit assistance as needed and to display samples of your work for feedback.
- Respond to the facilitator's questions on DF.

- Add items and reflections to your PPD in each of the following three sections in *Stage Four – Organization and Presentation*:

Section i. *Reflection on Organisation and Presentation of Portfolio* (record and reflect on samples of evidence selected for your portfolio);

Section ii. *Reflection on Progress* (Provide a reflection on progress);

Section iii. *Other Reflections* (summarise other reflections you want to record in response to questions from facilitator).

- Fill in *Journal Log of Progress* in PPD and reflect on progress on DF.
- Prepare your e-Portfolio for presentation in the mode you have chosen.
- Provide details on DF about how to access your portfolio.
- Post feedback to peers on DF.
- Submit PPD to facilitator via Digital drop box.

Appendix 7: Preliminary Study Interview Questions

Appendix 7.1: Preliminary Study - Initial Interview Questions

1. State your job position and area of professional practice.
2. Please describe your experience in your area of professional practice.
3. What type of evidence are you required to present to your employer or professional association as a practitioner?
4. Have you previously used a journal or portfolio or other reflective techniques for professional development purposes? If so, can you describe the nature of the journal/portfolio?
5. What processes do you use to critique your practice with the aim of improving what you do?
6. What type of electronic resources do you use presently for learning and in your practice? Please outline how confident you feel overall in using these electronic resources and why.
7. Do you have any reservations about using reflective techniques? a. Please explain.
8. Are you willing to participate in an online discussion forum with other participants?

Appendix 7.2: Preliminary Study - Final Interview Questions

These questions were formulated once some of the data i.e. the initial interview and discussions were examined.

Researcher: I just want to acknowledge that you didn't get as far as developing an electronic portfolio as such, so we will be talking about the process and the strategies you have used throughout the process.

1. Please describe how you feel about the portfolio development process overall.
 - a. What you liked
 - b. What you disliked
 - c. What helped
 - d. What hindered.
2. Did you find it difficult to set the aim, purpose and goals?

3. How you find the instructions for each stage of portfolio preparation?
 - a. How did you find the Portfolio Preparation Document (PPD)?
 - b. Which parts were used? For example, have you filled in your aim, purpose, goals and activities?
 - c. How was it helpful?
 - d. Was it easy to understand what you needed to do?
 - e. Did it help you reflect?
4. How did you find the Discussion Forum process?
 - a. In helping you reflect?
 - b. In preparing material for your portfolio?
5. How were you encouraged to reflect during the process?
6. Do you believe you have been critically reflective in this process? If yes, how? If no, why not?
7. Has the portfolio development process helped you become more aware of your strengths and weaknesses as a practitioner?
 - a. That is did it promote reflective practice?
 - b. Help you reflect during your practice – reflection-in-action?
 - c. Help you reflect about your practice – reflection-on-action?
8. What would have helped you meet the goals you originally set for your portfolio?
9. Do you intend to go on and achieve the goals you set and put this material into an electronic portfolio?
10. What would have made the portfolio development process easier or simpler?
11. Would you prefer to start with a piece of evidence and then be guided to reflect on this in relation to your professional practice?
12. What have you learned from what you did in the process of planning for an electronic portfolio?
13. What sort of learner do you believe you are?
 - i. Active – discuss, apply, explain, group work.
 - ii. Reflective – think about topic
 - iii. Sensor - learn facts
 - iv. Intuitive – more innovative, prefer to understand concepts
 - v. Visual – pictures, demonstrations, diagrams
 - vi. Verbal – written and spoken
- b. What is your cognitive style?
 - i. analytical or sequential – step-by-step – break things up
 - ii. global – holistic – look at the big picture

Learning styles questionnaire: <http://www.engr.ncsu.edu/learningstyles/ilsweb.html> (Felder & Solomon, 1991).

Appendix 8: Preliminary Study Strategies and Outcomes

Matrices of the outcomes for the research processes used in the preliminary study are shown in Table 34 and Table 35. The reflections on evidence which resulted from the seven prompting questions in the Bright Ideas discussion forum are shown in Table 36.

Table 34: Outcomes for stages one to four in the preliminary study.

Process	Outcome
Stage One – Preliminary DF and PPD.	All contributed ideas to the DF for this stage though the process was slow. Two participants did not confirm aim, purpose and goals. Only one participant added information to their PPD.
Stage Two – Decisions DF and PPD.	Most contributed well to this on DF. One participant did not develop aim, purpose and goals. No-one added items to PPD for this stage.
Stage Three – Content and Self-Reflection.	No-one reached this stage on DF or in PPD. However, when the “Bright Ideas” Discussion Forum was started, two participants provided evidence and reflected on the evidence using guided questioning techniques which were facilitated by the researcher. This process was equivalent to Stage Three.
Stage Four – Organisation and Presentation.	No-one reached this stage on the Discussion Forum or PPD. However, components of what was required in this stage were undertaken by two participants. For example, two participants presented evidence they had selected for an ePortfolio in Word and in a digital story format. The pieces of evidence were not placed into the final software application to be used for their ePortfolio .

Appendix 8: continued.

Table 35: Outcomes for some specific strategies used in the preliminary study.

Process	Outcome
Portfolio preparation Document (PPD)	One applicant completed Stage One – Preliminary (not analysed).
Journal log of progress	No-one completed this aspect of the PPD.
Discussion board (DB) (contained forums)	All participants contributed to Introductions; Stage One – Preliminary; Stage Two – Decisions. The other forums were not used. Two participants contributed to the “Bright Ideas” forum.
Peer interaction on Discussion Forums	Five instances occurred.
Email communication	Some participants used this method to communicate with the researcher; asking questions about the process; setting up interviews.
Aim, purpose, goals	A lot of confusion developing these aspects – all apart from one developed them.
Activities to meet goals	Three people chose an activity to focus on.
Activity about values	All participants contributed to the discussion around <i>values</i> undertaken in the Stage One – Preliminary Discussion Forum; one participant added <i>values</i> information to their PPD.
Activity about culture	All participants contributed to the discussion around <i>culture</i> undertaken in the Stage Two - Decisions Discussion Forum. There was some confusion about the relevance of the activity to examine the culture they were working in and how it could be linked to development of their ePortfolio. No one added information about culture to their PPD.
Bright Ideas Discussion Forum	Two participants contributed to this and presented samples of evidence representing <i>reflection-on-action</i> which they were then guided to reflect on <i>reflection on reflection-on-action</i> .

Appendix 8: continued.

Reflections on evidence: The researcher used seven prompting questions in the Bright Ideas discussion forum to assist the participants to examine their evidence and reflect on the content.

Table 36: Reflections on evidence in the Preliminary Study (n=2).

Questions	Responses
1. What was the main message you were trying to get across?	<p>Participant B: Trying to convey the crux of my learning from my FLLinNZ year - I wanted to find a way of doing this that would gain people's attention and hold it. In publishing X's story the main message I wanted to get across was that therapists didn't need to look for formal learning to demonstrate competence.</p> <p>Participant C: My story is about my professional development and where it led me using skills and knowledge I learnt along the way. Now .working on how .. to incorporate this learning into my practice and share it with others.</p>
2. What were the most important points?	<p>Participant B: This was a journey for X - not everything she tried worked because it didn't fit well with her learning style. She had to understand what she needed in order to find it, that she used others as resources, and that things like supervision or learning could happen via the Internet or the phone - not everything had to be face to face. Also that working it out for herself was probably the most powerful learning.</p> <p>Participant C: Developing as a leader ... finding out who you are, what you are capable of .the way you present yourself to others. I chose a digital story ... because stories are personal and in the telling of them we understand ourselves a lot more. A great deal of reflection went on as I was developing my digital story. Now in this project I intend to unpack this thinking even further and document it.</p>
3. How did you decide what to put in your story?	<p>Participant B: Word limit ... needed to create X as a real person, and to do so I drew from the real stories I heard from practitioners. I had a number of solutions for X - things she had tried and worked, things that hadn't ... had to decide what would be realistic options for X based on what I was creating her to be.</p> <p>Participant C: The messages I thought were important to share I was very driven to talk about what had impacted on my professional development – leadership, facing my fears, professional development ... what worked for me, reflective practice e.g. DST, blogging, ePortfolios, networking, technology</p>

Questions	Responses
4. How did you decide what to leave out?	<p>Participant B: Most of this was in my head not on paper - so remembering what I had originally thought would go in and what didn't end up is a bit problematic (<not> if I was a reader/writer!). I left out options that were too way out in left field e.g., have her join a virtual conference ... was using ..scaffolding - providing a picture of X involved mostly in things that people are possibly already doing, but at the same time putting out one new idea ..</p> <p>Participant C: Set myself some criteria I wanted to cover in my presentation. ... believed these were the key new areas of learning for me. Anything that didn't fit with this wasn't relevant .. had to be strict .. time a real pressure ... worked hard on the script ... captured the most important points I wanted to share through my story.</p>
5. Does the story reflect your values?	<p>Participant B: Good question. If look at my new credo statement X's story probably does. "The belief that everyone is capable of learning underpins all I do." Have a zest for learning – my own and others. ... curious about the ways in which learning is theorised and these ... shape the ways in which I think about the people I work with, <clients> or colleagues in practice. aim to work in partnership in the story I tried to show how her friend helped her to identify her needs and to create this vision of X being able to stay in the profession as she was able to find the things she needed to demonstrate learning.</p> <p>Participant C: Absolutely! My values are at the core of everything I am and what I do e.g., making a difference and being passionate about it. An ardent lifelong learner - changing the way we do things meets the learner's needs, willing to share my knowledge and skills, value receiving feedback to enable me to improve what I do and offer to others. My own reflections as a practitioner on everything that I do are targeted at always improving to ensure the best outcomes possible for everyone concerned. Reflection is an important aspect of my practice although I don't usually commit my professional reflection to paper or electronically. Changing as I work on my blog.</p>
6. What does the story say about you as a practitioner?	<p>Participant B: Not sure what you mean here - practitioner as educator, or practitioner as in <clinical>? Educator – the story shows my understanding of learning theories and an ability to reconceptualise learning – as a practitioner – I tried to think about what I would be like if I had continued in practice – what would I have needed – so I guess the story reflects what I continue to believe which is that I'm a clinician who happens to teach just at the moment. I'm not an academic, and I'm not only a clinician – I meld the two worlds together?</p> <p>Participant C: My story shows I am prepared to try something new, to put time into learning how to do it, and to not be afraid to be different. Creating this story challenged me but I learnt a lot of new skills in the process. It shows directly that I was engaged as a learner. I practice what I preach! Also shows I believe learning can be, and should be, fun and exciting. My story showed I can be serious without being solemn and I am not scared to laugh at myself.</p>

Table continued.

Questions	Responses
7. Why did you choose the format?	<p>Participant B: Chose an avatar because at the time I was trying to work out what I was going to do with my presentation. I also was trying to write X's story. In thinking through what I had got from my FLLinNZ year I also realised that X's story in many places paralleled my own story - so in trying to be creative I chose X to tell her story, ... was able to draw connections with my own; related to my FLLinNZ learning but also the culture of my profession.</p> <p>Participant C: Stories are full of emotion. They connect us to other people's lives and experiences – they are real. I loved the way I could capture images I had taken, with voice and also a soundtrack. I picked the soundtrack because it also communicated a message I wanted to send – this was a fast paced frenetic year and I survived!</p>

Appendix 9: Example of a Journal Entry using the Reflective Framework

The following example is a guide to what you might record as a journal entry using the **Three-Step Reflective Framework**. Please refer to the concept map showing the four stages and the table showing prompts and tips for more detail:

1. Take notice and describe the experience.
2. Analyse the experience.
3. Take action.

Table 37: Example of a journal entry using the Three-Step Reflective Framework.

Reflective Framework	Example of reflective journaling using the framework
1. Take notice and describe the experience.	Somehow I have to get this project done in four weeks. I have no idea where to start or what to do. It is very confusing, and although there are guidelines I am still unsure of the type of thing I should create which would fit the theoretical model. Should I create something relevant to my teaching?
1.1. What do you do, know, feel, think, need?	I do need something to help my students understand how to sift through all the information available on the Internet, efficiently, and so they use reliable sources not just any old thing.
1.2 What decisions did you make?	<p>I spent the day exploring some options to help me decide what to design. First of all I need to design something which I can use in my own teaching e.g. using the Internet is problematic for my students. This will save me time in the long run, and give me some practice designing and creating something for the classroom.</p> <p>The learning environment needs to:</p> <ul style="list-style-type: none"> Be practical Provide a solution Use easily available software Meet design standards - what are they? Fit into an information landscape model – what is this? <p>The reading provides some good information: e.g. “Information Landscapes Florin, F. (1990) Information Landscapes. In S. Ambron & K. Hooper (Eds). Learning with Interactive Multimedia. Microsoft Press. pp. 27-49.”</p> <ul style="list-style-type: none"> • Decided to make a list to get going. • Search the Internet for information about democratic and prescriptive instructional design • Find a free, easy to use software for concept mapping • Create a step-by-step guide

Table continued.

Reflective Framework	Example of reflective journaling using the framework
<p>2. Analyse the experience.</p> <p>2.1 Why these decisions and actions?</p>	<p>Two decisions</p> <p>1. Create something to help the students sort through all the information they come across on the Internet. I did this for lots of reasons, to: help them become more digitally literate; save time; find reliable sources of information.</p> <p>2. Make a list of things to do – this would help keep me focused. The list worked well, but I had trouble finding free software which was easy to use. It looks like digital information literacy is a huge area to delve into. I will have to focus on one small area e.g. evaluating information rather than trying to help them search as well. Will have to write a lot of the material. But what standards should I align with? I'll need to ask a librarian.</p> <p>Digital information literacy fits well as the topic requires some exploration and the students need to know what they are looking for when searching the databases and Internet.</p>
<p>2.2 What was your reaction?</p>	<p>I am really excited about the prospects. Finding out that the job ahead was so huge, made me want to give up right there and then. I was sick of all the materials I found which were mainly text. Where is all the interesting and fun stuff? Some concept maps on the subject to help sort out the mass of information. Looks like I will have to create my own.</p>
<p>3. Take Action.</p> <p>3.1 What did you learn?</p>	<p>I learned that I need to find out more about digital information literacy such as a definition of what it actually is. I found a really good concept mapping software called C-Map and after much trial and error managed to make a concept map to illustrate the main points about digital information literacy. I still need to practice using it so I can create an interesting and fun resource for the students to use.</p>
<p>3.2 How will you use this experience?</p>	<p>What helped me learn how to use the software was having a real thing to create, otherwise it is all hot air and meaningless! I think I will ask one of the technology centre staff to show me some short cuts with Cmap or maybe M as she is using it already in her teaching.</p> <p>Hey I could get the students to create their own concept maps when planning what they will search for or they could use a table to lay it all out. This means I need to include options in the resource to help students with evaluating digital information such as a concept map or table to organise what they need to do. I also need to practice searching for something and evaluating it so I can decide on some criteria to include – maybe create a checklist as well.</p>

Appendix 10: Comparison of Theoretical Frameworks

Table 38: A comparison of the Levels of Reflection taxonomy with other frameworks.

Levels of Reflection taxonomy	Sparks-Langer et al. (1990) Framework for reflective thinking.	Hatton & Smith (1995) and Rodgers (2002)	Other Theories/ Examples	Comments/Examples
Descriptive reflection – Level 1 - includes sub-categories: <i>Noticing</i> ; <i>Deciding</i> ; <i>Stating</i> ; <i>Goals</i> ; and <i>Self-Questioning</i> . <ul style="list-style-type: none"> ▪ Writing is superficial. ▪ Participant describes the process but no reasoning or reflection or emotional response is apparent. ▪ Participant describes what has happened and what he/she sees, knows, feels, thinks, needs at a superficial level (<i>Noticing</i>). ▪ States decisions made but not why (<i>Deciding</i>). ▪ Participant states what occurred without providing rationale or emotional responses (<i>Stating</i>). ▪ Goals are stated or implied with no reasons given (<i>Goals</i>). ▪ States an actual question about what he/she should do personally or professionally without reasoning apparent (<i>Self-</i> 	Level 1 - No descriptive language; Level 2 - Simple lay person description Level 3 - Events labelled with appropriate terms.	Descriptive writing <ul style="list-style-type: none"> - Not reflective. - Description of events with no attempt to provide reasons/justification for events (Hatton & Smith, 1995, p. 48). Phase one - Presence in experience: Learning to see - ability to perceive and respond intelligently (Rodgers, 2002, p. 234). Phase two – Description: Learning to describe and differentiate - “look and see the variety and nuance present in ... moments” and not interpret (Rodgers, 2002, p. 237).	Concrete experience (Kolb, 1984). Description – an event is described in detail, i.e., what happened – Level 1 (McCollum, 2002). Routine reflection – Focus & Inquiry - self-centred concerns; questions about needed personal change are not asked, critical questions are limited to critique of others (Ward & McCotter, 2004).	Sparks-Langer et al. (1990) mention two kinds of descriptive reflection- one which includes reasoning - Level 4 (equates to Explanatory reflection in Levels of Reflection taxonomy) and the other evidence from the literature Level 5 (equates to Supported reflection in Levels of Reflection taxonomy). Two types of reflective writing described by Hatton and Smith (1995) fit with Explanatory reflection, also Descriptive & Dialogic Reflection. Based on Hatton and Smith, 1995, writings, I interpreted Dialogic Reflection as including exploration and examination - “exploring and examining why things occur the way they do” (p. 46). Before being able to ‘mull things over’ do they have to demonstrate

Questioning).

Explanatory reflection – Level 2 - includes sub-categories: *Personal; Professional; Deciding; Stating; Learning; Reactions; Goals; and Self-Questioning*

- An explanation is written about the process with reasoning apparent and rationale provided.
- There is evidence of reflection both personal and professional.
 - Uses terms such as *I believe* and *I need* with

Level 4 - Explanation with tradition or personal preference given as the rationale; (Sparks-Langer et al., 1990.)

Level 5 - Explanation with principle or theory given as the rationale (Sparks-Langer et al., 1990).

Phase three - Analysis of experience: Learning to think critically and create theory (Rodgers, 2002). “Analysis involves generating a number of different explanations about what is going on and settling on a theory or hypothesis to test in action” (p244).

Reflective observation (Kolb, 1984).

Justification – rationale of an action and why an event was important – level 2 (McCollum, 2002).

Technical reflection – Inquiry - questions asked by oneself about specific

what they have learned and how they have reacted to the evidence (equates to Supported Reflection in Levels of Reflection taxonomy)?

Could Dialogic Reflection equate to Explanatory reflection in Levels of Reflection taxonomy – if ‘mulling about’ in context of their professional practice and own perspective?

I wonder if this is where they explore their own opinions and beliefs to develop their own “systems of meaning” (Allen & Jeffers, 2000, p. 9), before being able to state their beliefs and analyse other perspectives - dialectic.

Technical rationality – appears first in reflective writing as **technical** - (decision-making about immediate behaviours or skills) – drawn from a theory base but interpreted from personal worries or experience (Hatton & Smith, 1995, p45).

Dialogic reflection is:

“Such reflection is analytical or/and integrative of factors and perspectives and may recognise inconsistencies in

<p>reasons why. <i>I consider myself, I think I feel.</i></p> <ul style="list-style-type: none"> ▪ Rationale for the decision-making process – why further investigation or learning is needed, ‘thinking out loud’ to determine the design of the learning object. <ul style="list-style-type: none"> ○ Or deciding what they need to learn to make it happen. ▪ Self-questions - asks questions of herself/himself and reasoning is apparent. ▪ Explanations about the intellectual, emotional and physical responses associated with the process are included. ▪ Statements with reasoning about what the writer learned from the process are provided. ▪ States what occurred with reasoning apparent and rationale provided. ▪ Also explanation for goals which are stated for items or areas where further learning or investigation is needed. 	<p>Descriptive reflection Reflective, not only a description of events but some attempt to provide reason justification for events or actions but in a reportive or descriptive way. For example, "I chose this problem-solving activity because I believe that students should be active rather than passive learners." (Hatton & Smith, 1995, p. 48).</p> <p>Dialogic reflection Demonstrates a "stepping back" from the events/actions leading to a different level of mulling about, discourse with self and exploring the experience, events, and actions using qualities of judgements and possible alternatives for explaining and hypothesising. Two forms:</p> <p>(a) Reflection based generally on one perspective/factor as rationale.</p> <p>(b) Reflection is based on the recognition of multiple</p>	<p>situations or implied by frustration, unexpected results, exciting results or analysis of complex situations – then stops asking questions when issue is addressed (Ward & McCotter, 2004).</p> <p>Dialogic reflection – Inquiry - situated questions lead to new questions (Ward & McCotter, 2004).</p>	<p>attempting to provide rationales and critique, for example, "While I had planned to use mainly written text materials I became aware very quickly that a number of students did not respond to these. Thinking about this now there may have been several reasons for this. A number of students, while reasonably proficient in English, even though they have been NESB learners, may still have lacked some confidence in handling the level of language in the text. Alternatively, a number of students may have been visual and tactile learners. In any case I found that I had to employ more concrete activities in my teaching." (Hatton & Smith, 1995, p. 48).</p>
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<p>Supported reflection – Level 3 - includes sub-categories: <i>Evidence Mentioned; Evidence Identified; Learning from Evidence; and Reactions to Evidence.</i></p> <ul style="list-style-type: none"> ▪ Reflective writing refers to or provides evidence to support statements. ▪ Includes references to design theory and learning theories and principles in the literature. ▪ Reference made to concepts and principles related design theory and learning theories but references are not provided. ▪ Concepts are clearly outlined and linked to design and/or learning theories in the literature. <ul style="list-style-type: none"> ○ Concrete examples are provided, i.e., references and rationale. ▪ Some discussion of ideas but no new perspectives. ▪ Learning of concepts read about or discovered in subject is mentioned. ▪ Explanations about the 	<p>Level 5 - Explanation with principle or theory given as the rationale; Level 6 - Explanation with principle/theory and consideration of context factors (Sparks-Langer et al., 1990.)</p>	<p>factors and perspectives. (Hatton & Smith, 1995, p. 48). Recognition of <i>alternate</i> viewpoints in the research and literature which are reported. For example, “Tyler (1949), because of the assumptions on which his approach rests suggests that the curriculum process should begin with objectives” (cited in Hatton & Smith, 1995). “Yinger (1979), on the other hand argues that the "task" is the starting point. Two forms:- (a) Reflection based generally on one perspective/factor as rationale. (b) Reflection is based on the recognition of multiple factors and perspectives” (cited in Hatton & Smith, 1995). Phase three from Rodgers (2002). Phase four – Experimentation: Learning to take intelligent action</p>	<p>Abstract conceptualisation (Kolb, 1984).</p>
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intellectual, emotional and physical responses to evidence.

Contextual reflection – Level 4 - includes sub-categories: *Analysis*; *Cross-linking*; and *New Perspectives*.

- Dialectic reflection is evident - analysis of different perspectives in relation to one's own ideas and beliefs [so has to state these].
- Writing about new perspectives which the author has developed as a result of his/her analysis based on evidence which is clearly stated.
- Cross-linking to several different sources occurs with reference to what the writer believes is important.
- Evidence of new ways of thinking by the writer is demonstrated clearly based on theories and ideas in the literature.
 - What was learned and how it will be applied to professional practice.

Level 6 - Explanation with principle/theory and consideration of context factors (Sparks-Langer et al., 1990.)

(Rodgers, 2002).

Critical reflection

Demonstrates awareness that actions and events are not only located and explicable by reference to multiple historical and socio-political contexts.

For example, "What must be recognised, however, is that the issues of student management experienced with this class can only be understood within the wider structural locations of power relationships established between teachers and students in schools as social institution based upon the principle of control" (Smith & Hatton, 1992).

Phase three and four in Rodgers (2002).

Hatton and Smith (1995) skip contextual reflection and incorporate it in dialogic reflection.

Dialectic reflection - such reflection is analytic or/and integrative of factors and perspectives and may recognise inconsistencies in attempts to provide rationale and critique.

Provides recognition of one's personal belief system or conceptual framework (Allen & Jeffers, 2000).

When all factors in Allen and Jeffers (2000) are taken into account, I came up with the following interpretation of dialectic reflection:

Constructive - Inner dialogue about opposing perspectives:

- acknowledgement of own beliefs;
- examination of other perspectives;
- relate own beliefs to other perspectives;
- synthesis of new ideas/perspectives.

<p>Critical reflection – Level 5 – includes the sub-category: <i>Application of Learning</i>.</p> <ul style="list-style-type: none"> ▪ Writing demonstrates awareness of multiple theories and principles and multiple perspectives – ideas which go beyond the subject, the project and the self. ▪ The application to professional practice is evident. ▪ What was learned and how it can be used is outlined in the writing. ○ Mentions how learning will be applied and issues to be considered. 	<p>Level 7 - Explanation with consideration of ethical, moral, political issues (Sparks-Langer et al., 1990.)</p>	<p>Critical reflection</p> <p>Demonstrates awareness that actions and events are not only located in, and explicable by, reference to multiple perspectives, but are located in, and influenced by multiple historical and socio-political contexts (Hatton & Smith, 1995, p. 49).</p> <p>Phase three and four in – Rodgers (2002).</p>	<p>Active experimentation (Kolb, 1984).</p> <p>Critique – an explanation and evaluation of an action. What was learned or felt about an event – Level 3 (McCollum, 2002).</p>	<p>Hatton and Smith (1995, p. 45) mention a fifth level in their framework which aligns with reflection-in-action and includes descriptive, dialogic and critical reflection. That is, contextualisation of multiple viewpoints - drawing on the other four levels applied to situations as they occur. This occurs before Critical reflection in the Levels of Reflection taxonomy.</p>
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Appendix 11: Ethics documents – approval letter, email letter, consent form and information sheet



RENEWAL & AMENDMENT APPROVAL

In reply please quote: HE05/067

Further Enquiries Phone: 4221 4457

22 August 2006

**Ms Bronwyn Hegarty
5 Cottle St,
RD 2 Waitati,
Otago,
New Zealand**

Dear Ms Hegarty,

I am pleased to advise that **renewal** of the following Human Research Ethics application has been **approved**. This certificate relates to the research protocol submitted in your original application and all approved amendments to date.

Ethics Number: HE05/067

Project Title: Using metacognitive strategies to support professionals in health and education disciplines to develop electronic portfolios

Name of Researchers: Ms Bronwyn Hegarty, Dr Susan Bennett, Dr Lori Lockyer

Approval Date: 14 April 2006

Expiry Date: 13 April 2007

Please remember that in addition to completing an annual report the Human Research

Ethics Committee requires that researchers immediately report:

- ♦ proposed changes to the protocol including changes to investigators involved
- ♦ serious or unexpected adverse effects on participants
- ♦ unforeseen events that might affect continued ethical acceptability of the project.

You are also required to complete a monitoring report at the end of your project. This report will be sent out approximately 6 weeks prior to the date your ethics approval expires. The report must be completed, signed by the appropriate Head of School, and returned to the Research Services Office.

Yours Sincerely,

Dr Garry Hoban
Chairperson
Human Research Ethics Committee

cc: Dr Lori Lockyer, Dr Sue Bennett, Education

Email Letter:

Dear student

I would really appreciate your help with my doctorate research. My research project is called: Using a Reflective Framework to Develop Practice-based Evidence.

The research project will be carried out while you are a student in EDGI913 Instructional Strategies and Authoring, and involve two of your assignments. I am really looking forward to finding out whether the reflective framework I have developed for this research will help you with your assignments.

There is more information about the research project on the attached information sheet, and I hope you find the concept interesting and want to take part. If you do agree to join my project as a participant, please fill out the attached consent form and return it to Sue Bennett, Faculty of Education, University of Wollongong. I would feel very privileged if you decide to participate in my research. Please understand though that you are under no obligation to take part in the project.

If you have any questions about the research project, don't hesitate to contact me.

Yours sincerely

Bronwyn Hegarty

Doctorate candidate and researcher



CONSENT FORM

Research title: Using a Reflective Framework to Develop Practice-based Evidence.

Researcher: Bronwyn Hegarty, Doctoral candidate, University of Wollongong, NSW

Aim: I understand that the purpose of the study is to investigate how a reflective framework may be used to help professionals develop skills of reflection, and also create evidence which may be suitable for inclusion in an electronic portfolio in the future.

My part in the research: I will spend normal course time and use a three-step reflective framework as part of Tasks 2 and 3 in EDGI913 Instructional Strategies and Authoring. In agreeing to be a participant in this research, I understand that I will:

1. Fill in a short survey and return it to the researcher;
2. Allow the researcher to collect copies of my assignment work for Tasks 2 and 3 in the subject, and provide her with a copy of the electronic journal I keep while working on the assignments;
3. Participate in a 30 minute interview near the end of my course - conducted by telephone and recorded, then transcribed and analysed;
4. Check the accuracy of transcripts made of my interview.

I have had an opportunity to ask Bronwyn Hegarty any questions I may have about the research and my participation in it. I understand that, if I consent to be involved in this project, 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. Refusal to participate or withdrawal of consent will not affect my relationship with the researcher or other participants in any way, nor will I be excluded from any subject materials or interactions.

If I have any enquiries about the research, I can contact Bronwyn Hegarty (researcher) (+64 3 4793600; email: bronwyn.hegarty@gmail.com) and/or Lori Lockyer (+61 2 42215511; email: lori_lockyer@uow.edu.au) and Sue Bennett (supervisors) (+61 2 4221 5738; email:

Bronwyn Hegarty The Creative Commons license logo showing the CC symbol, a person icon (BY), a crossed-out dollar sign (NC), and a circular arrow (SA).

sue_bennett@uow.edu.au). If I have any concerns or complaints regarding the way the research is or has been conducted, I can contact the Human Research Ethics Officer, Human Research Ethics Committee, Research Services Office, University of Wollongong on (+61 2) 4221 4457.

By signing below I am indicating my consent to participate in the research entitled: Using a Reflective Framework to Develop Practice-based Evidence. The research will be conducted by Bronwyn Hegarty as it has been described to me in the information sheet. This research is part of Doctorate in Education, supervised by Lori Lockyer and Sue Bennett in the Faculty of Education at the University of Wollongong. I understand that the data collected from my participation will be used for the researcher's thesis and possible journal publications and conference presentations, and I consent for it to be used in that manner.

Signed

Date

.....

...../...../.....

Name (please print)

.....



PARTICIPANT INFORMATION SHEET

Research title: Using a Reflective Framework to Develop Practice-based Evidence.

Researcher: Bronwyn Hegarty, Doctoral candidate, University of Wollongong, NSW – located in Dunedin, New Zealand (+64 3 4793600; email: bronwyn.hegarty@gmail.com)

Supervisors: Lori Lockyer and Sue Bennett, Faculty of Education, University of Wollongong, NSW (+61 2 42215511; email: lori_lockyer@uow.edu.au; +61 2 4221 5738; email: sue_bennett@uow.edu.au)

Aim: To investigate how a reflective framework may be used to help professionals develop skills of reflection and also create evidence which may be suitable for inclusion in an electronic portfolio in the future.

Process: Students enrolled in the subject EDGI913 at the University of Wollongong are being invited to participate in my research. I will be asking you to spend normal course time and use a three-step reflective framework as part of Tasks 2 and 3 in EDGI913 Instructional Strategies and Authoring. In agreeing to be a participant in this research, you will be asked to:

1. Fill in a short survey and return it to the researcher;
2. Allow the researcher to collect copies of your assignment work for Tasks 2 and 3 in the subject, and provide her with a copy of the electronic journal you keep while working on the assignments;
3. Participate in a 30 minute interview near the end of your course - conducted by telephone and recorded, then transcribed and analysed;
4. Check the accuracy of transcripts made of your interview.

I will be using case study¹ methods to gather descriptive data which will be used for my thesis, and possibly journal publications and conference presentations. The survey will gather base-line data, for example, your educational background, professional role and experience as well as information about how you learn. The final interview will ask for your opinion about the reflective framework.

Time: The research will occur as part of EDGI913. Your main commitment will be the time it takes you to complete Tasks 2 and 3, along with approximately 15 minutes for the survey and 30 minutes for the interview. There will be some additional time to check the transcription of your interview.

Benefits and strategies: The benefits for you taking part in my research will be that you will get to use some different strategies to support your learning. The material which you produce may also be suitable for use in an *electronic portfolio* of your professional work in the future. For example, the *three step* framework to be used in the research may assist you in recording what you do as you work on Tasks 2 and 3, and may also be used to help you write up the design statement.

Consent and right of withdrawal: Participation in the research is completely voluntary, and you are under no obligation to participate, or, having consented, may withdraw consent and/or data at any time during the project and exit the research. Refusal to participate, or any request to withdraw from the research will not affect any relationship with the researcher, your lecturer or other participants in any way.

Confidentiality and security: All data collection will be done respectfully with your rights in mind, and confidentiality will be maintained at all times. Any data collected will be stored securely, with access limited to only the researcher and supervisors. All procedures for the handling and storage of data collected from you will adhere to ethical requirements to ensure confidentiality and to ensure data remains anonymous. Survey and interview data will be coded, and names will be removed from data such as your

¹ A **case study** is a method of [qualitative research](#), involving relatively small samples and in-depth examination of a situation, phenomenon or event. See [wikipedia](#)

reflective journal and assignments prior to analysis. Also any information with the potential to identify you will be removed. Pseudonyms will be used in the thesis, and any publications resulting from the research. You will be given the right of removal of data and/or information prior to publication.

Concerns re conduct of the research: If there are any concerns or complaints regarding the way in which the research is or has been conducted, please contact the Human Research Ethics Officer, Human Research Ethics Committee, University of Wollongong on (+ 61 2) 4221 4457.

Contact details for researcher: I am very pleased to answer questions concerning the research and procedures. Please contact me or my supervisors.

Bronwyn Hegarty (Doctoral Candidate) Located at: F204, Otago Polytechnic, Dunedin,
New Zealand

Ph: (+ 64 3) 479 3600 Email: bronwyn.hegarty@gmail.com

Appendix 12: Table of methodologies used in the main research study.

Table 39: Research questions, strategies used to promote reflection, data types and analysis.

Research questions	Strategies used to promote reflection	Data type	Analysis details
How do educational practitioners reflect when writing about their experiences?	Reflective Framework Written reflection assignments Supporting statements Subject lecturer feedback on assignments	Survey of participants Written reflections. Subject lecturer feedback on reflections Supporting statements Interview with subject lecturer	<p>1. The level of reflective writing - how they wrote at the following levels: Descriptive (no reasons given), Explanatory (analyse actions & decisions), Supported (evidence), Contextual (multiple perceptions), and Critical (socio-economic, political etc). a. coded each sentence in written reflections using level of reflection taxonomy; b. frequencies for each participant at each level of reflection and each sub-category; c. results written up – patterns and themes - tables and graphs; d. individual cases</p> <p>2. Three-step Reflective Framework and 3. Level of reflection comparison with Three steps of the Reflective Framework How they wrote within this using the Reflective Framework and whether they wrote at a particular level of reflection within each step of the Reflective Framework.: Step 1 – Take notice & describe the experience; Step 2 – Analyse the experience; Step 3 -Take action. a. results written up – graph (scatter) to show there is no correlation prepared (not used in final results); Table showing matrix – three-steps versus learning, goals, deciding sub-categories of levels of reflection.</p> <p>4. Written reflections - content analysis of professional focus. Themes and patterns emerged re what they were writing about (content analysis) – professional focus.</p> <p>5. Subject lecturer feedback on written reflections - content analysis.</p> <p>6. Supporting statements – evidence of reflective writing and content analysis.</p>
Research questions	Strategies used to	Data type	Analysis details

	promote reflection		
What do educational practitioners focus on when writing reflectively about their learning and practice?	Reflective Framework. Written reflection assignments.	Written reflections. Participant interviews. Survey.	<p>1. Written reflections – evidence of influence of reflective writing on professional practice – themes relating to professional learning and practice - content analysis. Comparison between all participants to look at differences and similarities – the table of differences and similarities – informs content analysis for professional focus. Provided basis for taxonomy.</p> <p>2. Participant interviews - Most of the data for this came from an analysis of the interviews with the participants –reflective practice, professional learning past, present & future. Collated the responses to each of the interview questions and look for trends and patterns, and themes.</p> <p>3. Survey - gave background demographics and descriptive data – reflection, professional learning.</p>
How does scaffolding support reflection on professional learning and practice?	Written reflections. Lecturer feedback on reflections. Reflective Framework. Face-to-face workshop – presentation about reflection and trial run writing with Reflective Framework.	Written reflections – use of Reflective Framework, comments about feedback. Subject lecturer feedback on reflections. Participant Interviews – how feedback helped, use of Reflective Framework. Interview with subject lecturer use of Reflective Framework.	<p>1. Written reflections - a. Content analysis of comments by participants about feedback – frequency of use of the steps in the Reflective Framework and matrix to compare steps with levels of reflection.</p> <p>b. Use of the Reflective Framework can occur by looking at the following: i. coding using steps of the Reflective Framework – frequency of use of the steps in the Reflective Framework - matrix to determine levels of reflection at each of the three steps; ii. Participant interviews - analysis of the interview transcriptions to determine how the participants used the Reflective Framework, how feedback from the lecturer helped them.</p> <p>2. Subject lecturer feedback on reflections – themes for scaffolding.</p> <p>3. Participant interviews – coded for professional reflection, also content analysis for how feedback helped and Reflective Framework.</p> <p>4. Subject lecturer interview – use of Reflective Framework in subject and impressions of reflective writing. How the lecturer felt she supported them.</p>

Appendix 13: Survey: Using a Reflective Framework to Develop Practice-based Evidence

Survey for Doctorate research project called: Using a Reflective Framework to Develop Practice-based Evidence

Researcher: Bronwyn Hegarty, Doctoral candidate, University of Wollongong, NSW – located in Dunedin, New Zealand (+64 3 4793600; email: bronwynh@tekotago.ac.nz) Please ensure you have read the information sheet and signed and returned the **consent form** to the researcher.

Please respond to all questions by filling in the grey areas on this electronic form:

Name: #####

Age (optional)? #####

1. What is your gender? Please click in the appropriate box: Male ☐
Female ☐
2. What is your current occupation and what role do you perform? #####
3. How many years have you been in this role or occupation? #####
4. Describe the role/occupation you are currently engaged in: #####
5. What sort of tertiary qualifications do you have? Please also state the years you gained them: e.g. Diploma of Teaching – 2002: #####
6. Do you have any previous experience keeping a journal (diary, learning log, weblog² or similar) for professional purposes: Yes ☐ No ☐

If you answer No, please go to question 9. If Yes, please answer all questions.

² Also called a **blog**, - a type of website where entries are made (such as in a [journal](#) or [diary](#)), displayed in a reverse [chronological order](#). A typical blog combines text, images, and links to other blogs, web pages, and other media related to its topic. See more on [Wikipedia](#) re definition.

7. Select the type of journal you have used to record your professional thoughts, experiences and events, by clicking in as many boxes as appropriate:

diary ☐ scrapbook ☐ learning log ☐ portfolio ☐ blog ☐
other ☐

Please explain what you mean by other: #####

a. What was the format of the journal? electronic ☐ hand written ☐

b. Describe the purpose of the journal here: #####

c. How long have you have kept a journal (months or years)?: #####

d. Please add any further comments you may have about your experience with keeping a professional journal: #####

8. Explain how you normally reflect on both your performance and the experiences you have during your professional life? #####

9. Outline your feelings and perceptions about using reflection as part of your professional life: #####

10. What do you do when you want to learn something new? For example,

a. What sort of approach do you take? #####

b. What type of support or methods do you use? #####

c. What do you find works best for you? #####

d. Please comment further about the way you like to learn: #####

Thank you for taking part in the research.

Please return your completed survey form to bronwynh@tekotago.ac.nz

Appendix 14: Levels of Reflection Taxonomy

Table 40: Levels of Reflection taxonomy.

No.	Node	Descriptions	Quoted example
1.	Levels of reflection	This category characterises the type of reflective writing demonstrated by the participant.	I am preparing a learning object in Powerpoint for the first assignment. I need to do something simple. I feel like I have started the project at last.
1.1	Descriptive reflection	Writing is superficial. Participant describes the process but no reasoning or reflection is apparent. Participant describes what has happened and the decisions made but not why.	I found a set of images and added small chunks of text underneath. I decided to use PowerPoint for the learning object this time.
1.1.1	Noticing	Participant describes the process - what has happened and what he/she sees, knows, feels, thinks, needs at a superficial level.	I had trouble with finding suitable images which I could reproduce. I think the whole all rights reserved copyright rules are a nonsense. I need to find some publicly available images.
1.1.2	Deciding	Decisions made by the participant are described but no reasons are provided.	I have decided to use Creative Commons images by attribution.
1.1.3	Stating	Participant states what occurred without providing rationale or emotional responses.	This lesson has two important parts; the first one is introducing for English alphabet concept (Letters, Small & Large Letters, and Alphabetical Order). The second part is a Quiz. I
1.1.4	Goals	Goals are stated or implied with no reasons given. They are explanatory when reasons given before or after or as part of the list. Note: re goals ³	My learning object must: start with the conclusion and then provide the details, make text concise, not include unnecessary white space, provide a page for printing or a file to be downloaded, explain what each link contains, design effective homepage

³ Less obvious goal but one all the same: "I was less worried about this as issues of cross-browser compatibility are important for learners to be aware of but will look for some way to incorporate this information into the object. (Probably by adding a resources page)".

Table continued.

No.	Node	Descriptions	Quoted examples
1.1.5	Self-Questioning	States an actual question about what he/she should do personally or professionally [without reasoning apparent].	What do I need to learn? Who can help me? What are my goals?
1.2	Explanatory reflection	An explanation is written about the process with reasoning apparent and rationale provided. There is evidence of reflection both personal and professional. Rationale for the decision-making process – why further investigation or learning is needed, ‘thinking out loud’ to determine the design of the learning object. Also explanation for goals which are stated for items or areas where further learning or investigation is needed.	The learning object I am preparing in PowerPoint will be a good simple teaching resource. This will help the students learn concepts using a tool they are already familiar with.
1.2.1	Personal	Reasoning about the process and the rationale which is provided are from a personal angle. Using terms such as <i>I believe I need</i> with reasons why. <i>I consider myself, I think</i> , and <i>I feel</i> . Personal and professional areas can merge – <i>I think</i> is related to professional practice. Note: personal could also get merged with reactions.	I feel comfortable creating the first learning object in PowerPoint. I already have good skills using it so I don’t have to learn something new. I think the interactivity between students and materials is very important because it helps them in more understanding of the contents. Moreover, the learning abilities can be enhanced by using different kinds of multimedia for teaching purposes. (Qadir, reflection 4.) I feel comfortable creating the first learning object in PowerPoint.

Table continued.

No.	Node	Descriptions	Example
1.2.2	Professional	Reasons for the process that was followed and the rationale which are provided relate to professional practice.	I have used PowerPoint a lot in my teaching so I feel comfortable using this medium for the first learning object.
1.2.3	Deciding	Reasons for the decisions are provided - why they were useful and how they helped. Explanation as part of the decision-making process – why further investigation or learning is needed, ‘thinking out loud’ to determine e.g. the design of the learning object, or deciding what they need to learn to make it happen.	PowerPoint is easily available as I have it on my computer already plus I don’t have to learn how another type of software works.
1.2.3.1	Self-Questioning	Writer asks questions of herself/himself and reasoning is apparent.	My questions that develop are can I develop this rich media in time for June or next semester, where a preliminary program is necessary? And how can I seek support for this guidance in a very busy world.
1.2.4	Reactions	Explanations about the intellectual, emotional and physical responses associated with the process are included.	I was disappointed in myself for not anticipating the problem and should have started my assignment much earlier. I am confident that the school has a sound computer network and software available for teachers to design MM objects and enough support for students to access and use these objects. Initially I was not feeling very confident about the whole idea of designing multimedia for learning purpose. I was worried about how I would achieve a professional looking piece of learning object. This kind of intimidating and quite a pessimistic thought is basically due to superficial exposure to those finished product of Multimedia in the market. It is further aggravated by the ignorance of the theories and principles involved in designing and developing interactive multimedia.

Table continued.

No.	Node	Descriptions	Example
1.2.5	Learning	Statements [with reasoning] about what the writer learned from the process are provided.	<p>The interactive test always gives the students motivation toward learning; in addition, it gets the students full attention. Actually, I have learned from this design project important ideas about how you can make a good interactive test & design.</p> <p>I've learnt to be more thorough in my testing process and to try to empathise more with the likely needs of learners for easy access to resources. I've also learnt that some technical issues can simply be beyond your control – the Firefox/WMP plugin compatibility issue namely – but it's worth following I.T news as these are often the first sources for resolutions.</p>
1.2.6	Stating	Participant states what occurred with reasoning apparent and rationale provided.	A series of adaptable templates could help me incorporate cognitive learning processes and multimedia in my work.
1.2.7	Goals	Goals are mentioned or implied with reasons given before or after or as part of the list. These may not be specifically called goals as in the first quote opposite, but may be evident in the form of actions to be taken following what was learned as in the second quote opposite. The reasons for where the learning or design needs to go next are listed or mentioned.	<p>My goals for this subject are:</p> <p>Use multimedia in a learning object to provide a meaningful, purposeful experience for learners</p> <p>Create a learning object using software that is new for me (ie. Flash, Camtasia)</p> <p>Re-purpose one of my existing designs using multimedia to create a more efficient learning experience.</p> <p>Lots and lots of time is required to understand Flash, the manual that was put on the website for Flash is very helpful as there are examples of building an object. I have started the learning object using a storyboard but also initially investigating other examples of learning objects of the water balance model. Surprisingly, there are a few examples already from different universities. (Ruth – Written Reflection 3)</p>

No.	Node	Descriptions	Example
1.3	Supported reflection	Reflective writing [refers to or] provides evidence to support statements. It includes references to design theory and learning theories and principles in the literature. There is some discussion of ideas but no new perspectives.	I believe it is important to use a social constructivist framework (Vygotsky) for the learning object and to follow an experiential model (Kolb) of learning. This will encourage learning at a deeper level and reflection, both regarded as important if higher order learning is going to occur (Brockbank and McGill).
1.3.1	Evidence mentioned	There is reference made to concepts and principles related to the subject. As well design theory and learning theories are mentioned but references are not provided. Rationale provided.	The readings provided in the subject, clearly outline a need for a simple design with clear instructions provided and lots of visuals.
1.3.2	Evidence identified	Concepts are clearly outlined and linked to design and/or learning theories in the literature. Concrete examples are provided i.e. references and rationale.	The need for using a lot of pictures relates to the work done by several researchers, for example: "Some studies indicated that pictorial information is remembered much more easily than text" (Anglin, G., Towers, R., & Levie, H., 1996; Braden, R., 1996; Horton, 1994). It's interesting that most of the publicity surrounding Teachers is negative. An article in <i>The Sydney Morning Herald</i> on Saturday reaffirmed this view. Dale Pender in her article titled "Now the class scapegoat is the teacher (SMH 10-11/3/07) states: every day, most teachers in most state schools must face three or four classes of turned-on net generation kids, who are much better at using the new technologies than most adults. The challenge is there- adjust or become a dinosaur! (Marie, Written Reflection 1).
1.3.3	Reactions to evidence	Reactions to evidence. Explanations about the intellectual, emotional and physical responses associated with the evidence are included.	My initial response to another reading In particular, I enjoyed Brookfield's (1995) reflective lens, and how important is it to understand others perspectives. (Ruth Written Reflection one).
1.3.4	Learning from evidence	The learning from theory is mentioned. Learning of concepts read about or discovered in subject is mentioned.	From the readings (Hartley 2004; Colvin Clarke & Mayer 2007); I have learnt that, what I have suspected all along as a user/ reader of content, is right. (Teresa Written Reflection 2)

Table continued.

	Node	Descriptions	Example
1.4	Contextual reflection	Dialectic reflection is evident - analysis of different perspectives in relation to one's own ideas and beliefs [so has to state these]. Writing about new perspectives which the author has developed as a result of his/her analysis based on evidence which is clearly stated. Cross-linking to several different sources occurs with reference to what the writer believes is important. Evidence of new ways of thinking by the writer is demonstrated clearly based on theories and ideas in the literature. What was learned and how it will be applied to professional practice.	No examples found.
1.4.1	Analysis	Different perspectives are discussed in relation to own ideas and beliefs.	
1.4.2	Cross-linking	Several different sources are mentioned in light of their importance and the perspective of the writer.	

Table continued.

Node	Descriptions	Example
1.4.3 New perspectives	Evidence of new ways of thinking by the writer is demonstrated. What was learned and how it will be applied to professional practice.	I will create a staged approach in the learning object which takes students through a series of graded activities. They will move through tasks which start off by promoting mastery learning, then help them process new information and this will bring them to a level of readiness for scenario-based learning. That way they will be able to build on knowledge and explore new concepts and ideas. In reading about design approaches, I have learned that there can be more than one strategy used to encourage engagement and information processing.
1.5 Critical reflection	Writing demonstrates awareness of multiple theories and principles and multiple perspectives – ideas which go beyond the subject, the project and the self. The application to professional practice is evident. What was learned and how it can be used is outlined in the writing. Also mentions how learning will be applied.	The use of a combined approach is going to work well for the learning object. The students who will be accessing the resource need quite a lot of scaffolding in the beginning. Hence guided steps in the learning object, although prescriptive, will suit my students. Once they have grasped the facts, the use of some problem-solving scenarios in the LO will assist them to gain a deeper understanding of the concepts. This has always been a problem in this particular subject, and one common to this vocational group.
1.5.1 Application of learning	Statement about how learning might be applied and issues to be considered.	Before I conclude with my expectation from this subject, I would like to mention how & where I'm going to apply what I learn from this subject (masters). I 'm not really sure about the way in which I'm going to apply what I get because this depends on both: (1) an updated study about the educational systems in [country], the place where I'm going to apply my experience in, & (2) the type of experience I get. Finally, I expect to have a good experience in this subject.

Code colours for the Three-Step Reflective Framework taxonomy

- 1.1. **Descriptive reflection** – Descriptive reflection.
- 1.2. **Explanatory reflection** - Explanatory reflection.
- 1.3 **Supported reflection** - Supported reflection.
- 1.4 **Contextual reflection** - Contextual reflection.
- 1.5 **Critical reflection** – Critical reflection.

Appendix 15: Interview questions

Appendix 15.1: Interview questions for participants

Introduction

Thank you so much for agreeing to do this interview. In the interview, I will be asking you mainly about the processes of reflection you used while studying in EDGI931. This means I'll be asking you to talk about how you used reflection, in particular, the three-step reflective framework for Task 2 (reflection) and how you prepared your portfolio of three learning objects.

Please be assured that everything you say is confidential. I value your perspective, so feel free to be open and honest with your answers.

The interview will take up to an hour.

Would you mind if I recorded our session so that I can concentrate on what you are saying rather than having to take notes?

[turn recording device on – make sure it is working]

Is there anything you would like to ask me about before we get started?

Warm up question

Tailor a question about their professional life to get them talking. Eg. “XXX, I know you work as a XXXX. Can you tell me a little bit about...?” What your job involves...

Interview

The first set of questions are about reflection in general – before EDGI931.

1. This question is about the sort of reflection you were skilled in before you studied EDGI931.

Were you familiar with reflection before you took this subject?

- In your personal life?
- Study?
- Professional life?

Please tell me about your ability to write reflectively.

- Do you find it easy or hard to select what to write,
- Do you find it easy or hard analyse what you have done and why?

- What do you do to think critically about your work i.e. what you do well, what is not working etc.?

2. This question is about what you knew about reflection before using the reflective framework in EDGI931.

What were your ideas about reflection before using the framework?

- Have you used other formats before e.g. journals, blogs (refer to survey response)?
- Talked to colleagues, a mentor – debriefed?

3. The next group of questions relate to the way you used the three-step reflective framework as you designed your learning objects. In EDGI931 you used the RF to think critically about your design work.

What did you reflect on when designing the learning objects?

- What did you do to think through ideas and to problem solve?
- Did your reflections help you design the learning objects? How? For example?
- Did you feel that feedback from the lecturer help you to reflect?
- Differently?
- More so? More perceptively?
- What else was it about the feedback that helped you?

4. I am interested in your opinion about the reflective framework.

What was your opinion about the usefulness of the reflective framework?

- Did you find it useful?
- What was most useful about it?

Did you find anything else useful?

How did you use **the reflective framework** when writing your reflections (Task 3)?

- How helpful did you find the headings e.g. take notice and describe the experience?
- Did you reflect and write to suit each of the three steps?
- Or did you prefer to mix all the steps as you wrote?
- Did your reflections help you write your supporting statement? How? For example?

5. Now I would like to explore a little more what you felt helped you when using the framework to reflect.

Please tell me how you feel about different aspects of the RF.

- Did you like using the prompting questions – were they relevant to you?,
- the template,
- the tips,

- the three different steps,
- the headings,
- the diagram.

The next group of questions is about reflection in your professional life.

The first question is about how you *normally* reflect on your performance and experiences during your professional life.

1. Do you reflect on your work and experiences?

- What do you generally do to think through how you perform professionally?
- How do you determine how well you are working in your job?
- What do you do to reflect on the experiences you have at work?

2. Now I am interested in your opinion about using reflective techniques to help you professionally.

What do you think about the whole idea of using reflection as a technique to help you professionally?

- Is this related to your past experience or to what you would like to do in the future?

3. Lets now look at the RF as a technique you can use professionally.

How do you feel now about using the reflective framework as a PD tool to help you learn?

- Do you like using it?
- Feel it is helpful professionally?

4. What else do you now know about the use of reflective techniques for professional development? ...

- as you say you have ...fill this in by building on previous responses
- used them before ..
- and heard ofbefore?

5. What sort of reflection do you believe you are good at now?

- What type of reflection – writing, talking to colleagues?
- Do you mean currently or as a result of doing 931?
- Has doing 931 changed how you reflect? How?

This set of questions is about how you might use reflective techniques to put together a professional portfolio in the future.

You will probably need to create a professional portfolio showing evidence of your work, and an analysis of your decisions and actions, and what you have learned from different professional situations. The skills learned in EDGI 931 will hopefully help with this as the more you practice reflective techniques the easier it becomes. A professional portfolio is useful for performance review, promotion and to demonstrate to employers, both current and potential ones, that you are a critically reflective professional. Do you know what this means?

1. How might you use reflection professionally from now on?

- What sort of reflective techniques could/do you intend to use?
- Do you think you could apply what you have learned in EDGI 31?
- What do you think would be useful?

2. How has your opinion changed about the use of reflection as a professional tool?

- Do you find you like to reflect more?

3. What do you think about using the reflective framework to help you develop an ongoing professional portfolio?

- How do you think it would help you?

4. What will you need to know more about if you are to use reflective techniques professionally?

- Depends on how they answer other questions.
- Could ask if they feel they know enough to apply it themselves.

5. How do you believe your reflective skills might develop as you practise them more?

- Will it become easier to reflect?
- More intuitive?
- Motivated by a professional need?

• Is there anything else you would like to mention?

Closing

Thank you so much for taking the time to do this interview. It has been a pleasure talking to you.

The recording will be transcribed and I will email you a copy of the transcription of the interview for you to check the accuracy of what you said.

You can make changes or clarifications on the transcription as you see fit.

Appendix 15.2: Interview questions for subject lecturer

1. How did you use the three-step reflective framework in your subject?
2. Was it easy enough to integrate into the subject?
3. How useful did you find the reflective framework (RF) for the students in your class?
4. Do you think the RF helped them write reflectively?
5. Was this evident when you marked their assignments?
6. How did the students write reflectively?
7. Were you happy with the level of reflection in their assignments? Why or why not?
8. Did this class reflect better using the RF than previous classes?
9. Would you use the RF in future classes?

Appendix 16: Professional Focus coding system

Table 41: Professional Focus coding system.

	Node	Descriptions	Quoted Examples
3.	Professional focus	Experiences, knowledge and beliefs in the past, present and future in relation to professional practice.	
3.1	Professional practice		
3.1.1	Past practice	Background, previous experience, knowledge and beliefs.	I entered this field with a strong background in education; which has helped me a lot, however multimedia design is my weakness (Teresa, Written Reflection 1). “Since I have a background in teaching and as well as in the field of ICT, I feel I can be a good bridge between the technical experts and the subject specialist (Yonten, Written Reflection 1).
3.1.2	Current practice	Professional context, perspectives, role and present situation.	I would still need to incorporate elements of the scaffolding depicted above but my primary focus should be to replace conventional face to face teaching with a more holistic approach (Marie, Written Reflection 2). I'm going to develop a resource for the audio/video workshops which allows me to cover the various file characteristics in the depth that I think is needed but which allows learners to dip into it at their own level (Nicholas, Written Reflection 1).
3.1.3	Future practice	Career, changing role and implications for practice in the future.	I will surely be in a position to share some expertise in the initial stage of the formation of the IMM team and be an active member specialised in animation if not in managing the team (Written Reflection 1, Yonten). I think, it is difficult for me to become a professional in all multimedia design but it is not difficult to be a professional in one skill of them (Written Reflection 1, Nabil).

Table continued.

Node	Descriptions	Quoted Examples
3.2 Professional capability	Existing professional skills are discussed and areas for up skilling are mentioned. (Qualifications needed for profession, PD.)	<p>For the purposes of this assignment and my own professional development, I should choose media which will enable me to learn some new skills (Teresa, Written Reflection 2).</p> <p>They offer PD ... and I am booked in to learn how to use Kahootz and Photostory (Marie, Written Reflection 3).</p> <p>In order to be able to demonstrate some skills in developing IMM I would like to get into using Flash (Yonten, Written Reflection 1).</p> <p>My initial reactions are purely frustration with the lack of expertise and understanding of using Flash or for that matter multimedia (Ruth, Written Reflection 3).</p> <p>Fortunately, I decided to use images and text via Macromedia Flash Player because I thought this form of learning object will help students understanding the contents of the subject and promote my skills in teaching as well as enhance my skills of Graphics software (Nabil, Written Reflection 4).</p>
3.2.1 Critique	Critiques own professional weaknesses and strengths, and demonstrates awareness of both existing skills and those which are needed.	<p>My problem is that I am still finding Flash too hard and I need to have someone show me more on Dreamweaver (Ruth, Written Reflection 4).</p> <p>So having considered my professional weaknesses and areas for improvement in my work, I have made the following decisions:</p> <p>I need to think more carefully about what a learner gets out of an interactive experience (Teresa, Written Reflection 1).</p>
3.2.2 Learning	Learning for professional development is undertaken and examined – professional learning.	<p>Firstly, if I didn't believe that computer based education helps people learn, I wouldn't be doing this subject! (Marie, Written Reflection 2.)</p> <p>By taking this subject I intend to be equipped with the idea of what goes into designing and developing IMM and how complex and big the learning objects need to be! (Yonten, Written Reflection 1.)</p>

Table continued.

Node	Descriptions	Quoted Examples
3.2.3 Application	Learning is applied or linked to professional practice – application of professional learning.	<p>Using a mixed methods paradigm, I would like to give students the opportunity to learn at their own pace in an environment that is challenging but interesting (Marie, Written Reflection 2).</p> <p>I'm going to develop a resource for the audio/video workshops which allows me to cover the various file characteristics in the depth that I think is needed but which allows learners to dip into it at their own level (Nicholas, Written Reflection 1).</p>
3.3 Professional relevance	The focus of the approaches, relevance, issues/ challenges and how they can be useful professionally.	The greatest challenge in creating the first learning object was in selecting proper pictures, text and animations, and the second challenge was in writing sentences with simple words to help students understand the main concept of the learning object (Nabil, Written Reflection 3).
3.3.1 Theoretical	Theoretical-based approaches and issues and their relevance to practice e.g. pedagogy.	So far I feel that I've deepened my understanding of the pedagogical strategies that I have in the past applied either instinctively or because of the situation – e.g., not creating icons because I couldn't think of a universal way of visually representing a concept (Descriptive/Noticing, Nicholas, Written Reflection 1).
3.3.2 Technical	Technical-based and/or practical approaches and issues and their relevance to practice.	<p>It just accepts one kind of pictures format (BMP) and as we know, the design should be attractive, funny and unique because that we have to apply some pictures in this design (Qadir, Written Reflection 3).</p> <p>I've also learnt that some technical issues can simply be beyond your control – the Firefox/WMP plugin compatibility issue namely – but it's worth following I.T news as these are often the first sources for resolutions (Nicholas, Written Reflection 3).</p> <p>I've learnt quite a bit about the technical aspects of putting web pages together (using Dreamweaver etc), but know I'm lacking on how to use interactivity in a purposeful and meaningful way for learners (Teresa, Written Reflection 1).</p>

Table continued.

	Node	Descriptions	Quoted Examples
3.4	Professional constraints	Aspects which hinder or pose barriers, e.g., time, needs of users, existing skills, challenging software, colleagues, workplace issues.	Time and skill were the main reasons that I didn't explore the interactive Flash hotspots option – I may yet look at this but ultimately I decided that I would rather do a simple task well (Nicholas, Written Reflection 4). My anxiety about having to design a complex learning environment increases and I am beginning to use X to self teach myself Flash and Quicktime, however, I find it really difficult.
3.5	Wider profession	Principles and concepts which are discussed broadly in the context of the profession.	I do love to teach, I think the inability of the profession to change with the times is really frustrating (Marie, Written Reflection 1). Teachers have to recognize and understand the rules of using educational technologies in the classroom in order to use them effectively (Qadir, Written Reflection 4). Disenchanted with the structures in most schools; Disillusioned with the behaviourist approach in X; frustrated with the lack of resources and level of funding in .. Schools. (Marie, Written Reflection 1.)

Appendix 17: Professional focus themes

Table 42: Professional focus themes emerging from written reflections (n=7).

Qadir	Marie	Nicholas	Teresa	Yonten	Ruth	Nabil
Professional background. Past professional practice, experiences and knowledge. Current professional practice. Application to practice. Professional capability (qualifications needed for profession). Future professional practice – career. Application of professional learning to practice. Wider profession. Own beliefs. Professional perspective. Pedagogy. Professional context. Wider issues.	Professional background. Past professional practice, experiences and knowledge. Current professional practice. Application to practice. Wider profession. Critiques own professional weaknesses. Professional capability – PD. Pedagogy. Professional perspective. Professional context. Future professional practice – career.	Current professional practice. Professional role. Application to practice. Building on and extending professional skills. Professional capability – upskilling. Pedagogy. Technical. Workplace issues and context. Application of professional learning to practice. Designs from the angle of a gap in practice – professional capability (others’). Designs from the angle of a gap in practice – availability of resources in the workplace. Professional	Professional background. Current professional practice. Professional role. Building on and extending professional skills. Critiques own professional weaknesses. Professional capability. Workplace issues and context. Designs from the angle of a gap in practice - professional capability (own). Designs from the angle of a gap in practice - availability of resources in the workplace. Professional constraints – time, users, existing skills,	Professional background. Past professional practice, experiences and knowledge. Current professional practice. Professional aspirations. Professional role. Building on and extending professional skills. Professional capability. Critiques own professional weaknesses. Professional learning. Future professional practice – career. Application of professional learning to practice. Professional context. Wider issues. Technical.	Professional background. Building on and extending professional skills. Professional capability. Professional learning. Application to practice. Professional context. Theory-based Challenges	Professional background. Professional capability (Qualifications, PD). Professional aspirations. Professional learning. Professional context. Professional relevance.

constraints – time, users, existing skills, challenging software, colleagues. Professional decisions. Process undertaken. Professional perspective. Professional context. Immediate issues.	challenging software, colleagues. Professional decisions. Process undertaken Professional context. Professional perspective.
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Appendix 18: Three-Step Reflective Framework coding system.

Table 43: Three-Step Reflective Framework coding system.

	Node	Descriptions	Quoted Examples
5.	Reflective framework steps	Take notice & describe the experience - description of evidence	
5.1	Step 1		
5.1.1	Noticing	Participant writes about what he/she does, knows, feels, thinks, needs and how it relates to their professional career. This is a basic description of recent activities. There is comment on what he/she knew already which helped, and also initial reactions, ideas from reading, researching, teaching experiences or simulations, etc.	To me, learning objects are items I use to make my teaching relevant. They give me ideas on how to construct whole units of work, not just single objects. I've become more interested in curriculum design. (Marie, Written Reflection 4.)
5.1.2	Deciding	Decisions made by the participant are described but no reasons are provided. Although he/she may indicate what helped him/her to progress.	So to start off it will be relatively easier to develop e-learning materials and learning objects which can be dispensed in CDs (Yonten, Written Reflection 1). To meet my challenges I need to: Set a timeline Source useful contacts Continue to read a variety of literature Communicate with other members of staff Think outside the square (Marie, Written Reflection 4).

Table continued.

Node	Descriptions	Quoted Examples
5.2 Step 2	Analyse the experience - implications of decision/action, reaction.	
5.2.1 Explanation	An explanation for the actions and decisions is provided – why they were helpful or necessary, what worked and what did not, how they could help practice and what could be done differently. What needs to be investigated further.	First of all, I believe that the learning objectives of any subjects can be effectively achieved by using interactive test in the classroom. Thus, I will concentrate on this learning object by using a simple programming tool called “Advance learning builder” to achieve the learning objectives of simple math concept. As I mentioned in my second paper on reflection; I used to be a math teacher in an elementary school, so I will concentrate more on how to teach elementary school’s students so the target learners are the students in the elementary schools. (Qadir, Written Reflection 3.)
5.2.2 Reactions	Reasons for the intellectual, emotional and physical responses associated with the process are included. Also how thinking about teaching and learning may have changed as a result is mentioned and areas needing investigation.	My preconceived idea of designing Instructional materials was in total conflict with the learning theories in the sense that I have not considered who would be the target audience and user. Besides I was not aware of the magnitude of the difficulty that I would experienced in balancing the level of the content and the effectiveness of delivery. (Yonten, Written Reflection 2.)

Table continued.

	Node	Descriptions	Quoted Examples
5.3	Step 3	Take Action - Reflect on what you learned and how it will be used.	
5.3.1	Learning	What is learned is recorded with some explanation of what helped the learning, where there are gaps in understanding and knowledge and what he/she needs to explore further or seek help with. Goals may be mentioned.	<p>(In the process of reflecting for this journal and from the first workshop, I have learned that the size and the complexity of the learning objects being developed is a secondary aspect (Yonten, Written Reflection 1).</p> <p>As such the goals that I would like to meet by the end of the session are as the following which is aimed at developing small and self contained learning object” (Yonten, Written Reflection 1).</p>
5.3.2	Application	The application to professional practice is evident with some explanation of how the learning will change or affect future practice.	<p>In other words, teachers have to recognize and understand the rules of using educational games in the classroom in order to use them effectively. In addition, they need to consider the psychological and physical development of the audience (children) when choosing subject’s materials. Moreover, the teachers also have to find a good balance between each part of their planning (I mean between fun and education). Finally, I’ll apply what I have learnt in my experience as a teacher in X as well as whatever materials I get in this class in specific & in my subject study in general. (Qadir, Written Reflection 2.)</p>

Appendix 19: Professional Reflection coding system.

Table 44: Professional Reflection coding system used in the interview analysis.

Node	Descriptions	Quoted Examples
6.1	Past reflection	
	<p>Familiarity and experience with reflection before taking the subject (personal, study, professional) and ability to write reflectively – experience with different types of reflection, e.g., journals, colleagues, mentors etc. Formats used – electronic, audio, written etc. May mention how easy or hard to select what to write, to analyse what has been done and why, how to think critically about their work, i.e., what is done well, what is not working etc.</p> <p>How they <i>normally</i> reflect on performance and experiences during professional life. How they do this, what they generally do to think through how they perform professionally, how they determine how well they are working in the job, what they do to reflect on their experiences at work.</p>	<p>If I write things down, it is more a planning thing. If I am preparing for something I will be thinking back over what has to happen. (Teresa, interview.)</p> <p>I didn't have really any kind of experience with reflection writing before so when you are trying to explain yourself and trying to – it was difficult (Yonten, interview).</p> <p>The first time it was difficult for me because it was the first time for me to do the reflection because I have never used that before when I was in my country and when I studied my school, in the school, like in the primary school, or secondary school, even at university I didn't use them in my study. So it was the first time was difficult for me but after that I was familiar with it. (Nabil, interview.)</p> <p>I can reflect but yeah it wasn't, it was never really particularly structured (Nicholas, interview).</p>

Table continued.

Node	Descriptions	Quoted Examples
6.2	Current reflection	<p>How they have been reflecting in general during the subject – their experience with reflection. What was reflected on, what was done to think through ideas and to problem solve, whether reflections helped and how, whether feedback helped.</p> <p>This reflection, it let me write what I have learned and what I feel regarding my learning object for example, and what I have to do in the future with the next learning object. And I think there were three points, it was important to improve my work. (Nabil, interview.)</p> <p>I used that template a bit but I actually had one which was for scholarship teaching for reflection so I used that a bit. I used a combination of things (Ruth, interview).</p> <p>I mean it was a little bit sort of tricky because the first learning objective that you wrote it was on anything that we wanted to write and then we had to design the first learning object but it was a little bit of a sequencing problem. First you design one learning object and then you reflect could you do it a little better based on the first time you could reflect. (Yonten, interview.)</p> <p>When I wrote the first reflective journal I can recognize well the strengths and weaknesses in my work so I can enhance my work and I can improve my skills actually (Qadir, interview).</p>

Table continued.

Node	Descriptions	Quoted Examples
6.3 Reflective Framework use	Use of the Reflective Framework and feelings and opinion about the helpfulness and usefulness of the it and how it was used, i.e., different aspects of the framework - prompting questions (relevance), writing template, tips, three different steps, headings, diagram. How it was used for the written reflection assignments and the supporting statement assignments.	<p>It was good for people who have never used the reflective practice before (Ruth, interview).</p> <p>I probably referred to that (diagram) first before I looked at anything else. I think the other pages had a lot of information. Maybe because you had it as an example, the pages that followed that. I think that was really simple to look at. (Ruth, interview.)</p> <p>I wrote about what I have learned and what I feel about doing this learning project and what I will do in the future for the next learning object (Nabil, interview).</p> <p>I found the reflective process Reflective Framework (quite good) after I'd actually completed something. It gave me a good idea of what else I needed to do to improve it. But as I was actually creating it I probably wasn't reflecting on it so much. (Nicholas, interview.)</p> <p>I used a bit of it and I found it was pretty long to use. Um, I liked how it was in two sections and that you gave an example to follow. I found that really helpful. (Ruth, interview.)</p>

Table continued.

	Node	Descriptions	Quoted Examples
6.4	Future reflection	<p>Use of reflective techniques in general to put together a professional portfolio in the future. How they might use reflection professionally from now on, what sort of reflective techniques they intend to use, e.g., Reflective Framework. Reflective Framework, whether they think they could apply what was learned in the subject, what would be useful.</p> <p>Ongoing reflection - what they will need to know more about to use reflective techniques professionally. How they believe their reflective skills might develop as they practise them more - easier, more intuitive, motivated by a professional need.</p>	<p>It is important now especially when I finish my degree, I mean my Master's degree, I think I need this kind of reflection in my teaching. So it is important (Nabil, interview).</p> <p>Do you think you would use the Reflective Framework now as a professional development tool? No. (Teresa, interview.)</p> <p>Sometimes it happens with the flow, the information, the thinking I give helps the flow and that is why it is better to have the guidelines, the framework, to organize the parts properly (Yonten, interview).</p>
6.5	Opinion reflection	<p>Opinions about using reflective techniques to help them professionally and includes changes in opinion - whether based on past experience or what they would like to do in the future – use of other reflective techniques for PD apart from Reflective Framework. Whether their opinion has changed about the use of reflection as a professional tool – whether they reflect more, use reflection in their professional role. Changes in reflection skills since using the Reflective Framework/taking the subject - what sort of reflection they believe they are good at now and whether the subject has changed how they reflect.</p>	<p>I did have to put it on paper and actually some of the stuff that I have reflected on I have now used as scaffolding in some of the units that I am doing at school so I would have to say that I have sort of changed my opinion about reflections (Marie, interview).</p> <p>Perhaps if I was doing a reflection that wasn't an assignment, I would write things a bit differently. I would just write it so it was only for me to understand and it wouldn't be such a tedious process. (Teresa, interview.)</p> <p>I guess I feel more comfortable doing it all in my head anyway. I mean I don't feel by doing the reflective process that I gained any more than I would have normally from my own way of reflecting. (Teresa, interview.)</p> <p>I think it is important to practice more and more in order to improve yourself and your skill (Qadir, interview).</p>

Appendix 20: Supporting statement template

Learning Object Supporting Statement

Part A. Summary Information

1. Title:

2. Author:

3. Description (<100 words):

4. Subject:

5. Keywords:

6. Intended end user:

- ☐ Learner
- ☐ Teacher
- ☐ Author
- ☐ Manager

7. Content of use:

- | | |
|--|--|
| <input type="checkbox"/> Pre school | <input type="checkbox"/> Professional formation |
| <input type="checkbox"/> Primary school | <input type="checkbox"/> University undergraduate |
| <input type="checkbox"/> Secondary school | <input type="checkbox"/> University post-graduate |
| <input type="checkbox"/> Adult/Community education | <input type="checkbox"/> Vocational education and training |

8. Total learning time:

9. Type of learning resource

Step 1. Choose at least one item from this list:

- | | |
|--|----------------------------------|
| <input type="checkbox"/> Exercise | <input type="checkbox"/> Diagram |
| <input type="checkbox"/> Simulation | <input type="checkbox"/> Figure |
| <input type="checkbox"/> Questionnaire | <input type="checkbox"/> Graph |

- ☐ Index
- ☐ Slide
- ☐ Table
- ☐ Narrative text
- ☐ Exam

- ☐ Experiment
- ☐ Problem statement
- ☐ Self-assessment
- ☐ Lecture

Step 2. Choose items from the lists below to add to this description:

FUNCTION

- | | |
|---|--|
| <input type="checkbox"/> Activity | <input type="checkbox"/> Rules and ethics |
| <input type="checkbox"/> Assessment | <input type="checkbox"/> Problem |
| <input type="checkbox"/> Briefing | <input type="checkbox"/> Quiz/test/exam |
| <input type="checkbox"/> Data collection instrument | <input type="checkbox"/> Sample student work |
| <input type="checkbox"/> Demonstration | <input type="checkbox"/> Self-assessment |
| <input type="checkbox"/> Example | <input type="checkbox"/> Scenario |
| <input type="checkbox"/> Hints and tips | <input type="checkbox"/> Template |
| <input type="checkbox"/> Key reading | <input type="checkbox"/> Tutorial |
| <input type="checkbox"/> Optional reading | <input type="checkbox"/> Tour |
| <input type="checkbox"/> Laboratory work | <input type="checkbox"/> Workshop |
| <input type="checkbox"/> Lecture | |

FORM

TEXT

- | | |
|--|--|
| <input type="checkbox"/> Announcement | <input type="checkbox"/> Manual |
| <input type="checkbox"/> Bibliography | <input type="checkbox"/> Minute/memorandum |
| <input type="checkbox"/> Book | <input type="checkbox"/> Newspaper report |
| <input type="checkbox"/> Book chapter | <input type="checkbox"/> Note |
| <input type="checkbox"/> Case | <input type="checkbox"/> Overview/Summary |
| <input type="checkbox"/> Conference paper | <input type="checkbox"/> Orientation statement |
| <input type="checkbox"/> Conference proceedings | <input type="checkbox"/> Policy or procedure |
| <input type="checkbox"/> Definition/Glossary | <input type="checkbox"/> Press release |
| <input type="checkbox"/> Design Statement | <input type="checkbox"/> Problem Statement |
| <input type="checkbox"/> Diary notes | <input type="checkbox"/> Proposal |
| <input type="checkbox"/> Expert comment | <input type="checkbox"/> Question(s) |
| <input type="checkbox"/> Field notes | <input type="checkbox"/> Textbook |
| <input type="checkbox"/> Frequently Asked Questions/FAQ | <input type="checkbox"/> Reading |
| <input type="checkbox"/> Journal Article | <input type="checkbox"/> Reference |
| <input type="checkbox"/> Journal | <input type="checkbox"/> Reference list |
| <input type="checkbox"/> Handbook/guide/guidelines | <input type="checkbox"/> Report |
| <input type="checkbox"/> Interview transcript | <input type="checkbox"/> Role profile |
| <input type="checkbox"/> Job description | <input type="checkbox"/> Study Guide |
| <input type="checkbox"/> Teacher-prepared material/notes | <input type="checkbox"/> Unit outline |
| <input type="checkbox"/> Magazine article | <input type="checkbox"/> White paper |

MULTIMEDIA

- ☐ Animation
- ☐ Audio
- ☐ Database
- ☐ Digital video
- ☐ Illustration
- ☐ Image
- ☐ Interactive multimedia program
- ☐ Simulation
- ☐ Spreadsheet
- ☐ URL/web page/Web site
- ☐ Video

PHYSICAL

- ☐ Class room
- ☐ Computer hardware
- ☐ Computer software
- ☐ Digital camera
- ☐ Equipment
- ☐ Library
- ☐ Laboratory

10. Education use (<100 words)

Part B: Descriptive Information

1. Introduction

[Describe your learning object, the learning context in which it would be used and how you envisage it being used.]

2. Design rationale

[Describe the key design features of your learning object and explain the reasoning behind your design decisions and justify them.]

3. Production process

[Description of the production process you went through including the tools you used, and the resources you created or adapted. Describe the key technical issues you encountered and how you solved these.]

4. Implementation

[Describe any practical implications for implementation, especially those relevant to teachers wanting to use this learning object.]

5. References

[Include the details of any references you have cited in the text above.]

Appendix 21: Examples of Coding

The following table illustrates how one participant's (Qadir) written reflection assignments, were coded using NVivo and the Levels of Reflection taxonomy. Four levels of reflection were coded in Qadir's writing: Descriptive, Explanatory, Supported and Critical.

Table 45: Examples of units, from Qadir's written reflection assignments, extracted using the Query function in NVivo and annotated.

Coding	Quoted Examples	Annotation
Written Reflection 1 – 1.1.1 – Descriptive/Noticing	Many aspects of my teaching skills have improved as a result of many conferences and workshops I attended; but still I need more experience particularly in Multimedia Design.	Aware of his professional skills in relation to PD and multimedia design but no detail about what skills.
Written Reflection 1 -1.2.3 – Explanatory/ Deciding	Back then, I decided to adapt a style of teaching which was totally new to the students because it depends on using some computer-based learning activities and some other types of multimedia such as video, sound and simulation (the model of Earth).	Types of MM he decided to use in teaching and the reasons.
Written Reflection 1 – 1.3.2 – Supported/Evidence Identified	Nowadays, Clark, R and Mayer, R (2007) claim that “rich media can improve learning if they are used in ways that promote effective cognitive processes in learner.”	Quotes something he has read about media and learning. In the previous sentence he writes about how his teaching using MM was new to students.
Written Reflection 4 -1.5 - Critical reflection	The main idea deals with the basic concept of English language.” “The English language Alphabet because last year the Ministry of Education applied English language as official subject in elementary schools in X”.	About English language and its introduction to schools. Difficulties for students and teachers.

When queries were run the number of references for each category and sub-category were obtained for each participant. In Table 46 and

Table 47, is an illustration of how references for each category were collated to obtain frequencies for Qadir. The same was done for each sub-category, and the descriptive data as frequencies can be seen in each of the individual case studies in Chapter Five.

Table 46: Qadir – Calculation of references for estimation of frequency of Descriptive reflection and Explanatory reflection (n = 1).

Category	Units	Category	Units
Descriptive	0	Explanatory	2
Noticing	5	Personal	6
Deciding	5	Professional	16
Stating	30	Deciding	19
Goals	0	Self-Questioning	0
Self-Questioning	0	Reactions	0
Total units	40	Learning	2
Total % Frequency	32%	Stating	25
		Goals	2
		Total units	72
		Total % Frequency	60.3%

Table 47: Qadir – Calculation of references for estimation of frequency of Supported reflection and Critical reflection (n = 1).

Category	Units	Category	Units
Supported	0	Critical reflection	3
Evidence Mentioned	1	Application of Learning	4
Evidence Identified	1	Total units	7
Learning from Evidence	0	Total % Frequency	5.7%
Reactions to Evidence	0		
Total units	2		
Total % Frequency	1.6%		

As well as using the query function, matrices were created to measure the relationship between two nodes or sets of nodes. For example, a matrix was generated for levels of reflection versus written reflections so that the frequency of writing for each node and sub-node could be tracked across all four written reflections. The following Table 48 illustrates part of such a matrix for Qadir's four written reflection assignments.

Table 48: Qadir – Matrix showing levels of reflection in four written reflections (R1 to R4).

	R1	R2	R3	R4
Descriptive reflection	0	0	0	0
Noticing	4	2	1	1
Explanatory reflection	0	1	1	1
Personal	4	2	1	0
Supported reflection	1	0	0	0
Evidence Mentioned	1	0	0	0
Contextual reflection	0	0	0	0
Analysis	0	0	0	0
Critical reflection	0	0	0	4
Application of Learning	1	1	1	1

Appendix 22: Participant survey - responses to question 10

Table 49: Responses to question 10 in the participant survey (n = 7).

	10 a. New learning - approach	10 b. Methods	10 c. Works best	10 d. Comments on learning
Qadir	Nil	Internet, technology magazine, books.	Internet.	eLearning is good and effective way to learn new things in the different sectors. refer to diagram.
Marie	Find out who on staff has the knowledge and experience I need to access.	Talk to my peers about their experiences. Search the net.	I find talking to people first. This works best as this cuts down research time - I find info a lot quicker.	
Nicholas	find a useful how-to-resource - textbook/website.	Work through exercises, read. Ask friends or search for answers online.	Read, try, do.	Combination of reading and practical activity/exploration.
Teresa	I guess I define in my head exactly what it is I need to learn. I narrow it down to what specifically needs to be learnt. This is often something I don't think too much about doing, it can happen while I'm doing something else - or it can just be a fleeting thought. I'll then work out who/ what I need to consult to get guidance.	I usually learn from other people. At work, if there's something I don't know how to do, but need to know, I'll always find someone to explain it to me. If it's something I think I'll need to remember, I usually write down the steps on how to do it (this often occurs as the person is instructing me).	Asking someone how to do something and then getting them to guide me through the steps (if it's something technical) as I do it often works well for me. For example, learning something new on the computer is best for me if someone sits with me and guides me through the steps. That way I can stop them and ask for clarification on things as I go.	I know I certainly don't like learning on my own, as often is the case with distance ed. I prefer being able to ask for guidance and receiving it as problems arise, rather than waiting for a response on a discussion forum or via email. With distance learning, I like the material ... easy to process (ie., in a logical sequence). I find I learn best by doing things, rather than reading about them. Through demonstration.
Yonten	Ask and get some insight from those who have done it.	Ask & read literature.	Asking people.	
Ruth	I break it down and diarise the timeframe.	Calendar.	Electronic notebook.	I read a lot!! And listen to other people.
Nabil	There are different approach, eg., experience	Reading different books- benefit from other experience.	Best works which have references.	

Appendix 23: Tables of Results

Table 50: Frequency of five levels of reflection overall (n = 7).

Name	Descriptive	Explanatory	Supported	Contextual	Critical
Qadir	32.6%	58.9%	2.1%	0.0%	6.3%
Marie	56.4%	36.9%	6.7%	0.0%	0.0%
Nicholas	46.7%	45.1%	8.2%	0.0%	0.0%
Teresa	71.3%	25.5%	3.2%	0.0%	0.0%
Yonten	41.8%	51.6%	4.1%	0.0%	2.5%
Ruth	61.4%	22.8%	15.8%	0.0%	0.0%
Nabil	45.2%	47.1%	7.7%	0.0%	0.0%

Table 51: Sub-categories at the Descriptive level of reflection - percentage frequency (n = 7).

Name	Noticing	Deciding	Stating	Goals	Self-Questioning
Qadir	17.8%	13.3%	68.9%	0.0%	0.0%
Marie	31.0%	7.1%	48.8%	2.4%	10.7%
Nicholas	28.1%	28.1%	42.1%	1.8%	0.0%
Teresa	25.3%	24.7%	45.5%	1.9%	1.9%
Yonten	60.8%	9.8%	25.5%	3.9%	0.0%
Ruth	33.3%	18.2%	38.4%	0.0%	10.1%
Nabil	38.6%	24.3%	35.7%	1.4%	0.0%

Table 52: Frequency of different sub-categories of Explanatory reflection (n = 7).

Name	Personal	Professional	Deciding	1.2.3.1 Self- Questioning	Reactions	Learning	Stating	Goals
Qadir	7.9%	22.4%	27.6%	0.0%	0.0%	3.9%	30.3%	2.6%
Marie	14.5%	12.7%	25.5%	9.1%	5.5%	3.6%	25.5%	7.3%
Nicholas	5.5%	5.5%	38.2%	0.0%	3.6%	12.7%	23.6%	10.9%
Teresa	11.1%	6.3%	28.6%	6.3%	3.2%	4.8%	36.5%	3.2%
Yonten	13.6%	13.6%	25.4%	0.0%	15.3%	8.5%	15.3%	8.5%
Ruth	9.1%	7.3%	29.1%	3.6%	10.9%	10.9%	21.8%	7.3%
Nabil	20.5%	20.5%	34.2%	0.0%	4.1%	6.8%	11.0%	2.7%

Table 53: Supported level of reflection - number of units for sub-categories found in written reflections (n =7).

Name	Evidence Mentioned	Evidence Identified	Learning from Evidence	Reactions to Evidence
Qadir	1	1	0	0
Marie	0	7	0	3
Nicholas	3	6	0	1
Teresa	1	5	1	0
Yonten	4	0	0	1
Ruth	3	23	7	8
Nabil	8	0	4	0
Total	20	42	12	13

Table 54: Levels of reflection at each step of the Reflective Framework (n = 6).

Level of Reflection	Step 1	Step 2	Step 3
Descriptive	58.0%	48.9%	50.0%
Explanatory	35.3%	38.9%	45.0%
Supported	6.8%	10.5%	4.5%
Contextual	0.0%	0.0%	0.0%
Critical	0.0%	1.7%	0.5%