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An information system in its organisational contexts: a systemic semiotic longitudinal case study

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An Information System in its Organisational Contexts: A Systemic Semiotic Longitudinal Case Study

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

Doctor of Philosophy

from

University of Wollongong

by

Rodney J. Clarke, BA, GDipBusInfoSys

Department of Information Systems
2000
Declaration

This is to certify that the work presented in this thesis was carried out by the author at the Department of Information Systems at the University Wollongong, Australia and is the result of original research and has not been submitted for a degree at any other university or institution.

Rodney J. Clarke
Acknowledgements

I am indebted to Efi Hatzimanolis of the Communication and Cultural Studies Program, Faculty of Arts, University of Wollongong, Australia who first suggested to me that social semiotics might be useful in information systems research. I am fortunate that she still provides detailed critical readings of most of my research output in this area.

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Finally, I would like to acknowledge the past and present staff at the Microcomputer Laboratories, who have built a remarkable unit and who still develop innovative systems to support its operations. It is their labours that have made mine possible. Special thanks are also extended to Rodney Vickers, Department of Physics, who assisted me in producing the density plot in Appendix A1.
Abstract

This dissertation develops a new form of Systems Analysis based on Systemic Semiotics. Systemic Semiotics, a combination of Social Semiotics and Systemic Functional Linguistic theories, can be used to provide contextual descriptions linking the operations of information systems to their specific situational and organisational contexts. A semiotic model of workpractices is developed using Systemic Semiotics in which workpractices, including those associated with systems use, are contextually defined as consisting of one or more text types and zero or more action types.

Because Systemic Semiotics defines text types and action types contextually, changes to workpractices over time can also be described contextually. In order to develop, test and extend the theory proposed in this dissertation, a number of workpractices associated with a small administrative information system were studied over a ten-year period. Some of these workpractices can be traced to several predecessor manual systems. Changes in the structure and function of these workpractices were traced over the useful life of the information system from its commissioning through to its effective decommissioning.

Keywords: Information Systems, Workpractices, Semiotics, Organisational Semiotics, Systemic Functional Linguistics, Social Semiotics, Systemic Semiotics, Longitudinal Case Study
Preface

This Preface provides basic information about the dissertation. Topics covered include the statement of the problem in §P1, the rationale and scope of the dissertation in §P2, the theoretical, methodological, and substantive contributions made by it to the information systems and semiotics disciplines in §P3, as well as a description and justification of the structure of the dissertation in §P4.

P1 Statement of the Problem

There are several major problems in traditional information systems analysis theories that limit the utility of the resulting system descriptions. These major problems are apparent in even the most basic of information system’s definitions. For example, Avison and Fitzgerald (1988, 1) define an information system as a “… grouping of people, objects and procedures... [providing] information about the organization and its environment... which is useful to members and clients of that organization” (emphasis own). Typically, traditional structured systems analysis practices (Yourdon and Constantine 1978; DeMarco 1978; and others) are based on definitions of a process (Kowal 1988, 5), rely upon modeling the physical, logical, and data aspects of a system, and can only describe the structural and functional characteristics of information systems. While human and social factors have been recognised as important, these are generally considered as separate from and unrelated to technical issues (Quintas 1993; Low and Woolgar 1993). When attempts have been made to consider social aspects of information systems, the accepted approach within the
information systems discipline has been to utilise sociological adaptations of General Systems Theory. However, for a number of decades sociologists have been skeptical about the utility of this theory (Alexander 1982, 1984). Jary and Jary (1991, 649) state that..."[a]lthough hugely influential at the time... [attempts] to found a new general theory of... social systems [are] now adjudged a relative failure". This judgement is primarily based on conservative assumptions built into the theory concerning the integration of social systems and the construction of levels of abstraction well removed from the specific social conditions that influence the conduct of workpractices in actual workplaces. Applied to organisations, General Systems Theory fails to theorise amongst other issues, the agency and subjectivity (Thibault 1991; Lemke 1988; Henriques et al 1984) of analysts, workers and other members of organisations (Clarke 1991b, 1992b). The interrelationships between workpractices and the situational and cultural contexts in which they are embedded cannot be described in terms of the usual system/environment dichotomy constructed in General Systems Theory. Consequently, the contextual relationships that exist between an information system and its organisational contexts (Hanseth 1991) usually go unrecognised in traditional structured analysis practices (Goguen 1994, 194).

A more pernicious theoretical problem involves information theory itself. In order to be of use, information systems need to be informative for members of organisations. Yet, the concept of information used in the information systems discipline relies on the work of Shannon and Weaver (Shannon 1948; Weaver 1972) which defines a mathematical concept of information in terms that exclude meaning. The first published paper describing their probabilistic theory of communication contained a footnote cautioning against its
application to human communication. Like General Systems Theory, the theory of communication has been very influential in many different disciplines. The so-called process models of communication derived from it (Fiske 1982), have been the subject of successful critiques in a number of these disciplines (for example Kress 1988; see also Schirato and Yell 1996). Tully (1985, 206) notes that “[a] general theory of information, and its relationship to human knowledge and activity, would help [the information systems discipline relate]… theoretical fragments [appropriated into it in response to its theoretical deficiencies] and to judge their worth; but no such coherent theory has emerged. As a consequence, a number of researchers have re-theorised the concept of information using semiotics (Nauta 1992) in order to account for organisational pragmatics and semantics (Stamper 1973, 1985, 1987, 1992, 1996).

These major theoretical problems are compounded when attempting to describe diachronic change associated with information systems in terms of gross shifts in system functionality. Diachronic changes in systems can only be adequately explained by applying a theory of contextual relationships that emphasises the mutual interdependency between an information system and its organisational contexts. In addition, a well-recognised fundamental problem with systems analysis practices is that they are rooted in objectivism and individualism (Chalmers 1982, 113-123) which constructs a rational and mechanistic view of organisations and information systems (Kling 1991, 153; Morgan 1986, 12-38). Organisations should not be treated as independently pre-given objects about which analysts make ‘discoveries’. While analysts are often warned about modeling their
assumptions, conclusions or improvements to a system (Kowal 1988, 50), the role of the analyst in formulating systems descriptions is elided in traditional systems analysis.

**P2  Rationale and Scope**

*Approach*

Given the issues raised in the previous section, the *rationale* for this dissertation necessarily involves (i) providing an explicit theorisation of the contextual relationships which link an information system to its organisational contexts, (ii) the need to develop diachronic as well as synchronic system descriptions in order to characterise longitudinal change, and (iii) developing theory and practices which are explicitly reflexive (Thibault 1991).

Systemic Semiotics, the theoretical approach adopted here, provides analyses that are contextual, interpretivist, and reflexive (Clarke 1998a, 1998b). Within the domain of Information Systems, these analyses are *contextual* in that Systemic Semiotics emphasises the necessity of understanding specific situational and cultural contexts in relation to workpractices and/or system features. In contrast to the rational and mechanist views of organisations and information systems usually associated with many traditional forms of analysis, Systemic Semiotics adopts an *interpretivist* position in relation to the development of pragmatic and systematic descriptions of workpractices and/or system features. Systemic Semiotics analyses are also *reflexive* (Fuhrman and Oeler 1986) in that critical reflexive practices (Thibault 1991) are applied in order to understand the relationship between the investigators and the objects of analysis.
Use of a Single Case Study

Given that the dissertation involves the formulation, testing, and revision of a new theoretical model (Systemic Semiotic Workpractice Model), a single case study was examined in-depth. This is a recognised research strategy for case studies and action research conducted in the information systems discipline (Galliers 1990). The use of a single case study provided the opportunity to study the diachronic development of the system from its predecessors to its commissioning, its operation through successive versions, to its effective and ultimately its actual decommissioning.

Selected System

The Automated Library and Borrowing System (ALABS) was selected as the single case study with which to formulate, test and revise the Systemic Semiotic Workpractice Model developed in the dissertation. There were several reasons for selecting ALABS. It was a standalone information system, which provided, for the most part, operational level support. As a consequence, the complexities of networked and distributed information systems, and management-oriented systems (MIS, DSS and EIS) which ultimately rely on operational systems, could be avoided while formulating, testing and revising the theoretical model.

ALABS was an end-user-developed system, in that those who developed and changed the system did so because of the direct operational reasons to which they were subject, or because these end-users were instructed to do so by one or more of its funding units. ALABS was developed to support operations within the Microcomputer Laboratories which
functioned, and still functions as a Type I department. Panko (1988, 6-10; 1984) defines Type I departments as having routine paperwork, with mostly clerical workers who conduct pervasive and operational-level organisational procedures. With respect to systems development activities, Type I departments utilise applications development approaches that focus on procedures and employ traditional development tools used entirely within the boundary of the department. While this characterisation of the Microcomputer Laboratories and ALABS appears to be correct, Panko’s taxonomy is also misleading. ALABS was more than simply a means to learn about the kinds of services that could be provided by a unit like the Microcomputer Laboratories. Its development provided the means and opportunity for its end-users to develop the Microcomputer Laboratories. ALABS literally produced many of the Microcomputer Laboratories workpractices at the same time as it organised the physical workplace, created and destroyed entire classes of participant, and imbued specific classes of participant with required and expected behaviours.

Access and Involvement

Most of the principal stakeholders are still accessible to the author. The Laboratory Assistant who was responsible for conducting many of the day-to-day operations that ALABS was created to support, currently occupies the position of Operations Supervisor at the Microcomputer Laboratories. One of the trainees who used ALABS on a daily basis now holds the position of Computer Systems Officer for the Department of Business Systems at the University of Wollongong. The designer and principal programmer of ALABS now holds the position of Computer Systems Officer at the Microcomputer Laboratories. An aspect of the critical reflexive practices (Thibault 1991) alluded to as a
mandatory requirement of any Systemic Semiotic approach, is the necessity for disclosure concerning the relationship between the author and the objects of analysis. The author of this dissertation possessed insider *participant knowledge* about ALABS and the Microcomputer Laboratories. I held the position of Operations Supervisor between 1981-1984, was responsible for the commissioning of ALABS, served as Systems Analyst during its development and was involved in the first four years of its end-user development and operation. I was in a unique position to see the mutual effects of rapidly changing organisational contexts on this system while being involved in determining the kind of services that this system was to provide.

*Issues of Power and Method*

Related to access and involvement when researching language in organisations, are *issues of power and method*, which influence the conduct of a case study. Cameron et al (1992) suggests research approaches which involve ethical, advocacy and empowerment research positions. These research positions can be characterised as being involved in research ‘on’ informants, ‘for’ informants, and ‘with’ informants. While the case study attempted to utilise an empowerment research agenda, ‘on, for and with’ the informants (Cameron et al 1992, 131-138), the type of case study described in this dissertation did not directly address any issues concerning the subjects' own research agendas. As ALABS is effectively decommissioned, the informants of this case study had little or no investment in any actual outcome of the project. Nor did they require, need or request any advocacy position from the researcher. In terms of issues of power and method, it seems that empowerment research is either more difficult to achieve, or less relevant to informants when the systems being
researched are effectively decommissioned. What this suggests is that some longitudinal case studies, including this one, may only support a research position that can be characterised in terms of ‘on’ informants and ‘with’ informants.

Limitations Imposed by the System

The dissertation involves the identification of workpractices involving text types and action types associated with ALABS. These terms are introduced in §P3 and described more fully in the body of the dissertation. While the system imposed no real limitations in achieving the stated rationale, see above, it did impose several limitations with respect to this case study.

The first limitation imposed by ALABS concerns the fact that the system is effectively decommissioned. The largest numbers of available transcripts were those associated with staff and student borrowing of manuals which can still be conducted through the remaining ALABS features. However, there are certain workpractices for which no transcripts exist, for example all workpractices involving Tutors and some Loan features such as Student Append. This apparent limitation eventually proved to be advantageous, as it promoted the methodological development of qualitative sequences based either on interviews, or the reconstruction of activity sequences from system code, and indirectly provided the means for characterising action types in the form of sequences and digraphs.

The second limitation imposed by ALABS relevant to this study is the simplicity of the associated action types. ALABS action types involved either the physical movement of texts within the facility, the movement of some specific text types to a locations outside the
Microcomputer Laboratories, or menu selections associated with either triggering text types or supporting system functions. Simple action types of this kind may well be characteristic of standalone information system providing operational support in Type I departments. More elaborate action types may be more typically associated with manufacturing information systems. If this is true, then it may constitute one way in which information systems and manufacturing information systems can be distinguished from each other.

P3 Contributions of the Dissertation

Theoretical Contributions

The theoretical contributions of this dissertation include developments in four specific areas. First, a Systemic Semiotic workpractice framework using a combination of Systemic Functional Linguistics and Social Semiotics was developed in order to link specific information systems features to their situational and cultural organisational contexts. This framework enables the creation of contextual descriptions of information systems features in terms of one or more text types and zero or more action types. Second, the dissertation outlines a Systemic Semiotic form of systems analysis which represents a new class of semio-informatic practices. At the time of writing, this analysis practice is the only one to be based on a single semiotic model of texts, rather than the more usual approach of applying one or more models of the sign (for example, Stamper 1973, 1992, 1996), or hybrid approaches which utilise texts and signs (for example Andersen 1990a). Third, new Systemic Semiotic concepts were developed to account for the multi-generic nature of most information systems features. These new concepts including genre assemblages and genre associations. Related to these was the development of the concept of a genre collection to
describe the generic extent of an information system in its organisational contexts. Fourth, in order to account for the diverse structural realisations of genre sequences describing workpractices, particularly those which have undergone diachronic change, a fuzzy formulation for genre called the *genre quasispecies* was developed. The traditional crisp classifications of genre described in the systemic literature could not account for the range of realisations identified in the longitudinal case study presented here.

**Methodological Contributions**

Methodological contributions of this dissertation include developments in three specific areas. First, methods for conducting information systems analysis based on the Systemic Semiotic workpractice framework were developed. Second, traditional genre analysis was extended to document the qualitative structure of workpractices elicited during analyst-user interviews. Third, new notations were devised to support (i) the description of genre sequences and action sequences, (ii) the comparison of one or more genre sequences and/or action sequences, (iii) the specification of genre and action digraphs used for describing respectively text types and action types associated with workpractices, and (iv) the higher level representation of information systems workpractices through the use of Genre Collection diagrams. Both the Church-Turing thesis described in Dahlback (1995, 3) and Bohm and Jacopini's (1966) computability thesis suggests that machine executable tools could be developed for these notations.

**Substantive Contributions**

Substantive contributions of this dissertation include developments in four specific areas. First, the dissertation represents the first longitudinal case study of an information system
using a semiotic framework. In contrast to the diachronic study developed here, semiotic studies usually focus exclusively on the synchronic characterisation of information systems. Second, the dissertation represents the first application of Systemic Semiotics to the study of an information system, as distinct from information technologies (see for example, Cross and O’Brien 1992). The case study demonstrates the interdependence between information system features (texts) and its organisational contexts (situational and cultural). Third, the dissertation describes the contributions made by two manual predecessor systems to several workpractices that were eventually implemented in ALABS. The relationships between these workpractices are described contextually as well as functionally. Fourth, diachronic changes to ALABS workpractices occurred at several levels, including (i) changes within a workpractice (genre elements and digraphs), (ii) changes between related workpractices (genre associations and assemblages), (iii) broad system restructuring (genre collections), and (iv) changes to the user population (social subjects). The diachronic changes to the workpractices are able to be explained in terms of three proposed basic operations called generic cutting, generic pasting, or a combination of both called generic elaboration.

P4 Structure of the Dissertation

The structure of the dissertation, described below, conforms to the Theory Extension plan (see Figure P.1), considered appropriate for information systems research projects that utilise case studies and action research (Galliers 1990). By providing a Statement of the Problem in §P1, and a Rationale and Scope in §P2, this Preface satisfies the requirements for the Research Questions stage of the Theory Extension plan.
Chapter 1 provides an introduction to semiotic and related applied linguistic approaches relevant to the information systems discipline. It includes an overview of the history, basic definitions, and the extent of these approaches within the information systems discipline, together with a classification of the distinct approaches that have been developed in this field. This chapter also describes the general characteristics of Systemic Semiotics sufficient to distinguish it from other semiotic approaches that have been applied to information systems. While this chapter does not relate to any stage of the Theory Extension plan (Galliers 1990, see Figure P.1), it is required in order to situate semiotics, in general, and Systemic Semiotics specifically, within the information systems discipline.

Figure P.1: The structure of the dissertation relating the chapters to the Theory Building, Testing and Extension plan considered appropriate for case study and action research based information systems research projects (modified after Galliers 1990, 170).
Based on the general characteristics of Systemic Semiotics previously introduced, Chapter 2 develops the Systemic Semiotic Workpractice Model. The model provides a contextual theory of workpractices suitable for studying information systems in organisational contexts. Social Semiotics and Systemic Functional Linguistics have related but distinct disciplinary histories and utilise different theoretical concepts. As a consequence, the model is developed in three stages. Workpractices are initially described using Social Semiotics and then using Systemic Functional Linguistics. The identification of homologous concepts between relevant Social Semiotic theory and Systemic Functional Linguistic theory completes the Systemic Semiotic Workpractice Model. Workpractices are theorised as consisting of one or more text types, also known as genres, and zero or more action types. Methodological issues resulting from the theory are also addressed. This chapter satisfies the requirement for a Theory Building stage according to the Theory Extension plan (Galliers 1990, see Figure P.1).

The case study used in the dissertation is spread across Chapters 3 and 4. Chapter 3 covers the commissioning and development of ALABS from prior to Version 1 through to Version 3. This chapter describes the predecessor systems that lead to the development of ALABS, and relates various significant system features of these predecessor systems to those features fulfilling similar purposes in ALABS. Using the Systemic Semiotic Workpractice Model, the system features developed in Version 1 are analysed in terms of the generic operations that led to the diachronic expansion of the system in Version 2 and 3. Chapter 4 analyses the subsequent diachronic contraction of the system in Version 4. The chapter also describes the specific changes made to the system over the course of its 10-year operational
life by developing new systemic concepts of genre assemblages and associations. By reflecting on the case study developed in these two chapters, a substantially different genre theory is developed to that found within either the Systemic Functional Linguistics or the Social Semiotic literatures. Chapter 3 and §4.2 and §4.3 of Chapter 4 satisfy the requirement for a Theory Testing stage in the Theory Extension plan (Galliers 1990, see Figure P.1), while the Theory Extension stage is addressed in §4.4 of Chapter 4.

Chapter 5 summarises the results of the dissertation and proposes a number of new research projects that could be undertaken. The results section summarises the Systemic Semiotic approach developed in the dissertation, briefly reconsiders the distinctiveness of workplace applications using this theory, and recapitulates the diachronic changes that occurred in the system which was the subject of the case study. The further research section briefly describes new research directions as a consequence of this work. Some preliminary work has already started on some of the suggested research directions. The range of topics includes tool support of the Systemic Semiotic Workpractice Model and the parallel development of a new systems analysis methodology, extending the workpractice analysis developed here into a more comprehensive organisational analysis, and applying the concepts developed here to the process of analysis itself.

Several diagram conventions and notations developed in the dissertation are briefly described in the attached appendices, together with a visualisation of ALABS hourly loan rates corresponding to a period during its diachronic expansion.
Related Publications, Conference & Seminar Presentations

The following section summarises publications, conferences and seminar presentations, completed to date on topics directly related to various sections of this dissertation.

The overview of semio-linguistics provided in §1.2 and §1.3 was based on part of a presentation given at the 1998 Toronto Semiotic Roundtable on Semiotics and Information Science (Clarke 1998d). Details about Social Semiotics and its potential uses in information systems theory and practice can be found in Clarke (1992c). The relationship between Systemic Functional Linguistics and Social Semiotics described in §2.2 and §2.4.1 were first presented as a Department of Business Systems seminar (Clarke 1996c) and subsequently published as Clarke (1997a). A Systemic Semiotic approach to information systems development and use was suggested in Clarke (1996b).

Work conducted on Hasan’s model of genre applied to information systems analysis critiqued in §2.3.6.1, is based on a seminar written and delivered during study leave with Ronald Stamper in 1993 at Twente University, The Netherlands, published as a LEGOL working paper (Clarke 1993a). An extension of this work was delivered as an invited seminar (20/02/95) to the Department of Administrative Data Processing at Umea, Sweden (Clarke 1995f), and in extended form at the First International Conference on Organisational Semiotics hosted by Twente University, The Netherlands (Clarke 1995c). An abridged version of the case study using Hasan’s model of genre, instigated during study leave in 1993 with Peter Andersen and Berit Holmqvist at Aarhus Universitet, Denmark.
was published as Clarke (1996). The concept of the Genre Collection was proposed in (Clarke 1996d). The relationship between workpractice texts and actions is being published in a forthcoming article (Clarke 1999).

A functional introduction to the case study system used as the basis for §3.2.3 is provided in Clarke and Athanasiadis (1987). The general approach of using social, economic and historical analysis as an alternative to development narratives in organisations was first presented at an invited seminar given to faculty at the Agrarwissenschaftlichen Facultät der Christian-Albrechts-Universität, Kiel, Germany (Clarke 1990, 1991b). The reflexive application of systemic semiotic methods to the process of analysis, used to reconstruct workpractices from stakeholder interviews in Chapter 3 and 4, was developed with the financial support of an internal competitive grant from the Commerce Faculty Research Board and reported in Clarke (1997b, 1997e).

Work has been started on a number of the projects, proposed in §5.2 as extensions to the current research. The development of a methodology to support genre analysis developed in the dissertation was described in Clarke (1998c). The theoretical and methodological basis for a systems analysis practice based on systemic semiotics, rather than conventional information theory and systems theory, was outlined in a pair of seminars (Clarke 1998e, 1998f). A general survey and assessment of systemic semiotics applied to the Information Systems discipline, especially the rationale for a comparative analysis of information systems methodologies based on their embedded social assumptions, and a meta-analysis of deliverables provided by methodologies was described in Clarke (1998d).
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A Genealogy of Organisational Semiotics

1.0 Introduction

The purpose of this chapter is to situate Systemic Semiotics within the context of debates and literatures currently in circulation at the boundaries of information systems, computing science and organisational studies. Systemic Semiotics is the theoretical approach being developed and applied here to the study of diachronic changes to workpractices associated with the use of a specific information system. For the sake of brevity, we refer collectively to the fields of information systems, computing science and organisational studies by the neologism informatic domains in recognition of the prominence given to general systems theory and information theory within these fields. This neologism is used here in the broadest sense, and should not be confused with its narrower usage as ‘digital communication’.

Section §1.1 briefly introduces some of the reasons that have been used to argue for the use, development and deployment of semiotic concepts and theories within the purview of Information Systems, the substantive application area of this dissertation. Of particular interest to informatic domains are issues involving representation and communication. Representation involves questions of the encoding and the instantiation of organisational phenomena within the computer. Arguably, of greater importance to Information Systems are issues involving communication not only of the issues concerning the definition of information, but also more generally the questions concerning meaning making in situational and cultural contexts. These questions
necessarily involve fundamental theoretical issues concerning the methodologies and practices deployed by systems developers in organisations, as well as the uses to which these representations are put. Nonetheless, while a large proportion of the informatics literature addresses issues of representation, what is left unaddressed are the social and political contexts in which organisational communication occurs.

The remainder of this chapter is devoted to considering the constitution of ‘Organisational Semiotics’ together with a review of the debates and literatures surrounding this and similar terms designating the application of semiotics to informatic domains. This poses the question of how to construct a review of the debates and literatures without simply constructing a chronological history which would ultimately be teleological and which would elide the real and various distinctions between discipline, theory, method and practice into an homogenous and progressive historical narrative? A unified, singular and chronological history of the use, development, and deployment of semiotic theory in informatic domains would ultimately be an illusory epistemology of self-correction imbued with idealist rationalism (Canguilhem 1975, 1977). It would certainly not reveal the cultural framing of this work and the historical and institutional conditions of its emergence and continual re-emergence. What is more valuable in describing the “histories” of distinct types of semiotic theory in informatics domains would be the epistemological study of the formation of concepts, and the processes of separation and discrimination which defines both the object and the problem that is being made intelligible (Young 1990, 68).
The term *genealogy*, used in this chapter's title, was originally coined by Nietzsche and subsequently developed by Foucault (1984) to designate an approach which seeks to break away from the usual representation of history within *disciplinarity* as having a false unity and totality. Instead, genealogies attempt to recognise the multiple contested histories of disciplines. For Foucault (1984, 85), “humanity does not gradually progress from combat to combat until it arrives at universal reciprocity, where the rule of law finally replaces warfare; humanity installs each of its violences in a system of rules and thus proceeds from domination to domination”. In addition, rather than valorising individual academicians and practitioners, genealogies highlight the fact that we are ‘disciplined by our disciplines’ in that amongst other things they help to produce our social worlds (objects and relations between them), while simultaneously constituting us as particular kinds of social subjects (academics and practitioners) that are simultaneously subjected to and subjects of our disciplines (Messer-Davidow et al 1993). The mechanism which underpins disciplinarity and *subjectivity* and through which we negotiate access to these disciplinary worlds is the category of discourse. *Discourse* should not to be conflated with its traces, that is, the conference papers, articles, monographs and the like, although these are the products of discourse and imbued with discourses. Rather, Foucault uses the term discourse to designate the rules, regulations and prohibitions (Kress 1985) with which our access to disciplines is regulated, for example, what counts as appropriate methods, what is classified, what is not, and what constitutes the criteria for knowledge in a discipline? Two sets of knowledge need to be accounted for within this genealogy: semiotics and linguistics. While the concepts of discipline, subjects and discourse are required in developing a genealogy of Organisational Semiotics presented here, they also constitute one of the
fundamental theoretical foundations for the Systemic Semiotic Workpractice Framework developed more fully in Chapter 2. Workpractices instantiated by information systems similarly construct social worlds, produce social subjects and regulate our access to and understanding of work in organisational, as well as institutional and disciplinary contexts.

1.1 Contested Core Concepts in Informatic Domains

In general, the theoretical and methodological basis of the information systems discipline is based upon two related theories. The first basis of informatic domains is the systems framework instigated in the biological work of von Bertalanffy (1956). The second basis is the mathematical theory of communication (Shannon 1948; Shannon and Weaver 1949) developed from a probabilistic model of information in the tradition of work by Nyquist (1924; 1928) and Hartley (1928).

The classical concept of a general system applied to both organisations and the information systems embedded within them, consists of a boundary which separates the particular elements or features of interest from an environment which affects the behaviour of those elements. In principle, a boundary denotes a difference - a property which has been exploited to create semiotic interpretations of systems (see for example Wilden 1972) that have considerable influence within the artificial intelligence and intelligent systems communities. Recent ethnographic studies in systems analysis and requirements engineering (see for example Randall et al 1994, 197-214), demonstrate that during the enactment of systems analysis practices that which is located within the
environment is typically excluded. What remains to be analysed are the elements or features of interest to developers that lie within the boundary. For traditional systems analysis practices, the boundary circumscribes a structural-functional similarity within an organisation. As a consequence, the practice of systems analysis is one of identifying, negotiating and/or enforcing a managerially mandated description of organisations based on a notion of structural-functional similarity. In contrast to this, a semiotic theory of organisation ought to create a description of organisations based on differences.

The mathematical theory of communication and its probabilistic theory of information have proved to be extremely difficult to apply to anything other than the development of technological artifacts. Within the mathematical theory of communication:

The fundamental problem... is that reproducing at one point either exactly or approximately a message selected at another point. Frequently the messages have meaning; that is they refer to or are correlated according to some system with certain physical or conceptual entities. These semantic aspects of communication are irrelevant to the engineering problem. (Shannon 1948, 31)

While adequate for the purposes of electrical engineering, the mathematical theory of communication is arguably inappropriate for informatics domains. Typical definitions of information systems (for example Avison and Fitzgerald 1995, 1), necessarily refer to the 'use' or 'usefulness' of artifacts, as well as to 'meanings' associated with them in organisational contexts. Despite Bateson's proposal that "... redundancy in cybernetics and information theory could be extended to include the role of context in meaning" (Lemke 1995, 155), no theory of context has been developed within the sender-receiver model of communication (Shannon and Weaver 1949) used in the IS discipline. Without
a definition of context, it becomes impossible to describe the conditions under which ‘information’ becomes informative or communicative. While relying on specific truth claims concerning its objectivity and neutrality, the mathematical theory of communication relies on social inequalities in order for it to function (Schirato and Yell 1996) together with a ‘commonsense’ notion of meaning (Belsey 1985). A naive category of truth informed by an untheorised notion of meaning and an inappropriate model of communication, is at best a problematic basis for informatic domains.

1.2 Semiotics applied to Informatic Domains

In the previous section a brief argument was mounted for the applicability of semiotic thinking to core questions in the purview of informatic domains. Interestingly, there has always appeared to be some limited exchanges between these domains. This realisation of the semiotic nature of information systems in organisational contexts has been apparent in the earliest work in semiotics applied to the informatic domains. This has been the case in Europe and Scandinavia, where recognition of the need to create organisationally appropriate information systems has helped to maintain an interest in applying semiotics to informatic domains in general. While specific schools may have flourished for a time, most schools have failed to reach critical mass and have been subsumed within traditional and accepted information systems theories and practices. Some specific selections of semiotic theory have been utilised within informatic domains. The preeminent Swedish methodologist Börje Langefors (1966) was an example of one of the earliest information systems academics, circa 1967, who developed an interest in semiotics, (Nilsson 1995). He proposed the research project that developed into the ISAC methodology (Dahlbom 1993, 1995) which had as its
definition of elementary information, Pierce’s triadic sign. Fiol (1989) provides a relatively early and excellent example of organisational analysis based on differences, of the kind proposed in §1.1.

Yet despite the apparent applicability of general semiotics - shown by the examples of limited exchange between them - there was a relatively sparse and episodic utilisation of general semiotic theory within the information systems and organisations domains. A “sparse and episodic utilisation” of semiotics could have been a reasonable description for semiotics applied to informatic domains until the mid-1990s after which there was an explosion of activity both in the number of received terms in use to describe and label the research in the area, and the workshops and conferences that enabled the ideas to be put into circulation. For example, in 1999 there were four international workshops and conferences while prior to 1995 there were none (see Table 1.1).

Currently, the diversity of approaches, totaling seven by the mid-1990s appear to be rapidly merging into two distinct, polarised macro-fields of Organisational Semiotics and Computational Semiotics. The development of Organisational Semiotics in the context of this explosive activity and specific kind of polarisation poses questions concerning the nature of disciplinarity - questions that form the focus of the remainder of this chapter.
Table 1.1: Recent Organisational Semiotics and Computational Semiotics workshops and conferences. The shaded entries indicate mainstream conferences that have hosted relevant themes. Entries above the thick line have been publicly announced and are forthcoming; those that are below the line have been held.

<table>
<thead>
<tr>
<th>Year</th>
<th>Month/Day</th>
<th>Event Title</th>
<th>Host</th>
<th>Chair</th>
</tr>
</thead>
<tbody>
<tr>
<td>2000</td>
<td>May 28</td>
<td>Computational Intelligence and Semiotics Seminar</td>
<td>DCA-FECE-UNICAMP, Brazil</td>
<td>Ricardo Gudwin</td>
</tr>
<tr>
<td>2000</td>
<td>July 4</td>
<td>3rd International Workshop on Organisational Semiotics</td>
<td>Staffordshire University, UK</td>
<td>Kecheng Kiu, Peter Andersen, Rodney J. Clarke, Ronald Stamper</td>
</tr>
<tr>
<td>1999</td>
<td>Oct 15</td>
<td>Organisational Engineering Workshop- Challenging the OER-paradigm</td>
<td>Delft University of Technology, The Netherlands</td>
<td>Jan Dietz</td>
</tr>
<tr>
<td>1999</td>
<td>Oct 12-14</td>
<td>2nd International Workshop on Organisational Semiotics</td>
<td>Twente University, The Netherlands</td>
<td>Kecheng Liu, Peter Andersen, Rodney J. Clarke, Jan Dietz, Marc Halfkamp, Ronald Stamper, Joaquim Filipe, Anastasia Pagnoni Holt, Robert A. Stegwee, Yasser Ades</td>
</tr>
<tr>
<td>1999</td>
<td>Oct 3-6</td>
<td>7th International Congress- International Association for Semiotic Studies (IASS/AIS) Sign Processes in Complex Systems</td>
<td>Technical University, Dresden, Germany</td>
<td>Walter Schmitz</td>
</tr>
<tr>
<td>1999</td>
<td>Oct 3-6</td>
<td>9th International Congress of the German Society for Semiotic Studies (DGS) Machines and History</td>
<td>Technical University, Dresden, Germany</td>
<td>Walter Schmitz</td>
</tr>
<tr>
<td>1998</td>
<td>Oct 13-15</td>
<td>Semiotics and the Information Sciences</td>
<td>Victoria College, University of Toronto</td>
<td>Jean Umiker-Sebeok, Marcel Denesi</td>
</tr>
<tr>
<td>1998</td>
<td>Sept 14-17</td>
<td>Intelligent Systems and Semiotics (ISAS)</td>
<td>National Institute of Standards and Technology, Maryland USA</td>
<td>Alex M. Meystel</td>
</tr>
<tr>
<td>1997</td>
<td>May 26-27</td>
<td>1st International Workshop on Computational Semiotics (IWCS97)</td>
<td>Pôle Universitaire Leonard de Vinci, Paris, France</td>
<td>Claude Vogel, Suzanne Bertrand Gastaldy, Jean-Claude Heudin, Kathleen Carley</td>
</tr>
<tr>
<td>1996</td>
<td>Feb 19-23</td>
<td>Semiotics and Informatics Dagstuhl Seminar</td>
<td>Schloss Dagstuhl- Inrenationales Begegnungs-und Forschungszentrum für Informatik</td>
<td>Peter B. Andersen, Mihai Nadin, Frieder Nake</td>
</tr>
<tr>
<td>1995</td>
<td>Feb 10-15</td>
<td>1st International Conference on Organisational Semiotics</td>
<td>Twente University, The Netherlands</td>
<td>Ronald Stamper, Duda Nauta, Rodney J. Clarke</td>
</tr>
</tbody>
</table>
1.2.1 Provisional Histories: Questions of Disciplinarity

Writing a history of semiotics and information systems in terms of a progressive historical narrative might have its political uses, for example, to signal the existence of a new scientific paradigm or to act as a rallying cry for those already convinced of the usefulness of these ideas. Within information systems, paradigm research is common, see for example Iivari and Hirschheim (1992) and Hirschheim and Klein (1989). Writing progressive historical narratives about the development of disciplines is a textual strategy that is already available to authors in Western educational institutions. Indeed, this kind of textual strategy exists prior to the formation of the objects of study that would form the basis of these histories. Messer-Davidow et al (1993) remind us that while knowledge has assumed a disciplinary form only recently within Western educational institutions (for example Organisational Studies, Information Systems), these disciplines have become so naturalized that it is difficult to imagine alternatives to them except perhaps by combining them (Organisational Semiotics, Semio-informatics).

Significantly, constructing such a progressive historical narrative of the literature would operate to obscure the actual history of the ideas including their specific institutional bases and temporalities. These decidedly distinctive histories resist the kind of unifying and homogenizing themes imposed by the linear structure of progressive historical narratives, especially those which are usually written for, and about, the formation of emerging areas of investigation.

Academics and practitioners in these fields have historically neither had access to a coherent or extensive body of knowledge, nor anything approaching a widespread
institutional representation with established and widely recognised curricula. Several examples will suffice to demonstrate some of the strategies that have been employed by academics in order to have these semiotic theories and methods applied to the informatic domains represented in academic institutions. The author knows of one case where in order to present semiotic theory to a postgraduate information systems audience, a course was deliberately given an innocuous title which enabled the material to be taught, albeit stealthily. After several years the course was recuperated by the department and used as a shell to teach entirely different and much more conservative content. A less efficient, but ultimately less contentious solution is to embed semiotic theory and practice within existing courses. In postgraduate courses, this can lead to a high level of exposure to semiotic theories and methods for students while at the same time permitting the description of compatible theory and methods from different disciplines. One Australian example of this is a postgraduate Analysis of Systems subject in which semiotic theory and methods are presented together with compatible methods in qualitative analysis. Elsewhere, the value of semiotics in informatics domains is more widely accepted, enabling different and more collaborative strategies to develop in order to disseminate theory and method. In one case, the short supply of academics with the requisite expertise to teach this material resulted in a Scandinavian academic teaching their postgraduate semiotic subject at an institution located in a foreign country.
1.2.2 Institutional Resistance to Semiotics in Informatics Domains

Several reasons for the institutional resistance to semiotic theory in informatic domains may be ascertained. These are the dominance of commonsense notions of communication; the monolithic self-representation of pan-semiotics; the transdisciplinary status of Semiotics; the perceived absence until recently (and even now in some respects) of an identifiable semio-informatic community, and the association of semiotics with unpopular forms of knowledge.

A major contributory reason for the resistance encountered by semiotics in the informatic domains lies in the historical development and the goals of semiotics. Western semiotics represents itself as having a seamless and rich history dating back at least to the Greco-Roman times from the Stoics (approximately 300 BC to 200 AD) and the Epicureans (300 BC to 0), through the Enlightenment and into the 19th and 20th Centuries. Faced with such a diversity of researchers, theories, terminology and traditions, rivaling the most entrenched of modern disciplines, it is not surprising that a casual 'dip' into the literature might prove uninformative. In the absence of programmatic semiotic research with an extensive literature relevant to organisational analysis, many researchers would simply refuse to venture into the 'deep waters' of investigation and investment in semiotic thinking. Moreover, as semiotics is centrally involved with understanding communication, it becomes obvious that many commonsense notions of what constitutes communication would also need to be interrogated. As a consequence, semiotics usually needs to employ meta-theory of one form or another, which therefore leaves it open to charges of obscurantism and elitism (Sless 1986, 2). But the assumption that the constructs used to explain and examine such
complex and taken-for-granted cultural phenomena should in principle be simple, is unreasonable.

Another major contributory reason is the difficulty of locating semiotics within any single discipline - semiotics is inherently trans-disciplinary. Broad application domains have included, but are not limited to the cultural constitution of subjectivity, criticism and knowledge, communication and perception. A sample of subjects using semiotic theory of one form or another would include cultural and literary studies, film criticism, feminism, political science, legal studies, town planning and architecture, anthropology, biology and genetics. Moreover, there is considerable debate about what constitutes the core criteria that defines semiotics (Clarke 1992, 68). Most semiotic studies utilise a model of the 'sign' as a basic unit of investigation - a sign usually being glossed as 'something that stands for something else in some capacity or another'. Yet, for a discipline which is often defined as the 'study of signs', there are a plethora of distinct sign models from which to choose. In modern semiotics alone, dating from the turn of the century, there are at least fifteen dyadic sign models and ten triadic sign models (Nöth 1990). There are also forms of semiotics, which do not use any explicit sign model during analysis (text semiotics, social semiotics) and definitions of semiotics, which have avoided using it (Pap 1991).

Moreover, semiotics is often considered, especially in North America, as a quantitative discipline, due in no small part to Morris's (1964) gloss of semiotics as being the "science of signs" and the amalgam of semiotics and North American behaviorism
which was the hallmark and goal of his work. This association between semiotics and quantitative analysis continues to prevail in North America.

1.2.3 Received Terms and Emerging Definitions

In February 1995, approximately forty researchers, mostly from Europe but also from Scandinavia and Australasia, attended the First International Conference and Workshop on Organisational Semiotics at Twente University in the Netherlands. The term Organisational Semiotics was coined by its chair Ronald Stamper to refer to the use of any semiotic approach in the study of organisations. The MEASUR Research Group that Ronald Stamper initiated at the London School of Economics in the United Kingdom, and continued at Twente University in the Netherlands, had since its formation consistently developed and advocated semiotic thinking in informatic domains (Stamper 1973; Kolkman 1993; Liu 1993). The broad application of semiotic approaches to organisations has been considered by a number of information systems academics to be a necessary advance in information systems theory (see for example, Land 1985, Rzevski 1985, and Tully 1985). In 1995, Ronald Stamper was successful in arguing the case for semiotics to be considered, along with psychology and sociology, as a foundation discipline for information systems within the IFIP FRISCO framework.

A principle interest at the conference was the application of semiotics to the information systems discipline, referred to as Semio-informatics, a term coined and used independently by the author and Mihai Nadin. Related to this was the intersection of linguistics and informatics domains referred to as Work Language Studies (Holmqvist and Andersen 1987; see also Katzenburg and Piela 1993).
Peter Bøgh Andersen (1990a) has coined the term *computer semiotics* to refer to the application of semiotic principles to computing in its most general sense. The kinds of activities included within the gamut of computer semiotics include amongst other things, program development, interface design, systems description, systems development, work analysis, organisational analysis, and technological assessment (Andersen 1990a, 18). However, within Australia and North America there exists a strong institutional demarcation between *computer science* and *information systems*. The former emphasises the design and implementation of systems specifically used in the support of machine functions (operating systems, file systems, compilers). The latter emphasises the support of organisational work processes (systems description, systems development, work analysis, organisational analysis, and technological assessment). Increasingly, a further distinction is being made between computer science and information systems, through the term *communication technology* (often confusingly referred to as informatics in Australia) which focuses on hardware and software systems which support networks, satellite communication and related technologies. In Australia and North America, the disciplinary basis of computer science is often considered to be applied mathematics, whilst that of information systems is considered to be commerce, and communication technology is considered to be electrical engineering. Therefore, most of the applications included within computer semiotics in North America and Australia would be considered outside the realm of a ‘computer’ science and located within the province of information systems. The use of the term ‘computer’ in computer semiotics is probably a consequence of the broader meaning of the term ‘computer science’ within Scandinavia, which has propelled Andersen’s work and that of his
colleagues involved in the SYDPOL group. This group spanned many interests ranging from the consideration of computers as symbolic and *semiotic machines*, and the linguistic status of programming languages, to a consideration of work and professionally oriented language in organisations (Andersen and Holmqvist 1988). The work of Nadin (1998) dating from 1977 and Döben-Henisch (1998) also use the concept of the computer as a semiotic machine. The field of computer semiotics and semio-informatics are considered here to be synonyms for the intersection of semiotics and information technology in general, and therefore a part of the broader program of organisational semiotics. *Semiotic engineering* has also been used by de Souza (1998) since 1995 to designate a form of analysis and design which spans the interests of semio-informatics and computer semiotics.

The University of Technology, Dresden recently hosted the 9th International Congress of the German Society for Semiotics Studies (DGS), followed immediately by 7th International Congress of the International Association for Semiotic Studies (IASS/AIS), October 3-6, 1999. The former conference had as its general theme 'Machines and History', where 'machine' was used in two senses referring to a general cultural concept, and also to the physical or conceptual devices describable within a broadly semiotic framework. The latter conference had as its general theme 'Sign Processes in Complex Systems' where 'complex system' was interpreted in a broad interdisciplinary sense. This interest from the mainstream semiotic community is due in part to the novel cases that are provided by Information Systems and Computing Science for testing and further elaborating traditional semiotic theory, at the same time as opening up the possibility of developing new semiotic theories. The 1999 DGS and
IASS/AIS represented an opportunity to hold the first *Computational Semiotics* session in a mainstream semiotic conference. The session was entitled *Computational Semiotic Systems: Theories and Applications* and was chaired by Gerd Döben-Henisch, in response to discussions between Prof. Burghard Rieger, Alexander Mehler, Ricardo Gudwin, Gerd Döben-Henisch, Lauwrence Erasmus, and the author held at ISAS'98 with the aim of establishing a semiotic theory of computation. While one part of this community has aims similar to computer semiotics, other parts of this community aim to construct autonomous systems with semiotic processing that will provide them with abilities like intelligent behavior, perception, value judgement and behavior generation (Gudwin and Gomide 1997). There are at least six prominent research groups with a significant interest in semiotics applied to informatics domains (see Table 1.2). For convenience sake, they are generally given a geographical and/or institutional name, unless a formal name for the group exists in which case this is used.
Table 1.2: A selection of significant Organisational Semiotics Research Groups (a), and significant Computational Semiotic Research Groups (b).

<table>
<thead>
<tr>
<th>Group Name</th>
<th>Institution/Country</th>
<th>Example Publication</th>
</tr>
</thead>
<tbody>
<tr>
<td>Twente</td>
<td>Twente University, The Netherlands (formerly at the London School of Economics, United Kingdom)</td>
<td>Stamper (1973)</td>
</tr>
<tr>
<td>Aarhus</td>
<td>Department of Information and Media Science and the Centre for Human Computer Interaction, Aarhus University, Denmark</td>
<td>Andersen (1990a)</td>
</tr>
<tr>
<td>Systems in Context (SysCo)</td>
<td>Department of Information Systems, University of Wollongong, Australia</td>
<td>Clarke (1991)</td>
</tr>
<tr>
<td>Organisational Semiotics</td>
<td>Staffordshire University, Stafford, United Kingdom</td>
<td>Liu (1993)</td>
</tr>
<tr>
<td>Trier</td>
<td>Linguistische Datenverarbeitung/Computerlinguistik, University of Trier, Germany</td>
<td>Rieger (1981)</td>
</tr>
<tr>
<td>Computational Semiotics</td>
<td>DCA-FEEC-UNICAMP, Brazil</td>
<td>Gudwin (1999)</td>
</tr>
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</table>

Figure 1.1 lists and classifies currently received terms in the application of semiotics to information systems domains. Seven distinct applied semiotic fields have been identified within the informatics domain. These include: organisational semiotics; semio-informatics; computer semiotics; semiotic engineering; work language studies; semiotic machines and computational semiotics. This is by no means a fixed list. As I have been arguing, the use of semiotics in information systems reveals how the Information Systems has emerged as a discipline both from within institutional struggles over disciplinary boundaries and also as a consequence of the disjunctions and disparities from within its own knowledges, namely semiotics. This 'struggle' has no resolution. To endow it with a fixed set of thematized concerns, in this sense, would mean constructing a history of Information Systems precisely along the lines of the linear, unfolding and progressive narrative structures which dominate the organisation.
of knowledge areas into unified fields. In other words, I am not concerned to position or ‘fix’ semiotics in an agonistic relation to other forms of knowledges or disciplines, so much as to point out the ‘parasitic’ nature of the incorporation of semiotics into ‘host’ areas. As can be seen from the above list, semiotics has not superceded the knowledges to which it has been attached. Rather, the list reveals a process of hybridisation at work in the histories and institutional and disciplinary uses of semiotics in the informatic domains. This is not a linear process, but a discursive process in which sets of knowledges compete in the academy in speaking about their objects of study.

**Figure 1.1:** Tentative list of applied semiotic fields proposed for the Informatics domain, the latter being segmented into Organisational Studies, Information Systems, and Computing Science. Provisional dates are based on publications or have been mentioned within conference and/or workshop announcements.

<table>
<thead>
<tr>
<th>Organisational Semiotics</th>
<th>Semio-informatics</th>
<th>Computer Semiotics</th>
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*Semiotic Engineering*
Clarisse Sieckenius de Souza (1995)

<table>
<thead>
<tr>
<th>Work Language Studies</th>
<th>Semiotic Machines</th>
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<table>
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<tr>
<th>Organisational Studies</th>
<th>Information Systems</th>
<th>Computing Science</th>
</tr>
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<tbody>
<tr>
<td><strong>Computational Semiotics</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Claude Vogel, Suzanne Bertrand-Gastaldy, Jean-Claude Heudin (1997); Burghard Rieger (1981)</td>
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1.2.4 An Instance of Institutionalised Hybridisation

An unusual entry occurs in Table 1.1. The ‘Organisational Engineering Workshop-Challenging the OER paradigm’ a regular forum for the language action perspective community extended an invitation to interested participants at the second International workshop on organisational Semiotics, the purpose of which was to discuss plans for the formation of a new composite organisational Engineering community. In studies of disciplinarity this kind of cross-disciplinary outcome is referred to as hybridisation. The particular form of hybridisation which occurred at this meeting is referred to as the institutionalised form which is defined as “...a hybrid which becomes a recognised sub field or permanent cross disciplinary committee or program” (Klein 1993, 192). This invitation only occurred after a number of researchers had already established formal hybrids defined as “discipline exchanges that remain at the level of topics or cross-disciplinary contacts” (Klein 1993, 192). The hybridisation of disciplines would appear to be the characteristic of knowledge growth into current discipline formations.

1.2.5 Future Reconfigurations of the Fields

While the emphasis in genealogical studies concerns disciplinarity, that is, what constitutes dominant categories in the study of knowledge, genealogical studies do not exclude the permeation, blurring or mergers across the boundaries that separate one field from another. We can use genealogy as a way of attempting to predict future possible reconfigurations of these areas, but an argument in favour of a particular future configuration of fields needs to rely on established categories of disciplinarity, discourse
and subjectivity. A significant publication recognising the escalation in cross-disciplinary merging was an essay by Klein (1993, 187). He described the ways particular kinds of analogy had moved into another disciplinary area, where it took up an increasingly important role in the explanations deployed by entirely different disciplines. Klein (1993, 187) provides some possible explanations for *permeation* between fields. The left hand side of Figure 1.2 shows various fields which constitute Semiotics applied to informatic domains as they have been identified since 1995 (1st Organisational Semiotics Workshop). One possible reconfiguration for these areas is shown on the right-hand side of Figure 1.2. The arrows attempt to show the permeation between fields, as an attempt to account for the relations between the neighbouring fields, and as the redefinition of what is considered intrinsic/extrinsic to a particular field.

In accounting for this reconfiguration it is very likely that local and regional conferences tend to reflect more constrained sets of theories and models, whilst mainstream semiotic conferences, and almost all the recent workshops and conferences can be classified as either Organisational Semiotics or Computational Semiotics events, see Table 1.1. Secondly, these two meta-fields are sufficiently distinct from each other in terms of methods, concepts and theories to count as distinct disciplines. The third reason is that although these workshops and conferences remain open to diverse approaches the fact remains that Organisational Semiotics and Computational Semiotics are well aligned with the traditional fields of Information Systems and Computing Science, the dominant disciplines within the North American informatics tradition. Computer Semiotics and Semio-Informatics, the fields which attempt to provide a bridge between Information Systems and Computing Science, are distributed between Organisational Semiotics or
Computational Semiotics. One consequence of this future reconfiguration is that the socio-linguistic and semio-linguistic methods that they both share will tend to be less well represented within the available fields.

**Figure 1.2:** Terms referring to the application of semiotics into informatic domains (left), and one possible future reconfiguration of these fields (right).
1.3 Linguistics applied to Informatic Domains

There are a number of potentially relevant linguistic theories which are replete with useful methods to be applied to informatic domains. Examples include Ethnomethodology and Conversation Analysis, various types of sociolinguistics, especially Interactional and Variation Theory, Logico-philosophical (Speech Act Theory and Pragmatics), Structural-Functional Approaches (Birmingham School & SFL), and Social Semiotic (Critical Discourse Analysis & Critical Linguistics). However, in a review of linguistic theories potentially applicable to the information systems discipline, Lyytinen (1985) omits any mention of theories that are also explicitly semiotic. This is curious given the continuous dialogue between the semiotics and linguistics disciplines, evident in the work of Halliday (1978) and Hjelmslev (1943/1963), which can be dated to the start of modern semiotics with the posthumous publication of de Saussure's *Cours de linguistique générale* (Bully et al 1916/1993). The omission, or perhaps conflation, of semio-linguistics with socio-linguistics reveals particular preferences for linguistic theory on those occasions when it has been utilised within the information systems literature.

The linguistic theory that has received the most interest within the Information Systems discipline has been that associated with the Logico-philosophical school. Working within this school, a number of approaches to various informatics domains directly utilised speech act theory (Austin 1955/1962, Searle 1969, 1979a, 1979b). These approaches are informed by the later work of Wittgenstein (1963) - unlike his earlier work (Wittgenstein 1949) which led to his uneasy affiliation with the 'semantic
the 'ordinary language philosophers' of the Logico-philosophical school (Wittgenstein 1963; Austin 1955/1962), is that it does not provide an adequate account of the connection between language and experience, of history and social change, and of meaningful action and social relations" (Thompson 1981, 115). Concerning the critical social theory of Habermas (1979) which is closely associated with the use of the Logical-philosophical school, Thompson (1981, 115) emphasises that the "... typology of action is unsound, that his notion of systemically distorted communication is problematic, and that his speculations on the connections between ontogenesis and phylogenesis leave many issues open."

Language and communication based methods for systems analysis and design of office information systems is relatively well established in the academic literature. Despite this, the use of language based methods of analysis and design have had minimal effect in traditional information systems development projects. Lamentably few methodologies
utilise explicitly language based analysis and design techniques (Lyytinen 1985; Lyytinen et al 1991; Lehtinen and Lyytinen 1984), an assertion which can be corroborated by examining the range of techniques employed in conventional IS development methodologies. This is despite the fact that many venerable techniques (for example E-R modeling) rely upon implicit notions of language.

In subsequent chapters, this dissertation will develop and apply a combined theory called Systemic Semiotics to a case study within the informatic domain. Considering that the genealogy described above signaled the possibility of a future polarisation despite the widespread hybridisation of the semiotic fields currently applied to informatic domains, this dissertation will attempt to demonstrate the utility of a semio-informatic approach to the analysis of information systems in organisation contexts. In the face of this anticipated polarization, I am attempting to clear a space for a semio-informatics that uses a social semiotic theory of communication.

1.4 The Emergence of Systemic Semiotics

The purpose of this section is to situate the field of Systemic Semiotics within the broader context of semiotics applied to informatic domains. In Chapter 2 the theory that will be applied to developing a theory of workpractices associated with the use of information systems is Systemic Semiotics. It is a term coined by Fawcett (1986) that denotes a combination of Systemic Functional Linguistics, a semiotic model language (Halliday 1985; Martin 1992) with its extensions into Social Semiotics (Lemke 1988,
Thibault 1991). To account for information systems in organisational contexts, the theoretical basis of Systemic Semiotics describes workpractices in workplaces as socio-cultural practices consisting of patterns of human communication and action (Clarke 1997c). The methodological basis of Systemic Semiotics resembles that employed in Work Language Studies while its theoretical framework, described in more detail in Chapter 2, is similar in some respects to that of Computer Semiotics (Andersen 1990a).

Social Semiotics is a relatively new field (Hodge and Kress 1988), and uses as its main theoretical basis the work of Bakhtin (in Todorov 1984), Althusser (1971), and Foucault (1984). It has been developed primarily within Australia as an extension of Systemic Functional Linguistics, a semiotic model of language. For example, Gunter Kress trained under Halliday, although his interests from the onset have been directed at ‘socio-cultural practices’ not socio-linguistics (Kress 1985). Generally, definitions of social semiotics start with a critique of Saussure’s sign based on the work of Bakhtin who wrote under a variety of names including Vološinov (1973). According to Hodge and Kress (1988, 16), Saussure’s general approach involved setting up dichotomies and then excluding one of the options until he had a “… pure object of study”. Saussure (Bally et al eds/ 1916/1972) initially constructed a dichotomy between *semiotic systems* and *extra-semiotic phenomena* including culture, society, and politics. Having excluded extra-semiotic phenomena, Saussure then focused on the semiotic systems option, constructing a dichotomy between *language* and *other systems*. Excluding the other systems options, he constructed a further dichotomy between *langue*, the system of language shared by the community of speakers (Crystal 1985, 174), and *parole*, the concrete utterances produced by individual speakers in specific situations (Crystal 1985,
Excluding parole, a further dichotomy was constructed between the possibility of a *synchronic* approach to language study, one which describes the state of the language system at a particular point in time, and a *diachronic* approach to language study, which describes the historical development of languages. Favouring synchrony, a dichotomy was constructed between *paradigmatic* relationships a linguistic unit has with others in a specified system, over *syntagmatic* relationships between a set of selected constituent syntagms from the linguistic system. Saussure then concentrated on "...signs which have a *value*, a place in a system or structure, syntagmatic or paradigmatic, that is a signification; and a relation of reference, existing outside language" (Hodge and Kress 1988, 16). It is the options that were excluded in the development of Saussure's semiotics that form the starting point for social semiotics.

While Systemic Semiotics comprises an uneasy combination of Social Semiotics and Systemic Functional Linguistics, it represents one of a potentially large number of useful, combined approaches which could be applied to issues of relevance in information systems, computing science, and organisational studies. The development of these approaches require a critical understanding of semiotic theory, its limitations in practice, and a willingness to avoid unbridled theoretical pluralism that guarantees quick theory development at the expense of disciplinary diversity.
1.5 Summary

Of most value in the genealogical literature review of semiotics in informatic domains is the manner in which it discursively maps the remarkable and continuing tradition of hybridization at work in these knowledges. This tradition has its problems, as I have argued, notably in the recent propensity towards polarization along orthodox lines. However, the intention of this chapter is not to supercede in agonistic fashion the disjunctions and hyphenated formations which mark the domain. Rather, this thesis is in part about locating the gaps and fissures which allow new theoretical discourses to emerge from 'within' and not from some mythical outside space which seeks to unify and fix the boundaries of semiotics in informatic domains.

The application of semiotics to the information systems discipline has usually involved the adoption of one or more sign models, and the creation of methods or techniques for analysing and designing systems directly in terms of signs. The theoretical framework called Systemic Semiotics, described in the following chapter and applied to the remainder of the case study, does not utilise the sign as its fundamental unit of analysis. Rather, it employs a semio-semantic unit called the text. Systemic Semiotics is based on a contemporary theory of semiotics called Social Semiotics which has evolved out of, and has subsequently influenced, a semiotic model of language called Systemic Functional Linguistics.
Chapter 2: Systemic Semiotic Workpractice Framework

2.1 Introduction

This chapter develops a Systemic Semiotic framework suitable for theorising workpractices in organisational contexts. In Chapters 3 and 4, this framework is applied to analysing workpractices used in a small operations-level information system. Chapter 3 describes the small-scale diachronic development of a set of workpractices that formed the basis of this end-user-developed system, while Chapter 4 describes how workpractices can form groups which act to stabilize system functionality as well as being a site for the large-scale diachronic development of the system.

In contrast to traditional approaches to workpractice analysis which utilise processes, business processes, or process modeling, Systemic Semiotics defines a workpractice as consisting of one or more text types and zero or more action types. The term Systemic Semiotics, coined by Fawcett (1986) in Ventola (1987), designates a composite of two related sets of theories. The first theory is called Social Semiotics (Lemke 1988; Hodge and Kress 1988; Kress 1985; Thibault 1991). A Social Semiotic description of texts associated with workpractices is provided in §2.2. The second theory is a semiotic model of language called Systemic Functional Linguistics (Halliday 1985; Hasan in Halliday and Hasan 1985; Martin 1992). A Systemic Functional Linguistic description of the texts associated with workpractices is provided in §2.3. Although these two theories are historically related to each other, they draw upon different theoretical traditions. As a consequence, a number of core concepts are defined differently.
In §2.4, the Systemic Semiotic Workpractice Framework is described by identifying theoretical affinities between sets of concepts in Social Semiotics and Systemic Functional Linguistics. These theoretical affinities are used in §2.4.1 as the basis for describing workpractice texts associated with information systems use in organisations. Associated workpractice actions are described in §2.4.2 despite the fact that they appear to be less relevant to the kind of system studied in this case study. In §2.4.3, the framework is applied to systems use. A limitation of this study, described in P2, involved the difficulty of acquiring texts for the effectively decommissioned system. This difficulty stretches the limits of what can be said about systems, when workpractice texts cannot be directly gathered. Therefore, the application of the Framework to this type of Case Study is discussed in §2.4.4 through to §2.4.6.

2.1 Workpractice Texts 1: Social Semiotics

Bakhtin’s development of translinguistics was a result of his studies of the novel, which at the time was a relatively recent literary genre. He focused on developing a dynamic theory of language and meaning emphasising the interrelationship between three categories: (i) the active and productive capacity of language; (ii) the evaluative nature of meaning; and (iii) social subjectivity. According to Todorov’s (1984) reading of Bakhtin’s work, the first category involves discourse which is theorised in terms of the production of actualised meaning in a communicative event (text), as a responsive interaction between social beings. The second category involves the fact that an apparently initial utterance is never actually the first utterance in any sense. In effect, every word or utterance looks back to the word or utterance it is answering, while simultaneously looking forward to the anticipated word or utterance it will partly
determine in advance. This is the *dialogic* property of language attributed to workpractices, see below. The third category involves the social basis of meanings since Bakhtin viewed language and thought as intertwined. For Bakhtin, language cannot exist without thought, nor can thought exist without language, consequently both are social not individual. The development of social constitution of the individual (see Dore 1995, 151-176), referred to as *social subjectivity*, is having a profound impact on a range of disciplines, including psychoanalysis (Henriques et al 1984). Re-theorising communication using translinguistics means that the analytical emphasis is placed on understanding communicative processes operating as organisational practices in specific organisational contexts. Elements of the theory are described in turn, discourse in §2.2.1, text in §2.2.2, and social subjectivity in §2.2.3.

Having introduced the necessary concepts, these are then applied to the use of an information system in support of a workpractice. Goldkuhl (1993) proposed that systems designers should consider system features using two simultaneous approaches. The first approach assumes that the features be tightly integrated into the activity of the organisation it is being designed to support, while the second approach assumes that only a loose coupling should exist between them. In §2.2.4, this argument is applied to systems use, although doubts are raised about the dialectical relationship presumed between these approaches. In §2.2.5, this dialectic is *deconstructed* using Derrida’s reading tactics (Norris 1982) to reveal that the relationship between workpractices and systems features is actually a dialogic one.
2.2.1 Discourse

The concept of discourse (Bahktin in Holquist 1981, 426 and 428; Althusser (1971); Foucault 1972) was introduced as a way of thinking about how ideology functions in culture, institutions, and ourselves, although discourse has proved to be a much more flexible concept than ideology. A useful definition of discourse is provided by Kress (1985, 6-7):

Discourses are systematically-organised sets of statements which give expression to the meanings and values of an institution. Beyond that they define, describe and delimit what it is possible to say and not possible to say (and by extension what it is possible to do or not to do) with respect to the area of concern of that institution, whether marginally or centrally. A discourse provides a set of possible statements about a given area, and organises and gives structure to the manner in which a particular topic, object, process is to be talked about. In that it provides descriptions, rules, permissions and prohibitions of social and individual actions.

In organisational settings, discourses dictate how members of organisations, objects or activities, are defined, what values are ascribed to them, and the particular sets of options that might apply to them in a specific situation. In part, discourse theory suggests that much of our experience of organisation has already been preordained. In effect, members of organisations will already be locked into specific courses of action, which are already in part predetermined if they comply with the available discourses. As a consequence, members of organisations are actively involved in a kind of 'collective' and unacknowledged blindness to entire courses of action. This collective blindness is inscribed in the discourses that circulate within organisations, predisposing but in no way determining, what constitutes appropriate organisational behaviour. It is important to note here, that discourses never directly operate on members of organisations or others. Discourses inform texts, see §2.2.2, which in turn are 'read' by members of
organisations or others in specific organisational contexts, that is discourses must have participants in order to function.

Discourse are inescapable, operating in organisations, institutions and society, Academic institutions and disciplines are no exception. In a large number of modern ‘scientific’ disciplines, including modern Management and its related disciplines of Information Systems and Accounting, the psychological individual is viewed as the origin of meaning in social and cultural practices (Clarke 1992). In the previous chapter, we described the process model of communication, especially its interpretation by Weaver (Shannon and Weaver 1949), as having attained the status of ‘commonsense’ (Belsey 1980). This is possible because a particular type of discourse, referred to as liberal-humanist discourse, operates throughout western culture, including the academy. The effect of this type of discourse is to naturalise, that is to allow to operate unchallenged, the view that individuals are single, unified, originators of meanings. In turn, liberal-humanist discourse has influenced academics and practitioners to uncritically reproduce these discourses as ‘commonsense’ when creating theories about information systems. Theorising speakers as the originators of meanings favours those who can speak in specific circumstances, and issues of power and control in organisations are often discussed from just such an individualist standpoint. Power in organisations is treated as if it were a commodity: the possession of individuals. This individualism obscures the way organisations operate as product and process. Even the discipline of Organisational Behaviour, becomes reduced to a study of individuals compared to standards of behaviour against which dysfunctional characteristics can be treated and new functional behaviours reinforced. These standards are accepted as an objective reality, permitting the production and social use of these discourses to be left untheorised. As these
traditional models pass into the literature and are adopted and enacted by practitioners, the 'commonsense' nature of the individual producers and consumers of information is reproduced.

2.2.2 *Texts*

Social Semioticians view language as a social process. The argument for this is as follows recognising that, (i) language derives meaning from the social activities in which it is embedded, that (ii) knowledge is communicated in social contexts, that (iii) activities have social agents and goals, and that (iv) language, knowledge and activities utilise relationships defined and inextricably bound to value systems in the specific cultures of social institutions. The operational semiotic 'unit' of language that may be used to examine the complexity of a specific organisation, is the *text*. If language derives its meaning from social activities, text is language, that is functional to some extent within the social institution. Halliday (1978, 10) clarifies the distinction between language and text:

> ... [text] looks as though it is made of words and sentences, it is really made of meanings. Of course, the meanings have to be expressed, or coded, in words and [linguistic] structures... in order to be communicated; but as a thing in itself, a text is essentially a semantic unit. It is not something that can be defined as being just another kind of sentence, only bigger’

Texts operate in specific social contexts within organisations. Organisations are constantly being reproduced and reconstituted in texts; without this process organisations would cease to exist. A text may be defined as “a structure of messages or message traces which has a socially ascribed unity” whilst discourse “refers to the social process in which texts are embedded... text is the material object produced in discourse” (Hodge and Kress 1988, 6). Texts can be critically examined to reveal discourses in
operation and the contestation of meanings in institutions, see Halliday (1978); Belsey (1980); Toolan 1988, 227-262); Kress (1985, 1988); and Hodge and Kress (1988).

Any utterance in a social setting is referred to as a text and always operates in specific social settings within organisations. The term 'text' is used to indicate that organisational activity involves language or is reproduced in language. The plural form of the term is generally used to simultaneously signify two important aspects of the theory. First, organisational practices generally produce more than one text. If studying a specific workpractice a tape recording of what was said between the interactants would form one text, which might be then used to produce a transcript of what transpired during the enactment of the workpractice. Collecting associated written texts would also assist in understanding what took place (forms and documentation). All of these kinds of texts can be thought of as 'products'. Second, meaning-making occasions are 'processes'. Its constituent messages, and consequently the text itself, can never have a single, fixed meaning. This point requires further consideration. Belsey (1980, 26) states that whilst language provides the possibility of meaning, any text exhibits multiple meanings because meanings never remain static. However, the most significant factor determining the plurality of meaning is that a text's possible set of meanings will vary according to the way discourses are recognised by readers. So it is possible to have a single position from which a text is intelligible, because, as Belsey (1980: 19-20) puts it 'texts are rooted in specific discourses'. Meanings are subjective only to the extent that the contradictions and superimposition of discourses construct different sets of meaning in specific situations for each member of an organisation. These points are taken up more fully below.
Genre

Apart from being simultaneously a product and process, a text will also utilise genres and other social conventions to assist in the construction of meaning. Of particular interest here is the category of genre, the specific staging of a text. Examples of genres commonly found in organisations include memo, calendar, invoices, interviews, meetings and so on. Knowing, the purpose that a text serves in a particular social setting enables us to anticipate to a surprising degree of accuracy both the overall text structure and also its internal organisation of messages. As a part of our lived experience within institutions (Martin 1992), we learn to ascribe certain kinds of meaning to certain kinds of texts. A specific genre assists in constructing or reinforcing some of the meaning of the text, how it is to be ‘read’, identifying the agent(s) of the text, and specifying the audience. Members in organisations understand texts in social contexts because they have prior experience of them, since meanings are conventional, requiring familiarity not intuition (Belsey 1980, 26).

Subject Positions and the Reading Position

Social subjects are positioned (with respect to themselves and others) in relation to particular discourses and practices. Because of social positioning, a member of an organisation will tend to assume specific roles in interactions and texts. Kress (1996 in Cobley ed/ 1996, 311) refers to this as a “...habitual, though socially determined, conjunction of a certain subject position and certain textual and reading practices. That conjunction determines the use of certain forms of language”. Accordingly, discourses and texts always address subjects. They will usually appear coherent since parts of the text work together to construct its meaning. Texts will appear meaningful to a reader who adopts the particular configuration of discourses which is negotiated in and by the
Texts address and position social subjects by constructing a *reading position* which instructs the social subject “about who, what, and how to be in a given social situation, occasion, interaction...” (Kress 1985, 39). A reading position is the dominant position from which a specific text appears meaningful, and usually coherent. In adopting the reading position of the text, the subject gives tacit agreement to the negotiation of discourses constructed in the text, and is referred to as a *compliant subject*. Reading positions and subject positions are interrelated by the operation of discourses (Kress 1985, 37). Occupying the reading position, the subject is defined and described by, and may identify with, the discourses of the text. The idea of social subjects is based on Althusser’s (1971) concept of the *interpellated subject* where subjects recognise themselves being called or interpellated in the text. Compliant subjects are actually positioned by the text so that they do not see any contradictions it may contain. Compliant subjects in organisations may be socially rewarded depending on the circumstances. However, subjects may resist the obvious reading position in the text. If the subject views the semiotic practices as operating from a different position then they are referred to as a *resisting subject*.

The term *negotiation* refers to the ways in which specific texts construct meanings. Negotiation commonly involves the textual construction of (some of) the major discourses operating in the organisation (and society). Various discourses in a text need not necessarily be in harmony with each other— they may be in conflict since texts are both the material realisation of sign systems, and also the site where this change constantly takes place (Hodge and Kress 1988, 6). All participants negotiate texts according to the specific discourses, which define and delimit permissible subject positions. In other words, discourses position social subjects/participants to comply with
or to resist particular readings, that is, to see only some as 'natural'. This process of negotiating specific subject positions may generate conflict and contradiction, a kind of social dissonance.

2.2.3 Social Subjectivity

Having defined the concept of discourse, and seen that members of organisations negotiate specific sets of meanings (discourses) in specific social occasions (texts), we turn our attention to the final major concept used in a social semiotic theory of workpractices, that of social subjects. Organisations are conventionally viewed as consisting of collections of individuals. By recognising that individualism is a commonsense category (Belsey 1980), our responsibility becomes one of questioning the prevailing assumptions implied by it. We will adopt the term social subject to replace 'participants'.

Because subjects are socially and discursively formed, each will bring to organisations different sets of institutional and linguistic experiences (Kress 1988). It is possible for those who share similar institutional experiences (for example, workplaces, schools, churches), and similar linguistic experiences (nationality, class) to appear to comply with similar discourses. However, as no two subjects will share identical discourses, it is unlikely that they will consistently share the same meanings. Kress (1988, 127) notes:

... the individual participant in communication is significant... as both socially formed and socially agentive. Individuals are formed by and in their institutional and linguistic experiences and histories; in most or all encounters the meanings we encounter, produce, contest, and reshape are socially, culturally and institutionally given. Yet they are encountered, contested and reshaped, imposed perhaps by individuals as social agents in communication.
Following Henriques et al (1984), theories of the subject emphasise how the social domain constitutes 'subjectivity'. *Subjectivity* refers simultaneously to the condition of 'individuality' and self-awareness, which is continually formed and reformed under changing social, economic and historical circumstances. Furthermore, social subjects are considered dynamic and multiple- not as single, isolated individuals. For an illustration of this type of theorisation, see Urwin (in Henriques et al 1984, 264-322), who applies certain ideas of Foucault with revised theories of Lacan. It is often the case that readers encountering this concept for the first time recoil in horror at the thought that they are socially constituted, not unified, individual free agents. This effect is discursively produced! It is the operation of liberal-humanist discourse that constructs the subject of psychology known as the 'individual'. Dore (1995, 151-176) provides an excellent description of social subjectivity and describes why we can never be outside of 'discourse'. Rather than being determined by discourses, we are socially agentive because of them. This apparent contradiction is resolved by recalling that: (i) discourses never directly operate on social subjects but in turn are 'read' by them in specific organisational contexts, and that (ii) discourses must have social subjects in order to exist. Bound up with the concepts of discourse, text and social subjectivity is the concept of positioning, see §2.2.2.

By using social semiotic concepts, a model has been produced based on Clarke (1991, 57) which addresses some of the issues identified in classical process models of communication readily used in the Information Systems literature, see Figure 2.1.
Figure 2.1: Social Semiotic Relationships between Discourse, Text and Social Subject (based on Clarke 1991, 57)

As Kress (1988, 127) states:

...language, culture and communication as process, as activity, as interaction... [where] the individual participant in communication is significant... as both socially formed and socially agentive. Individuals are formed by and in their institutional and linguistic experiences and histories; in most or all encounters the meanings we encounter, produce, contest, and reshape are socially, culturally and institutionally given. Yet they are encountered, contested and reshaped, imposed perhaps by individuals as social agents in communication.

In the following sections, these concepts are applied to forming a social semiotic model of workpractices, based on Clarke (1997c).
2.2.4 Integration and Separation in Systems Use

Goldkuhl (1993) questions a prevailing assumption within the Information Systems discipline that designers should work to create a tight integration between workpractices or activities in organisations, and the information system features designed to support them. While current design practices assume Integration, he notes that there have been periods throughout the history of IS design when a Separation between workpractices and systems features has been assumed—a conclusion easily substantiated in the literature. Goldkuhl (1993) proposed that IS designers simultaneously consider each system feature from two positions. Integration assuming system features are tightly coupled to a workpractice, and Separation—assuming system features are loosely coupled to a workpractice. In order for system designs to be evaluated simultaneously from these two standpoints, either distinct integration-oriented and separation-oriented design practices must be used, or alternative practices must be applied or developed which can facilitate this kind of design evaluation, see Figure 2.2a. Modelling the design of any given system feature twice using integration-oriented and separation-oriented design practices is generally impractical in terms of time and effort. However, Goldkuhl (1993) employs methods, originally developed in the ISAC systems development methodology, to demonstrate how several system features may be considered from both integrationist and separationist standpoints.

Goldkuhl's (1993) work has important implications for the development of organisational semiotics, since the use of an information system could also be considered from integrationist and separationist standpoints. A movement from the domain of system design to that of systems use requires two steps. First, substitute the planned functionality afforded by systems design with the actual functionality afforded
by *systems implementation* of specific information systems features. Second, substitute the *proposed organisational activity* to be supported or created using the information system, with *enacted workpractices in organisational contexts*.

The only exception to a general agreement with Goldkuhl’s (1993) thesis, is that there is, or should be, a *dialectical relationship* between Integration and Separation in design and, by extension, systems use, see Figure 2.2a. Williams (1988, 106-108) defines ‘dialectic’ in terms of the “continual unification of opposites, in the *complex relation* of parts to wholes [emphasis own]”. As there appears to be no complex relation evident between Integration and Separation, there is cause to question the existence of a dialectical relationship between these concepts in systems design and by extension in system use. In the following section, integration and separation will be reconsidered as a dichotomy to be deconstructed using Derrida’s reading tactics (Norris 1982).
2.2.5  *Systems Use as Dialogic*

Integration and Separation appear to be end-points along a simple cline or grade- the degree of *binding* between a workpractice and a system feature. Consequently, in systems design and use, a ‘large’ degree of Integration presupposes a ‘small’ degree of Separation, and visa versa. In demonstrating that Integration and Separation are in an inversely proportional relationship rather than a dialectical relationship, the relationship between these entities appears to be a *dichotomy*, see Figure 2.3a: Dichotomy. Dichotomies in social theory often function to suppress one of their terms, that is, dichotomies are not equally balanced, see Figure 2.3a: Dichotomy in Current Use.
Derrida's *deconstruction* provides a set of *reading tactics* for interrogating dichotomies (Norris 1982).

The first deconstructive tactic used to interrogate the Integration/Separation dichotomy, is *reversal*, that is we reverse the relative positions of the two terms in privileging Separation. Reversal enables us to demonstrate that Integration and Separation are not logically necessary or unalterable in their relationship to each other, refer to Figure 2.3b: Reversal. As noted earlier, Goldkuhl (1993) uses the literature to disrupt the dominance of Integration, while at the same time valuing the repressed term Separation. However, such an operation still preserves the dichotomous relationship between the two terms. Derrida's second deconstructive tactic is referred to as *displacement*. The repressed term Separation must be displaced, not out of the dichotomy altogether but by positioning it within the core of the dominant term as its *logical condition*. This makes explicit the unacknowledged debt that the dominant term of Integration owes to the secondary term of Separation, refer to Figure 2.3b: Displacement. By demonstrating that the Integration/Separation dichotomy may not be logically necessary, the tactic of displacement foregrounds the fact that the dichotomy could be replaced by entirely different concepts.

The third reading tactic for interrogating dichotomies is the creation of a relevant *hinge term* which is 'outside' the binary opposition between integration and separation but which participates in both terms. A hinge term may be derived from texts being examined or it might be a neologism devised to interrogate a specific dichotomy. The function of the hinge term is to provide a *logical precondition* from which the dichotomy is constructed. The hinge term is in effect that which is leftover,
unrepresented and uncontained by the dichotomy, refer to Figure 2.3b: Hinge. Parenthetically, we have used the term ‘reading tactics’ as a way of avoiding using the term method since Derrida's ‘reading tactics’ do not suggest, for example, any candidates for the hinge term. The hinge term employed here to interrogate the dichotomy is negotiation. Negotiation is the logical precondition from which the Integration/Separation dichotomy is constructed in information systems theory. In using this term we foreground the fact that Integration or Separation between workpractices and information systems features is never historically fixed, but rather is always at risk. As a hinge term, negotiation is compatible with Goldkuhl's (1993) aim of describing a ‘dynamic view’ of the relationship between information system features and organisational activities. The choice of the term negotiation is strategic because it enables the relationship between workpractices and information systems to be theorised as dialogic according to Mikhail Bakhtin's sense of the term (Todorov 1984), and as applied in Clarke (1992).

In applying Bakhtin's concepts to information systems in organisations, workpractices may be defined as texts that conform to Bakhtin's notion of the dialogic. The characteristic of workpractices as ‘negotiated’, proposed above, accords with Bakhtin's theories of text (Todorov 1984; see also the development of Bakhtin’s work by Kristeva reviewed in Nöth 1990, 321-324). This is demonstrated in the ways that relevant social subjects actively renegotiate workpractices, so that workpractices may exhibit more than one preferred realisation. However, the imposition of information systems into workpractices often acts to create an opposite tendency toward what Bakhtin refers to as the monological, or “the reduction of potentially multiple 'voices' (or characters) into a

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single authoritative voice ...[reducing the production of actualised meaning which] is sometimes inescapable.” (Fowler 1987, 58-60), refer to Figure 2.1b.

**Figure 2.3:** Integration and Separation are shown as a dichotomy, see the upper panel, with the dominant term highlighted, in the lower panel in (a). In (b), the dichotomy is interrogated using Derrida's reading tactics (see text).
2.3. **Workpractice Texts 2: Systemic Functional Linguistics**

In this section, Systemic-Functional Linguistics (SFL), a semiotic model of language, is described. Unlike Social Semiotics, this theory provides a large range of methods for analysing actual workpractice texts. It has proved to be of use in applications outside traditional linguistics. SFL has been shown to be relevant to information systems analysis, design and implementation in organisations (Clarke 1995a, 1995b, 1997b). The discussion emphasises a variant of Halliday’s (1985) work called the Stratified SFL model developed by Martin (1992, 1994). In §2.3.1, basic tenets and hypotheses concerning the Stratified SFL Model are briefly described, followed by a description of the language strata, §2.3.2 and §2.3.3, and strata associated with context in §2.3.4 and §2.3.5.

2.3.1 *Tenets and Hypotheses*

**Functional-Semantic**

SFL is not simply interested in what people do when they use language that is in functional language use. SFL is also principally concerned with interpreting the linguistic system itself from a functional-semantic perspective. The fundamental purpose of all language is semantic, that is to exchange meanings.

The fundamental unit of analysis in SFL is the *text*. A text is defined in SFL as a functional, semantic unit realised (or expressed) in patterns of wordings and grammar. Whether written or spoken, a text is simultaneously an instance of a product and a process. A text is a product in the sense that it is an output or an object, which has an analysable structure. It is also a process in that it is interactive and social. In SFL, texts are viewed as being formed by a continuous process of semantic choice, where each
choice establishes the environment for further choices. Formally, paths through networks that constitute the linguistic system represent these choices. This is the **systemic** part of SFL. The **functional** part of SFL is not limited to the particular uses, to which language is put, but rather to consider function or use as a central organising principle in all languages. Historically, the functional part of SFL was first formalised in Halliday (1985).

**Bi-stratal Organisation of Context**

Martin (1992, 493) asserts that "... texts are social processes and need to be analysed as manifestations of the culture they in large measure construct. This means that alongside a theory of language, functional linguistics has to take some responsibility for a theory of contexts in which language plays a part". Applied SFL studies are possible, in part, because of an explicit relationship between text and context. Texts are produced or consumed in social occasions and in social settings. Consequently, these social occasions and settings have an important effect on texts themselves. How one semiotic system (language) realises a more abstract one (context) is referred to as **redounding**. Redounding means that language construes social context, language is construed by social context, and language re-construes social context, a relationship of mutual determination and interdependency not simple cause and effect. **Context** forms a bridge between the social world and the text and every text must refer to its social context in order to be meaningful that is to communicate something to someone.

Malinowski's concepts of Context of Culture and Context of Situation are used in SFL to theorise the context of a text, see Figure 2.4a. The stratified SFL model is organised to reflect this two-level or **bi-stratal** model of context. The **Genre** stratum involves the
kind of conventional patterns in text, which are recognisable in particular cultural contexts and accounts for meanings associated with the Context of Culture, see §2.3.5. The Register stratum assists in realising a particular genre by providing specific information about a given situation. It accounts for the meanings associated with the Context of Situation, see §2.3.4. The relationship between Genre and Register and Language is shown in Figure 2.4b.

**Tri-stratal Organisation of Language**

Unlike most semiotic systems, the meanings in language (content) are not directly realised into sound or letters (expression). Language is a semiotic system consisting of three strata. Content in language utilises two strata: meanings that are realised in wordings (words and structures). Wordings subsequently realise an expression consisting of sounds and letters. The stratified SFL model is organised to reflect this three-level or tri-stratal semiotic model of language. The stratum of Discourse-Semantics accounts for the *metafunctions*, which are conveyed simultaneously in texts, see below. These meanings are then rendered into selections of words (lexis) and grammar realised using the Lexico-grammar stratum, which are in turn expressed in sounds or letters using the Phonology/Graphology stratum, see Figure 2.4c.
Figure 2.4: Malinowski’s Context of Culture and Situation are theorized as the bistratal organisation of context (b) in Martin’s (1994). The tristratal theorisation of language is mapped into strata of Discourse Semantics, Lexico-grammar and Phonology/Graphology.

Metafunctional Organisation

All social languages, as distinct from artificial languages, possess the means for encoding or realising three distinct types of meanings which Collerson (1995, 2) informally glosses as action, reflection, and connection. These distinct types of meaning or semantic function, become a significant organising principle of the grammar, and are collectively termed the metafunctions of language. Three metafunctions have been identified and are referred to as the ideational, interpersonal, and textual metafunctions. Their correspondence to the informal terms of action, reflection, and connection, and the three metafunctions is tabulated in Table 2.1. Through the interpersonal metafunction "... social groups are delimited, and the individual is identified and reinforced" (Halliday 1978, 143). The ideational metafunction is resolved into two distinct components, experiential meanings and logical meanings. Experiential meanings in language are "... the expression of the processes and other phenomena of the external world, including ... the speaker’s own consciousness (Halliday 1978, 95), whereas logical meanings involve
the mapping between these in language. The *textual metafunction* refers to "...the way the text is organized as a piece of writing (or speech)" (Eggins 1994, 12). SFL analyses demonstrate that linguistic texts are involved in making these three kinds of meanings simultaneously (Eggins 1994, 11).

Table 2.1: Metafunctions in language (based on Collerson 1995, 3)

<table>
<thead>
<tr>
<th>Metafunction</th>
<th>Gloss</th>
<th>Explanation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Interpersonal</td>
<td>action</td>
<td>language is a way of acting upon the social world, allowing us to become involved in activities of work and life, and to interact with people</td>
</tr>
<tr>
<td>Ideational</td>
<td>reflection</td>
<td>language can be used to create representations of the world, and enables us to reflect on these representations</td>
</tr>
<tr>
<td>(experiential; logical)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Textual</td>
<td>connection</td>
<td>language is used to ‘connect’ a text to other texts, to its contexts, and enables connections to be made within itself</td>
</tr>
</tbody>
</table>

Metafunctions are a way of integrating across the strata. For example, with reference to Figure 2.5, the register variable of Field is realised in the experiential meanings at the level of discourse-semantics. Experiential meanings are realised in the level of lexico-grammar by Transitivity. The register variable of Tenor is realised in the interpersonal meanings at the level of discourse-semantics. Interpersonal meanings are realised in the level of lexico-grammar by Mood. The register variable of Mode is realised in the textual meanings at the level of discourse-semantics. Textual meanings are realised in the level of lexico-grammar by Theme. Language (Lexico-grammar) is structured to realise its metafunctions using Transitivity, Mood, and Theme. These metafunctions in turn are related in a predictable and systematic fashion to each situational variable. Text is formally related to context!
2.3.2 *Discourse Semantics Stratum*

The term Discourse Semantics is taken from the work of Martin (1992). In earlier SFL literature (Halliday 1978), this stratum was referred to as ‘Semantics’. Discourse-Semantics is a significant stratum in the stratified SFL model, it is the first content level and it is where the three metafunctions are conveyed simultaneously in texts. It represents the interface between Language and Social Context (see Figure 2.5). The major unit of analysis associated with the stratum of Discourse Semantics is the text. The ‘discourse’ component describes the different types of resources language utilises in order to make a text in which its clauses form, to a greater or lesser extent, a semantic unity. The ‘semantic’ component describes how the structure of clauses (at the Lexico-grammar stratum) are used to account for the meanings in a text.
Discourse semantic analyses of texts involve two stages. The discourse analysis stage relates the three kinds of meanings found in texts (interpersonal, experiential and textual meanings) with their respective contextual variables at the Register stratum. A central claim of SFL is that language is functionally organised. The Context of Situation represented by the register variables of field, tenor and mode have a significant effect on language use. According to Eggins (1994, 81) "... language itself is organized to make meanings about fields, modes, and tenors, because those are the meanings that we want and need to make in interacting with each other and the world". With reference to Figure 2.5, the tenor variable in Register is realised as interpersonal meanings in texts in the Discourse Semantics stratum. The field variable in Register is realised as experiential meanings in texts in the Discourse Semantics stratum, and mode variable in Register is realised as textual meanings in the Discourse Semantics stratum. Register relates to Discourse-Semantics by encoding the contextual dimensions within which the text was produced. The semantic analysis stage relates the three kinds of meaning found in texts (interpersonal, experiential and textual meanings) with their respective realisations at the Lexico-grammar stratum. In other words, the meanings in texts are analysed by examining the structure of clauses.

2.3.3 Lexico-grammar and Phonology/Graphology Strata

At the second content level in SFL, lexico-grammar, the metafunctions of discourse semantics are rendered into selections of words (lexis) and grammar, see Figure 2.5. The ideational metafunction is realised in lexico-grammar by Transitivity. Transitivity expresses "... who is doing what to whom when where why and how" (Eggins 1994, 77). It includes the patterns of processes, participants, and circumstances carried by or
attributed to the ‘content’ words of clauses. Transitivity includes verbs, nouns, and circumstances, prepositional phrases and adverbs that tell us where, when, how, why, and with what the action took place. The interpersonal metafunction is realised in lexico-grammar by Mood. Mood involves “... types of clause structure (declarative, interrogative), the degree of certainty or obligation expressed (modality), the use of tags, vocatives, attitudinal words, ... expressions of intensification and politeness markers...” (Eggins 1994, 77). The textual metafunction is realised in lexico-grammar by Theme. Theme expresses “... patterns of foregrounding and continuity in the organization of the clause” (Eggins 1994, 77). Lexico-grammar is subsequently realised in sounds or letters, as expression at the level of phonology or graphology.

2.3.4 Register and the Context of Situation

Register describes how the immediate situational context of the language event affects language use. A text always includes some aspects of the situation in order for it to be understandable. Register consists of three identifiable ‘variables’ (Hasan in Halliday and Hasan 1985) referred to as field, tenor and mode, which must be considered together. Field can be glossed as the topic or focus of the activity in which the text concerns its social activities and actions. Tenor can be glossed as the roles and relationships between participants in the text. Mode can be glossed as the communication channel used in the text; speech or writing for example. In a specific tertiary education text, register describes those meanings associated with the immediate situational context, including that the text might be about research funding (field), that an academic produced it (tenor), and that the text was written rather than spoken (mode).
Field

Hasan (in Halliday and Hasan, 1985) defines the field of a text as “the topic or focus of the activity”. Following Martin’s (1994) bistratal model of context, the field of a text is primarily recovered through the use of words, or so-called lexical items. Particularly useful are those lexical items known as indexical lexical items (Eggins 1994, 25) which can be used to uniquely disambiguate the topic or focus of activity of the text.

In situations where many texts can be observed in a given Context of Situation, it may be possible to construct a field taxonomy. Field taxonomies document the observed or inferred field options available to social subjects in specific situational contexts, and may represent a partial or a complete record of these options. System networks are used to diagram field taxonomies. The lexis (words) associated with the field are ordered into convenient or observed groups possible selection options can therefore be shown as sub-networks within the system network. System networks are organised and read from the left-hand side, the so-called least delicate, to the right-hand side, the so-called most delicate.

Tenor

Hasan (in Halliday and Hasan, 1985) defines the tenor of a text as “the social role relationships played by interactants”. Following Martin’s (1994) bistratal model of context, three continua are involved in characterising the tenor of a text: power, affective involvement, and contact. Eggins (1994) emphasises that these continua are more than just interesting descriptions of interpersonal aspects of situations because there is a direct claim being made about language and situational context. The Power
Continuum is used to classify situations according to whether the roles are those in which equal or unequal power is being exercised. The Contact Continuum is used to classify situations by whether the roles being played bring interactants into frequent or occasional contact. The Affective Involvement Continuum is used to classify situations by whether the roles being played bring interactants into high or low affective involvement (high or low emotional levels).

Mode

Mode is defined as the role language is playing in an interaction. Following Martins (1994) bistratal model of context, two continua are used to specify the distance between language and situation: spatial/interpersonal distance, and experiential distance. Spatial/Interpersonal Distance is a continuum based on the possibilities of immediate feedback between interactants. Experiential Distance is a continuum based on classifying different situations according to the distance between language and the social process. At one extreme, language can be viewed as action generally associated with spoken language, while at the other extreme language can be viewed as reflection generally associated with writing.

2.4.2 Genre and the Context of Culture

Genre refers to the kinds of conventional patterning in texts, which are recognisable in particular cultural contexts. Genre theory within SFL has been particularly concerned with identifying in texts, the “staged goal oriented social processes which integrate, field, mode and tenor choices in predictable ways” (Halliday and Martin 1993, 36). Social occasions are always conventional to a greater or lesser degree, and therefore produce conventionalised forms of texts (for example: memos in organisations, essays at
university, service encounters in shops). There have been two major models of genre within systemic-functional linguistics. Hasan (see Hasan in Halliday and Hasan 1985) developed the first model, while Martin (see Eggins 1994) has developed a more recent model. Both of these models are utilised in specific circumstances in this dissertation, but both models have severe limitations, based on the findings presented in Chapters 3 and 4 and elsewhere (Clarke 1996).

Hasan’s Model of Genre

In Hasan’s model, genre is considered to be a phenomenon located within the context of situation; that is at the level of register. This genre model requires the identification of the register variables of field, tenor, and mode for a given situation, which collectively form what Hasan refers to as the Contextual Configuration (CC). In effect the CC acts as a kind of boundary which constrains a text into a possibly large but none-the-less finite set of forms or patterns of genre elements. Genre elements are recognisable, single purposed stages in the unfolding of a text. Hasan identifies two types of genre elements, obligatory and optional. Obligatory genre elements must be present in every text belonging to a specific CC. Optional genre elements may be present in texts belonging to a particular genre, but they need not be present for the text to be considered as belonging to a particular genre. A formalism referred to as a Generic Structure Potential (GSP), specifies the potential or permissible set of patterns of optional and obligatory genre elements and their arrangement in texts. The GSP employs a notation used to distinguish optional from obligatory elements, the iteration or repetition of elements, ranges or the scope of elements, and fixed and variable sequencing of elements. Clarke (1996b) applied Hasan’s model of genre to workpractice texts in a pilot study of ALABS. For a given CC, there is one and only one GSP and in effect it represents a
specific genre. Changing the ‘value’ of any of the register variables in a CC, would lead to a different set of possible genre elements. Texts which conform to a given genre will have all obligatory genre elements, may have some or none of the obligatory elements, and must conform to the sequencing and iteration rules of the GSP in order to be considered as a member of a particular genre. Texts which present patterns of genre elements, that do not correspond to the GSP, either belong to some other genre, or perhaps they may not belong to any recognisable genre.

Despite the simplicity of Hasan's model, major problems have been identified with it in both theory and practice. Perhaps the most irreconcilable problem from the point of view of an organisational semiotic perspective (and therefore any form of semio-informatic practice) is that Hasan does not treat genre as a system. While the CC utilises a rich notation with which to describe the syntagmatic structure of actual genres, there is no corresponding paradigmatic structure to show the range of genre available to participants in a given organisation or part of an organisation.

Martin's Model of Genre

In the Stratified Model (Martin 1992), genre is considered to be a separate stratum above that of Register. This view enables genre to be considered as having both syntagmatic and paradigmatic characteristics, a major difference compared to Hasan’s syntagmatic theory of genre. Families of agnate canonical genres have been identified including the Narrative and Factual Group of genres. The Factual genres are concerned with the way things are and are commonly found in ‘scientific’ uses of language. A subset of this family (Martin 1992, 563), includes genres which are activity structured, and can be used to deduce some workplace activity of interest. They include [Factual] Recounts, Procedures, Explanations, and Explorations. Non-activity structured factual
genres include Descriptions, Reports, Expositions, and Discussions. The Narrative genres include [Narrative] Recounts, Anecdotes, Exempla, and Narratives (Martin 1992, 566-568).

**Recent Changes in Context Strata**

In the mid-1980s, Martin proposed the stratum of *ideology* as a means of accounting for language, which could not be fully explained by reference to the context or the text alone, but which appeared to be more closely associated with the political configuration of Western culture, see Figure 2.6a. In contrast to the profusion of conflicting definitions of ‘ideology’ in sociology and political science, ideology in SFL was relatively well defined. The creation of a separate stratum to account for this particular type of texts pattern, is consistent with the stratal organisation of the SFL model. The location of the strata of ideology as a layer ‘above’ both text and context was intended to signify the role played by it in the socio-political and symbolic ordering of institutions and organisations. A potential use of this stratum might have been to provide a theoretical link between SFL and a more broadly critical social semiotic practice. Several authors have been attempting to extend and recast SFL into a more broadly critical social semiotic theory (see for example Hodge and Kress 1988; Fairclough 1992; and Thibault 1991). Although by no means unproblematic, the stratum of ideology at first appears to be theoretically homologous with the concept of discourse developed by Foucault (1972). In information systems applications of SFL, the existence of such a link promised to provide an approach to the creation of a critical systems development practice.

However, at the Plenary Session of the 1994 Australian Systemic Functional Linguistics Conference, Martin formally modified his model of language by removing the stratum
of ideology. These changes to the SFL model of language are shown in Figure 2.6b. Although no specific reasons were given, this was no doubt due to several reasons. First, Hasan (1988) had circulated a penetrating critique of this model criticising amongst other things Martin's interpretation of Hjelmslev's *connotative* semiotics in general and the construction of a separate layer of ideology in particular. For Hasan, all aspects of language are patently and necessarily social and consequently must also be 'ideological'.

Second, this statum has proved difficult to operationalise in SFL studies. The reluctance to use a concept of 'ideology' within SFL studies is probably due in part to the relatively conservative nature of traditional linguistics. It is therefore no surprise then to find studies which utilise 'ideology' located in social semiotics rather than in linguistics per se (for example, see Hodge and Kress 1988).

Having described some of the reasons which may have lead to the abandoning of the strata of ideology within SFL, it is necessary to explain why such a concept might have been of theoretical use and practical benefit in SFL informed studies of information systems in organisations. Part of the utility of ideology might have been the formulation of systems development in terms other than as some politically neutral activity implicated in and compliant with the discourses of scientific management and control. A social semiotic theorisation would recognise the political nature of systems development and use, leading to the recasting of systems development as a reflexive socially oriented semiotic praxis (see Thibault 1991).
2.4 Description of Systemic Semiotic Workpractice Framework

2.4.1 Theoretical Affinities

Translinguistics is useful as a means for theorising how systems position users and others in organisations, and for providing a dynamic view of systems use. However, it does not provide methods for the analysis of actual work texts (for example transcripts) in specific situational and cultural contexts. Bakhtin was critical of the traditional linguistics of his day, developing substantial critiques of formalism and structuralism in linguistics. Specifically, he viewed traditional linguistic theories as monologic in that they attempting to account for discourse as if it consisted of single meanings. Therefore, translinguistics resists the kind of operationalisation necessary in a design discipline such as information systems.

In order to study texts associated with workpractices, we need methods that can be applied to the task. As a consequence SFL is used to analyse transcripts associated with
workpractices. The development of Social Semiotics, particularly the work of Jay Lemke 1995 and Norman Fairclough's critical linguistics, can be seen as a theoretical move to situate Systemic Functional Linguistics within a broader critical framework using as a basis the work of Bakhtin (in Todorov 1984), Althusser (1971), Foucault (1972), and de Certeau (1984). Given the historical relationship between them (Lemke 1995; Fairclough 1992; Hodge and Kress 1988; Kress 1985, 1988) and the pragmatic importance of combining them (Fawcett 1986), the use of Social Semiotics together with Systemic Functional Linguistics is a conservative pairing of theories compared to many multiple theory research strategies routinely employed in field research (Burgess 1982, 163-167). Denzin (1970) cautions against the 'theoretical incongruence' that results by attempting to use incompatible theories in conjunction with one another and advocates the use of theoretical triangulation. This is a commonly used approach in multiple theory research strategies in which researchers investigate how different theoretical approaches are linked to one another within individual studies, and evaluate the advantages and disadvantages of combining theories in the course of a particular study. In order to permit Social Semiotics and Systemic Functional Linguistics to be used in conjunction with each other, various theoretical affinities or links between compatible theoretical entities, are provided in Table 2.2.

Having identified and described a number of useful theoretical affinities between concepts in Social Semiotics and Systemic Functional Linguistics, it is necessary to consider some of the advantages and disadvantages of combining these theories in organisational semiotic studies of workpractices in workplaces.
In addition, SFL genre theory developed by Martin (1992, 493-590), is used to analyse transcripts in order to derive the *typical* arrangement of stages in the enactment of a specific workpractise and its associated information system. Genre analysis demonstrates that workpractices are negotiated. Related realisations of a workpractise are shown as alternative sequences in a genre digraph. When information systems are associated with workpractices, these technologies are also negotiated albeit from the point of view of the workpractise. From a social semiotic perspective, negotiating the typical arrangement of stages in a workpractise corresponds to an adoption of the dominant *reading position* of the system feature. The reading position is adopted by users who comply with the dominant discourses informing the workpractise, that is, the discourses which produce the ‘coherence’ of the workpractise. From this position, the system feature will appear to be the most obvious, natural, and uncontested negotiation of the workpractise. In adopting the dominant reading position, users comply with those discourses that produce centripetal forces tending to a monological or integrationist instance of systems use.

Current genre theory emphasises a synoptic view of genre, and as a consequence it is not well suited to explaining divergences from the typical arrangement of stages in workpractise genres. In contrast, translinguistics provides a dynamic view of text and genre that can be of use in theorising these *atypical* realisations of workpractise genres, as an adoption by users of a non-dominant, resisting *subject position*. At times users may: (i) re-negotiate one type of workpractise into a different form of workpractise, which still has the same overall purpose although realised by different means, or (ii) re-negotiate a workpractise into a completely different form. These new forms may not be organisationally sanctioned. As a consequence, resistant readings of a workpractise and
its associated system features run the risk of failure in organisational contexts, in so far as the pragmatic goals of the workpractice may not be achieved. In some contexts, resistant readings may be viewed as an infringement of workplace regulations, best practice agreements or relevant acts of parliament. However, in some circumstances the adoption of a non-dominant (resisting) *subject position* may lead to a successful renegotiation of the workpractice. By adopting a non-dominant subject position, users mobilise discourses, which produce centrifugal forces tending to a dialogic or separationist instance of systems use. Here, an associated information system may be used in an unorthodox way, or effectively bypassed using a manual work-around.
Table 2.2: Theoretical Affinities between relevant terms in Translinguistics and Systemic Functional Linguistics, presented across rows.

<table>
<thead>
<tr>
<th>Translinguistics</th>
<th>Systemic Functional Linguistics</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>social subjectivity</strong></td>
<td><strong>social roles (tenor)</strong></td>
</tr>
<tr>
<td>- Emphasises the way in and by which the social</td>
<td>- theorised as a component of Register, tenor</td>
</tr>
<tr>
<td>domain discursively constitutes subjects</td>
<td>involves established role relationships in texts</td>
</tr>
<tr>
<td>- Subjects navigate a maze of organisational discours</td>
<td></td>
</tr>
<tr>
<td>es in workplaces</td>
<td></td>
</tr>
<tr>
<td><strong>Environment</strong></td>
<td><strong>context of culture</strong> (Malinowski 1923)</td>
</tr>
<tr>
<td>- &quot;...constitutes [a social subject's] situation</td>
<td>- theorised using the contextual strata of Genre</td>
</tr>
<tr>
<td>in its entirety...&quot; (Roberts in Morris ed/ 1994, 250) in terms of purview and also those elements which are provided by others</td>
<td>(Martin 1992, 493-588)</td>
</tr>
<tr>
<td><strong>Purview</strong></td>
<td><strong>context of situation</strong> (Malinowski 1923)</td>
</tr>
<tr>
<td>- &quot;the limited extent of [social subjects'] ...vision (literally and figuratively) as an individual consciousness (q.v.), or as the member of a social group&quot; (Roberts in Morris ed/ 1994, 250)</td>
<td>- theorised using the contextual strata of Register (Martin 1992, 493-588)</td>
</tr>
<tr>
<td></td>
<td>- viewed as &quot;everything significant that was going on concurrently with the speech activity.&quot; (Hasan undated, 10)</td>
</tr>
<tr>
<td><strong>Genre</strong></td>
<td><strong>genre</strong></td>
</tr>
<tr>
<td>- &quot;the particular way by which consciousness models experience...broadly correspond[ing] to...artistic genres (Roberts in Morris ed/ 1994, 248)</td>
<td>- using Martin's (1992) stratified model of SFL, genre becomes its own contextual strata, see context of culture</td>
</tr>
<tr>
<td>- a specific type of genre, the speech genre</td>
<td>- viewed as synoptic and dynamic, although all methods emphasise the former, while some research has raised doubts about the possibility of the latter (see Hasan undated, 10)</td>
</tr>
<tr>
<td>is divided into primary speech genres (e.g. ordering</td>
<td></td>
</tr>
<tr>
<td>lunch), and secondary speech genres (e.g. workpractice texts)</td>
<td></td>
</tr>
<tr>
<td><strong>Utterance</strong></td>
<td><strong>text</strong></td>
</tr>
<tr>
<td>- any stretch or unit of language as small as a</td>
<td>- the text is the unit associated with the discourse-semantic strata in Martin's (1992) model: supported below by two 'lower level' language strata, and above by two 'higher level' contextual strata (Register and Genre)</td>
</tr>
<tr>
<td>word or as large as a text</td>
<td></td>
</tr>
<tr>
<td>- not a purely linguistic concept but an encounter</td>
<td>- considered as both product (eg. transcript) and as a (social) process</td>
</tr>
<tr>
<td>between a social subject’s self consciousness, mind,</td>
<td></td>
</tr>
<tr>
<td>and the world with all its socio-historical meaning</td>
<td></td>
</tr>
<tr>
<td>(paraphrase of Roberts in Morris ed/ 1994, 251)</td>
<td></td>
</tr>
<tr>
<td><strong>Meaning</strong></td>
<td><strong>meaning</strong></td>
</tr>
<tr>
<td>- opposed to any fixed notion of meaning, rejecting</td>
<td>- SFL conforms to a contextual theory of meaning, that is, meaning is ultimately derivable from its observed context (paraphrase of Nóth 1990, 100)</td>
</tr>
<tr>
<td>views of meaning as totally text-bound, or views</td>
<td>- meaning is not determined, rather it is construed as social semiotic (see Kress 1995; Halliday 1978)</td>
</tr>
<tr>
<td>of meaning as the product of exclusively extra-textual factors (paraphrase of Roberts in Morris ed/ 1994, 249)</td>
<td></td>
</tr>
</tbody>
</table>
2.4.2 Workpractice Action and Activity

A workpractice comprises one or more text types and zero or more action types. From first principles, this definition assumes that each workpractice text possesses a full complement of text-forming resources. In SFL, text-forming resources are collectively referred to as texture (Martin 1992, 181; Halliday and Hasan 1976, 23-26, 324). Any stretch of writing or speech must possess these text-forming resources in order to be considered as a text. Interestingly, it was ethnomethodologists who identified a characteristic that forms the basis of many texture-forming resources, referred to as sequential implicativeness (Eggins 1994, 85-86; Schegloff and Sacks 1973, 296).

Sequential implicativeness is simply the recognition that language is tied to a linear sequence, and implies that each stretch of language in turn provides a context from which subsequent stretches of language are interpreted. From a Systemic Functional Linguistic perspective, sequential implicativeness is also evident in the text-forming resources that form linear structures throughout a text. For example, associated with category of Cohesion, those inter-sentential text-forming resources associated with the 'discourse' part of Discourse-Semantics stratum, are reference chains associated with Reference (Eggins 1994, 99), lexical strings associated with Lexical Cohesion (Eggins 1994, 104), and conjunctive reticula associated with Conjunction (Eggins 1994, 107).

Similarly, the Intra-sentential (Martin 1992, 381) or 'structural' text-forming resources (Halliday 1985) of Theme and Information, primarily associated with the Lexico-grammar stratum, comprise resources which rely on sequential implicativeness for their deployment within texts.

In the Framework proposed here, action types like texts, occur in one or more named physical spaces called material settings. Like texts, action types have structural
constituents in that they consist of one or more sub-actions. If an action type consists of a single trivial action then it is referred to as an atomic action. Examples of atomic action are the execution or invocation of a system feature, or the relocation of an object or text from one material setting to another. The concepts of action types and material settings are similar to behavioral circuits and behavior settings proposed by Thiel (1997, 98) to account for action in architectural environments. Like texts, action can also be thought of as possessing sequential implicativeness (Drew and Heritage 1992, 37-42). The constituent sub-actions that comprise a recognisable action type are also related together linearly in time. Certainly, a given action type is linearly related to those actions types that preceded it, as it will be to those actions types that succeed it. While both workpractice actions and texts possess sequential implicativeness, two questions need to be answered. First, what mechanism can explain the form and frequency of occurrence of specific actions? Second, what mechanism can explain the co-occurrence with specific actions with specific texts in institutional and organisational settings?

One possible explanation is to extend the concept of metafunctional organisation, originally proposed by Feez (1997) to account for the co-occurrence of text types, to explain the co-occurrence of specific texts together with sequences of action. As originally proposed, two or more texts may co-occur because they consist of language which construes the social world in similar ways, creates similar representations of the world, or connects these texts together or to common contexts. While certainly being an interesting descriptive category, it is difficult to imagine an explanatory mechanism by which metafunction can collectively organise one or more texts. Although Feez (1997) has not proposed it, the concept of metafunctional organisation might also potentially explain the co-occurrence of specific actions and texts. While a specific action or
sequence could be described as having a non-text analogue of the ideational or interpersonal ‘metafunction’, it is certainly the case that action does not possess a textual metafunction. The risk of adopting metafunctional organisation to account for the occurrence of action in workpractices, is that of privileging the category of text over that of action. It is more likely that action and text are locked into a mutual co-dependency.

The mechanism used here for explaining the form and frequency of specific actions, as well as mechanism for explaining the co-occurrence with specific actions with specific texts in institutional and organisational settings, is the social semiotic concept of discourse. An advantage of using discursive organisation as a mechanism to account for one or more actions associated with workplaces is that it is theoretically consistent with the details of the Framework described in §2.2 for texts. Employing the Social Semiotic/Translinguistic concept of discourse to account for the organisation of action in workplaces, necessitates the use of social subjectivity as a necessary corrective to the individualism found in traditional accounts of action. This individualism is inherent in descriptions of action in architectural studies, see for example Perin (1970) and Thiel (1997, 98-104). A theoretical relationship can be established between the discourse and social subjects is already well established in the literature, see for example de Certeau (1984) and Althusser (1971). Figure 2.7 provides a representation of the discursive relationship between workpractice texts and actions.
2.4.3 Deploying the Framework in the Case Study

A variety of work situations present themselves to analysts when studying information systems in organisational contexts. Text situations are those which can directly yield a text of a workpractice without requiring analyst intervention. Texts of workpractices gathered in these situations are referred to here as direct texts. Socio-linguists refer to
these situations as talk-in-work. Examples of direct texts include spoken texts conforming to service encounter genres associated with system use, and written texts conforming to various factual genres which are the outputs of most information systems.

However, on occasion it is not possible to directly acquire relevant texts in organisational semiotic and semio-informatic applications. Such situations are collectively referred to as the empty corpus problem (Andersen 1992). Two scenarios can be used to illustrate aspects of the empty corpus problem. The first example is of a member of an organisation using an information system in isolation from any apparent social group within the organisation—a situation frequently encountered in many organisations. Theoretically, Bakhtin refers to this situation as the I-experience (Vološinov in Innis ed/ 1985, 54-56). Whatever may be going on is happening inside the head of the user, about which nothing socio-linguistically can be said. The second example is when a particular work practice is no longer conducted in a workplace. An analyst may find objects or other clues suggestive of a previous workpractice. This type of situation must be addressed in longitudinal studies. Prima facie, both examples do not appear to be analysable using SFL. Methodologically, these two examples differ considerably in their severity. In the first example, it may be possible to transform the situation into a so-called non-text situation where the analyst can recover a text, referred to here as an indirect text. However, the second example is an instance of an empty corpus situation where no such possibility exists. The relationship between non-text situations, empty corpus situations and the empty corpus problem is shown in Figure 2.8. The distinction between a non-text situation and an empty corpus situation depends on whether it is possible to probe for, or otherwise elicit, a text in a situation in which we would normally not expect one.
Several elicitation strategies exist to transform a non-text situation into a text situation. These strategies involve the use of various families of canonical genre. However under certain circumstances it may not be possible to elicit any text whatsoever. It may only be possible to acquire the steps involved in an empty corpus situation by direct observation of activities or activity reconstruction, see below.

2.4.4 Text Situations and Direct Texts

Text situations yield direct texts or language-in-work, refer to A in Figure 2.9. Direct texts, are likely to conform to either a Service Encounter genre, an Activity Structured Factual Genre or a Non-activity Structured Factual Genre, refer to G1 in Figure 2.9. Once gathered and analysed, a direct text can be diagrammed using a Genre Sequence Diagram, and merged directly with the appropriate Genre Digraph, see Appendix A3.

In addition, a direct text associated with a text situation, can be augmented by a probe in order to elicit an indirect text, refer to A'. An indirect text involves language-about-work. The choice of probe determines the type of text that can be recovered concerning the workpractice. Indirect texts in analysis scenarios are likely to be spoken and will
therefore need to be transcribed and coded. Indirect texts associated with text situations will likely conform to either an Activity Structured Factual Genre, a Non-activity Structured Factual Genre or a Narrative Genre, refer to G2 in Figure 2.9. Unlike direct texts, the staging of indirect texts must be processed in order to remove unwanted elements. This process is referred to as *ablation* and will depend on the type of genre elicited. Once ablated, the resulting staging of the indirect text can be represented using a qualitative sequence of digraphs (see Appendix A3).

Both the resulting direct text and subsequent indirect texts if any will need to be analysed in order to recover Register, refer to R in Figure 2.9. The procedure for analysing Register is the same regardless of whether the analysis situation yields a direct text or an indirect text, §2.3.5. Where actual direct texts or elicited indirect texts are available, Martin’s (1992) model will be applied for determining register, and ‘extended cohesion’ (see Clarke 1996) will be used to identify genre elements.

2.4.5 *Non-Text Situations and Indirect Texts*

The term *non-text situation* identifies those occasions where no text is immediately associated with a workpractice. An analyst will need to employ a probe in order to produce a text. The result will be an indirect text involving language-about-work, refer to B in Figure 2.9. As with indirect texts associated with text situations, described above, the choice of probe determines the type of text that can be recovered concerning the workpractice.

The resulting indirect text will need to be analysed in order to recover Register, as specified in §2.3.4, refer to R in Figure 2.9. Indirect texts associated with non-text situations will likely conform to either an Activity Structured Factual Genre, a Non-
activity Structured Factual Genre or a Narrative Genre, refer to G2. The staging of indirect texts is ablated and the resulting staging of the indirect text can be represented using a qualitative sequence, see Appendix A3. Register features and text staging are determined as per direct texts.

2.4.6 Empty Corpus Situations and Non-texts

So far, we have discussed text situations that yield direct texts. We have also discussed probes devised to transform a non-text situation into those that will yield indirect texts, in an attempt to partially resolve the empty corpus problem. But there also exist situations in which no transformation is possible and such field situations constitute empty corpus situations. The term *empty corpus situation* designates those occasions where neither a direct text associated with a workpractice can be observed or gathered, nor where any elicitation can be used to acquire any indirect text about a workpractice. Empty corpus situations yield non-texts, refer to C in Figure 2.9. The only strategies available to the analyst are direct observation, where the analyst has no other option but to rely on direct observation of a non-text situation, or activity reconstruction, where it may not be possible to observe any activity at all.

*Direct observation* of workpractices can provide some information concerning observed social actions and activities, especially the steps involved in an activity, and observed role relationships. The analyst insinuates himself or herself into the situation as a participant observer. Specifically we refer to the situation where the analyst acts as an observer, rather than to the two other modalities of participation available to analysts, when the analyst acts as a participant, or when the analyst participates as a researcher (Gans 1962). Observed social actions and activities is in effect a qualitative correlate of
Field, while observed role relationships is in effect a qualitative correlate of Tenor, refer to R3.

*Activity Reconstruction* is another possible strategy. For example, if the action to be analysed is the usage of an information system, then the analyst may repeat keystrokes, menu selections and other user interactions in order to reconstruct the activity, or set up a system to directly trap all user action by means of a keystroke transcript for example. A strategy that has been used in order to reconstruct activities is keystroke transcripts to study user interfaces. In longitudinal studies of information systems, such as the ALABS study, another strategy for the analysis of non-text situations involves the study of the user interface and of menu options. The user interface dialogue and prompt structure used in the system features themselves can be discovered by running the system code, or recovered directly from the source code. The qualitative sequence used to represent the activity reconstruction of the user interface or prompt structure, is likely to mimic the finite state diagrams (Ince 1988, 70) often used to develop front ends. In studies of effectively decommissioned systems, this latter may represent the only way an analyst can recover the steps that others may have engaged in when using a system.

By definition, there can be no qualitative correlate of Mode for empty corpus situations. Similarly, all that can be determined during activity reconstruction, are the inferred social actions and activities and inferred role relationships, refer to R4 in Figure 2.9. With reference to Figure 2.9, both direct observations G3, and activity reconstruction G4, can be represented using qualitative sequences. These can be compared with either direct or indirect texts using the sequence comparison diagrams, described in Appendix A3. In cases where no text is available directly, observed or inferred register
descriptions will be loosely based on Hasan’s categories, and the staging of the workpractice will be determined qualitatively.

**Inferred Language Resources**

It would seem to be an oxymoron to claim that an empty corpus situation does not produce texts, while simultaneously claiming that language resources can be reconstructed from it. However, in *some very constrained cases* we can determine the *kind of language resources* that were mobilised during a workpractice. This is possible because, although we do not have workpractice texts, we do after all have a grammar. There are two types of cases, where it is possible to make some claims about language use within empty corpus situations.

The first case involves when there is only one possible language resource available to interactants in order to realise a specific communicative purpose. An example of this is the use of service encounter genres embedded in casual conversation in the Ad Hoc System, described in Chapter 3, §3.2.1. We can make this claim- and know it to be correct- because the service encounter is the *only* genre available for requesting or providing goods and services. Once we know that there is a service encounter involved we could infer its canonical staging, as opposed to its specific institutional realisation. We can also make some inferences about its register features.

The second case demonstrates that while we may be able to identify the *kind* of language resource, we may not be able to say anything definitive about its deployment in actual workpractices. In Chapter 3, §3.4.5, an ALABS workpractice called Student Booking allows Students to reserve machines for future use. While there are no transcripts available for Student Bookings, we know that Labstaff are assisted in discriminating
between them and the range of other possible Student workpractices, by means of 'time references' encoded in the third functional component of a clause called its *circumstance*. Parenthetically, the other two components of a clause are *processes* realised by verb groups, and *participants*, which are often realised by noun groups. Circumstances function in clauses to indicate how these processes and participants operate (Collerson 1994, 83-85), and as a consequence are associated with the *ideational metafunction* of the clause, see §2.3.1, as a means of representing patterns of experience. Circumstances are classified into principal types including *Extent* and *Location* in time and real/abstract space, *Manner* which includes means, quality and comparison, *Cause* which includes reason, purpose and behalf, *Accompaniment*, *Matter* and *Role* (see Halliday 1985, 137-144). Circumstances can be expressed in a number of ways, including a separate clause. But, when used as a component of a clause, there are a variety of grammatical structures that could be used to express it, for example a single word, noun group or phrase. While there are many variations to the verb group that can be used to express different time references and meanings, these are not usually as specific as those that can be expressed using circumstances. Therefore for the Student Booking workpractice, circumstances of time are important. But as time is an important part of representing experience, it is not surprising that there are more grammatical resources for expressing it than for other circumstances. For Student Bookings, the circumstances are probably *Location/Temporal*, and must refer to the near future based on the policy information, and may be either *definite* for example, '1 o'clock', 'tomorrow', 'today', 'now', or *indefinite* for example 'soon' or 'afterwards'. All of these hypothetical examples are realised using single word adverbs, although groups, and phrases (like 'before 2:30', 'next Saturday') provide many time reference resources. If transcripts were available we could reasonably expect these relationships to time
packages into dependent clauses introduced by time conjunctions for example, 'when', 'before', and 'after'.

In the first case, making a general kind of language claim was reasonable only because the example utilised a resource for which no alternatives are available. In the second case, a claim about the expected kind of language resource used is only possible because out of the range of available options, the one identified is most likely to satisfy the specific social goals for which the workpractice was developed. For almost all other cases, making any statements about language features used in empty corpus situations is invalid.
Figure 2.9: Analysis Strategies for text, non-text, and empty corpus situations.
2.5 Summary

In Chapter 1, an argument was made for the use of semio-linguistic approaches in organisational semiotics. The importance of these approaches to the information systems discipline involves the ability to re-theorise information systems in terms of human communication in organisational contexts. Drawing from social semiotic theory, especially the work of Lemke (1988, 1995), Thibault (1991), and Kress (1985, 1988), a social semiotic model of organisations called the textual process model was described. This model has been suggested as a way of re-theorising subjectivity in the information systems discipline (Clarke 1992), applied to the early stages of systems analysis (Clarke 1991) and used to outline a critical theory of management decision-making (Fulop, Linstead and Clarke 1999).

In §2.2, the textual process model of organisations was modified and extended to account for the relationship between users and workpractices. Of specific interest are those workpractices, which are realised in whole or part by information systems. In order to theorise the relationship between workpractices and systems features in use, we take as a point of departure a view of systems design developed by Goldkuhl (1993). Goldkuhl (1993) proposed viewing systems design practices simultaneously from two dialectically opposite thought models he referred to as Integrationist and Separationist. The argument he provides can also be applied to the enactment of workpractices associated with information systems. By using the ‘reading tactics’ formulated by Derrida (Norris 1982), the dialectical relationship between Integrationist and Separationist views proposed by Goldkuhl (1993) is retheorised in Social Semiotic terms as ‘negotiation’ or a dialogic relationship (Bakhtin/Volosinov in Innis ed/ 1992). Despite developing a social semiotic theory of workpractices, Bakhtin's translinguistics
purposefully resists efforts at operationalisation. As a consequence, relevant concepts from Systemic Functional Linguistics- a semiotic model of language- were selected in order to be able to undertake applied studies in information system use. The Stratified Systemic Functional Linguistics Model developed by Martin (1992) is described in relation to texts associated with workpractices in §2.3. Although no simple mapping exists between Bakhtin's Translinguistics and those in SFL, theoretical affinities were tentatively established between a number of fundamental concepts in §2.4.1, with the latter enabling workpractice texts to be analysed in detail.

Workpractices consist not only of one or more texts, but may also consist of one or more actions. Drawing primarily on the work of de Certeau (1984), action and activity are described from a Systemic Semiotic perspective using discourse theory in §2.4.2. An action is organised in time as an implication sequence, analogous to the sequential implicativeness of a text. Consideration is given to the deployment of the framework to a case study of an effectively decommissioned system in §2.4.3 to §2.4.6.
Chapter 3: 
ALABS Expansion- Workpractice Sequences

3.1 Introduction

In the previous chapter, the Systemic Semiotic Workpractice Model was developed. In this chapter and the next, the model will be applied to analysing a small operational-level information system in its organisational contexts. The system, which forms the basis of the case study, is called the Automated Library and Borrowing System (ALABS). ALABS is a transaction processing system developed and operated by end-users at the Microcomputer Laboratories- a general computing services provider at the University of Wollongong. In this chapter, the Systemic Semiotics framework is used to demonstrate that an information system realises specific situational and cultural patterns of communication in an organisation.

The Information System discipline recognises that computer-based systems often re-use significant features of their non-computerised predecessors. The Manual System which ALABS replaced, owes a considerable debt to its precursor, the so-called Ad-hoc System, not through the direct incorporation of workpractices per se but through establishing as routine the conversational communication patterns upon which the Ad-hoc system relied. These predecessors to ALABS are described in §3.2.1 and §3.2.2. An overview of ALABS system features is provided in §3.2.3, while a history of its versions is provided in §3.2.4.

A workpractice analysis of Version 1 of ALABS is described in §3.3, together with the contributions made to ALABS by the Manual System. Using this analysis as a
benchmark, the diachronic changes to ALABS features across subsequent versions, a consequence of end-user enhancement of the system in response to changing organisational requirements, is described in §3.4 for Versions 2 and 3. The analysis is continued in the next chapter, §4.2 for Version 4 of ALABS. The kind of longitudinal study presented in these chapters, is only possible because the Systemic Semiotic Workpractice Model developed in Chapter 2, theorises the relationship between the texts associated with workpractices and their organisation contexts.

3.2 ALABS and its Predecessors

3.2.1 Ad-hoc System: Prelude to formalised Workpractices

From the middle to the end of 1981, an Ad-hoc System was developed by the systems operator to catalogue software at the Computer Centre at the Wollongong Institute of Education (WIE). In part this was motivated by the fact that the facility now consisted of two spatially separate microcomputer laboratories as well as a Perkin-Elmer 7/32 minicomputer. By the end of 1981, the Ad-hoc System included an extensible catalogue organised for quick retrieval, and a complete software holdings list. Since most software was in the form of ‘backups’, multiple copies of the associated documentation were unavailable. The systems operator generally oversaw the Loan and Return of software by clients. The number of users was so small that the Systems Operator merely memorised what software was currently being used. The software that could be loaned was able to be stored in a small number of boxes on the operator’s desk, located in one of the laboratories. Often the systems operator directly assisted users perform their tasks on the microcomputer. Under the Ad-hoc system, software was simply provided to those who needed it, or users could browse the available software on the operator’s desk. An
honour system existed for the return of items; users often returned software by placing it on the systems operator’s desk when they were finished.

When the provision of goods (materials) occurred between a user of the facility and the Systems Operator, both utilised the only linguistic resource available for demanding and offering goods and services, the so-called service encounter genre. However, the Ad-hoc system had no explicit Loan and Return practices and any pragmatic exchanges were embedded within casual conversation. Casual conversation consists primarily of chat stages, stretches of language typified by fluid interpersonal negotiation (Eggins and Slade 1997, 1). Interspersed within casual conversation are stretches of language called chunks, which are both pragmatically focused and generically organised. Consequently, the users and Systems Operator realised these service encounters as chunks within casual conversation. This accords with participant observation (by the author) and interview evidence supplied by the Systems Programmer (McGrath 1998).

The same Ad-hoc System was still in use by late 1984, but the facility was now supporting larger numbers of students. With an immanent organisational restructuring which would see the Microcomputer Laboratories supporting large numbers of users from the Commerce Faculty, the Ad-hoc System would be completely inadequate. To meet the new organisational circumstances facing the facility, the Ad-hoc System needed to be replaced. Any replacement system needed at least the following design criteria (DC):
the relatively unused laboratories were about to be continuously used for computer tutorials, and so the distribution (loan) of items (goods) needed to occur at a separate site - a service desk. Potential users would no longer be able to browse the available holdings until they found items they needed.

the service desk would also become the one point from which information (services) could be obtained or from which items could be borrowed or returned. Potential users would be required to articulate their needs, rather than constituting a self-service situation.

the familiarity with or recognition of users would soon be impossible due to the larger numbers of students and staff that the facility would soon be supporting. Users would need to be able to identify themselves.

the honour system that existed for the collection (return) of items would also need to be replaced by an explicit procedure ensuring that all items were returned in a timely fashion.

3.2.2 Manual System: Spoken to Written Texts

The hiring of an Operations Supervisor to replace the Systems Administrator in early 1985 at the newly renamed Microcomputer Laboratories, marked the start of a Manual System which was used during the remainder of that year. The Microcomputer Laboratories staff was increased by hiring a Laboratory Assistant to supervise loans and returns, and a Programmer to implement, amongst other things, a microcomputer based loan and return system modeled on the metaphor of a library and using the newly
available barcode technologies found in retail Point-Of-Sale systems. The Manual System, which replaced the Ad-hoc System, was a stopgap, required to ‘buy time’ for the facility while the microcomputer-based system was being developed. The deficiencies of the previous Ad-hoc System suggested a set of design criteria previously described which subsequent systems would need to employ. The Manual System helped to formalise a number of workpractices and system features developed to meet these design criteria (referenced in the subsequent discussion where necessary). Evidence for the persistence of these design criteria is substantiated by the fact that several workpractices, first developed in the Manual System, were ultimately reused with modifications in the implementation of the microcomputer based loan and return system. These included the Student Loan/Returns, Tutor Loan/Returns and Class Loan/Returns workpractices, conducted at a specially created Service Desk.

The Student Loan/Returns workpractice consisted of two face-to-face service encounters called Student Loans and Student Returns, see Figure 3.1. During Student Loans, a student presented their student identification card at the service desk to be retained for the duration of the loan by a Labstaff member. A Loan Form was filled out with the student’s details, and a description of the items to be loaned. The Loan Form, used during both Student Loans and Returns, was permanently retained at the Microcomputer Laboratories office and provided an audit trail for the transaction. The form itself constituted a contract, a regulatory genre between the Student and the facility in the absence of any other University Policy relating to the Student Use of Computing Facilities. It contained areas at the bottom of the form for the student to sign at the time of the loan, and also upon the return of the items. Most of the Loan Form consisted of rules pertaining to the loan and return of items as well as the expected behaviour of the
student while using the Microcomputer Laboratories. These rules were almost identical to those in the Conditions of Loan-Sessional Student Form in ALABS Version 2, see Text I in Appendix A2. In fact, these conditions were first developed in the Manual System and were subsequently reused in ALABS, see §3.3.3. Both the student and the Labstaff member needed to sign the form. The items that could be borrowed included software, manuals, and hardware. The form was retained at the Service Desk until the student returned the items. During Student Returns, students were required to identify themselves so that the Labstaff member could retrieve their student identification card. The student surrendered the items that they had borrowed to the Labstaff member. The Labstaff member counter-signed the Borrowing Form to indicate that all items had been returned, and stored the completed Loan Form in a file. Loan Forms that were counter-signed provided an estimate of facility usage, while those that were not yet counter-signed indicated currently active Student Loans. The qualitative sequences associated with the Student Loan and Returns are described in §3.3.2.

Figure 3.1 Student Loan/Return Workpractice formalised by the Manual System. Constituent service encounters are numbered and named in boldface.
The manual system also helped to formalise the Class Loan/Return workpractice, which consisted of four *nested service encounters*, Class Loans, Lab Loans, Lab Returns and Class Returns, diagrammed in Figure 3.2. The Manual System helped to install workpractices which addressed the design criteria of §3.2.1 by elaborating or modifying the basic language resource of the service encounter utilised in the Ad-hoc System. The patterns of human communication instantiated as informal service encounters of the Ad-hoc System became formal features of the Manual System. These service encounters were used to complete a written audit trail for the transaction in the form of a contract binding the actions of borrowers (Students, Tutors and Staff alike) into a hierarchical dyad. These service encounters established social relations of power, which can still be found at the Microcomputer Laboratories long after the effective decommissioning of ALABS. Indeed, the transformation from spoken to written texts instigated by the Manual System, conforms to Halliday’s often recited paraphrase (Martin 1985, 51) that written texts are privileged over spoken texts in western culture. The Manual System mirrored the actual flow of work involved in Loans and Returns. Through the use of a Loan Form for each transaction, the clients were reminded of their obligations agreed to in writing during the student loan, that they were expected to return all borrowed items.

By 1985, it was becoming apparent that the Manual System needed to be replaced since simply keeping it operational was placing ever-increasing demands on the staff. Management information was almost impossible to collate. Unsupervised loans (loans made outside tutorial times), which numbered 1,591 in the first teaching semester (Autumn Session) of 1985, leapt to 2,277 in the following semester (Spring Session), see Table 3.1. Furthermore, the University was actively expanding its student intake and
preparing for the introduction of University fees. The development of the microcomputer based loan and return system which replaced the Manual System in 1986 was conducted in a climate of rationalisation which saw the closure and amalgamation of other computing facilities on campus (Clarke 1991).

**Figure 3.2** Class Loan/Return Workpractice formalised by the Manual System. Constituent service encounters are numbered and named in boldface.
Table 3.1  Student Loans: Sessional Unsupervised Transaction Volume during 1985-1987 (after Clarke and Athanasiadis 1987, 123).

<table>
<thead>
<tr>
<th>Year</th>
<th>Session</th>
<th>Volume</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>1985</td>
<td>1</td>
<td>1,591</td>
<td>Manual System</td>
</tr>
<tr>
<td>1985</td>
<td>2</td>
<td>2,277</td>
<td>Manual System</td>
</tr>
<tr>
<td>1986</td>
<td>1</td>
<td>3,164</td>
<td>ALABS</td>
</tr>
<tr>
<td>1986</td>
<td>2</td>
<td>5,389</td>
<td>ALABS</td>
</tr>
<tr>
<td>1987</td>
<td>1</td>
<td>10,318</td>
<td>ALABS</td>
</tr>
</tbody>
</table>

3.2.3  Overview of ALABS System Features

ALABS was commissioned in 1986 to support the operational and management requirements for the loan and return of software, hardware and documentation to students and other clients of the Laboratories as well as providing management information in the form of statistical and graphical reports. At the time ALABS was developed, networking of the Microcomputer Laboratories had not yet occurred. Therefore, ALABS was designed as a centralised system and as a consequence all loans and returns were conducted through the service desk instigated during the use of the previous Manual System, see §3.2.2. Student identification cards were being issued by Student Administration at the University, with machine-readable barcodes to support a change in the technology at the Library. ALABS used these barcodes to uniquely identify students. Similarly, all items that could be borrowed at the facility, including software, manuals, and hardware, were provided with a unique barcode (see Clarke and Athanasiadis 1987). The loan and return of materials formed service encounters between a requestor (Student, Staff member or Tutor) and a Labstaff member who operated ALABS and provided the requested materials if possible.

The term feature is used here to designate a system function or capability. From a systemic semiotic perspective, a given information system entails two sets of systems
features, which may have workpractices associated with them. The first set of system features comprises operations required to support the technical infrastructure, for example packing databases. Features supporting the technical infrastructure of the system are labeled with $t$ in Table 3.2. These system features may have indirect texts associated with them that the analyst will need to identify along with the stakeholders responsible for this aspect of the technical infrastructure. For example, Packing of the ALABS Sessional transaction database (a supervisory function) was the responsibility of the Laboratory Assistant, the performance of which necessitated a meeting at the end of each academic session between the Programmer, Operations Supervisor and the Laboratory Assistant- an indirect text. This indirect text is obviously not supported by the information system itself. The second set of systems feature comprises operations required to support organisational workpractices. Features supporting organisational workpractices of the system are labeled with $o$ in Table 3.2. They are the justification for the existence of the first set of systems features. From the point of view of the system, it is the second set of workpractices (in this case direct texts) which are the most important.

ALABS can be divided into six main groups of features, shown in Table 3.2. The system features described in this section constitute a composite of all features that have ever existed in ALABS. Not all of these system features existed in all versions of ALABS. A history of ALABS versions is deferred until §3.2.4. The first group of features is the Modify Library group (Table 3.2: 1). Its purpose is to maintain accurate lists of software, hardware, and audio-visual holdings at the Microcomputer Laboratories. This group of features allows Labstaff members to change the item
holdings at the Microcomputer Laboratories by adding new records (append), editing existing records (view) or removing records that have been marked for deletion (pack).

The second group of features is the Loans/Return group (Table 3.2: 2). Its purpose is to keep track of the loan and return of items and provide current information concerning the status of each loan. This group represents the core-functionality of ALABS and is divided into eight subgroups. The Loan features group (Table 3.2: 2.1) comprises all the system features that support loans, renewals, and movements for all types of social subjects. The Return features group (Table 3.2: 2.2) comprises all types of interactions involving the return of borrowed items from all types of social subjects. The Items on Loan feature (Table 3.2: 2.3) displayed all the items on loan by the type of loan and also by social subject. The Date feature (Table 3.2: 2.4) displayed the current date on the screen as a reminder to Labstaff. The ‘Who is Late’ feature (Table 3.2: 2.5) was used to display the name of any student who had a loan that exceeded the maximum loan length, normally two hours. The Run Statistics feature (Table 3.2: 2.6) forced the execution of the statistics module. Prior to updating the statistics database, the feature checked to see if a student has a late loan, and if so, a message was displayed on the screen. Normally the frequency with which statistics were gathered was 15 minutes, but this could be changed from the Change System Parameters feature (Table 3.2: 3.2). The Change Input Mode feature (Table 3.2: 2.7) toggled the input mode for loans and returns from a default light-pen mode to an optional keyboard mode. This feature was also available from the Change System Parameters feature (Table 3.2: 3.2). The Book Terminals feature (Table 3.2: 2.8) was used to assign students to computers during peak lab usage periods. Students booked computers one day in advance during weekdays or two days in advance on weekends. The Laboratory Assistant was required to set up the bookings in
advance of the time they were needed by using an ancillary system called ALABS SUPERVISOR which provided additional features designed to support the technical infrastructure of ALABS. The features of this system are listed in Table 3.14 and Bookings were setup using its ‘Alter or Initialise Laboratory Bookings’ option (Table 3.14: 8.2), see §3.4.5. The Memos feature (Table 3.2: 2.9) enabled items without a barcode to be loaned to staff members. A Labstaff member ‘recorded’ information about the item into special text field called a memo in dBASE III+ syntax. Using this feature, the Labstaff member was able to add, view or delete memos.

The third group of features is the Auxiliary Commands group (Table 3.2: 3). This group consists of a miscellaneous set of fourteen features useful to Labstaff operators. The Offense Database features (Table 3.2: 3.1) were used to create, delete, and display or print offenses raised against students. An offense was a suspension of a student’s unsupervised borrowing privileges. Once an offense was created, the system prohibited any loans to the student outside of tutorial times for a specified period of time. Additional disciplinary measures could be exacted on disruptive students using the Black Book feature of ALABS SUPERVISOR, see Table 3.14: 14 and §3.4.6. The Change System Parameters feature (Table 3.2: 3.2) permitted Labstaff to change various global parameters used by ALABS during operations. These parameters included the current university academic session, the input mode (lightpen or keyboard), the maximum borrowing time in hours for students before the system declared a loan to be late, the time interval between successive automatic statistics calculations. Other parameters included whether individual transactions were to be sent to the printer as they occurred, whether barcodes or full descriptions were to be used when viewing or printing items on loan. Several parameters dealt with form numbers, the Borrowing
Form Number to be used when enrolling the next student on the system (see Text I in Appendix A2), and the corresponding Tutor Form Number to be used when enrolling the next tutor (see Text M in Appendix 2). The last parameter referred to as the System Mode determined whether or not Labpasses would be issued. The possible values are ‘normal’ if no Labpasses are to be issued or ‘draconian’ if Labpasses are to be issued.

The Dump User List features (Table 3.2: 3.3) were used to print or view enrolment details for an individual Student, Staff, or Tutor, or for the entire student, staff or tutor database. The Add Tutor feature (Table 3.2: 3.4) enabled a Tutor to be added to the system. As Tutors might also have been Staff members, the system requested the Staff number and then created a Tutor number. If the new Tutor was not a Staff member, a data entry screen was provided for entering the tutor’s personal details based on information recorded by a Department on the Tutor Information Sheet (see Appendix A2: Text L). The Change Staff Member’s Barcode feature (Table 3.2: 3.5) was used to change a registered Staff members barcode on the system. This would be necessary if the staff member obtained a reissued staff identification card, as might have been the case if the staff member had changed their name. The Batch Command Processor feature (Table 3.2: 3.6) was used to create, view or delete batch jobs for the system to run when it is closing down. The purpose of this feature was to run those tasks that took a long time to complete, such as operations on whole databases or large print jobs. The types of Batch files include technical maintenance features such as packing databases, and reporting features such as printing all offenses, all Students, all Staff members, or all Tutors. The Edit A Staff Member’s Record feature (Table 3.2: 3.7) was used to edit the changeable contents of a staff member’s record - the staff member’s department and internal phone number.
The Backup Databases features (Table 3.2: 3.8) were used to backup system databases. These commands involved supporting the technical infrastructure. The first half of these system features, introduced in Version 1, involve the maintenance of item holdings (3.8.1 and 3.8.2), the identification of various social subjects (Staff, Students, Tutors) recognised and constructed by the system (3.8.3 through to 3.8.5 inclusive) and the principal workpractice of loaning (3.8.6 and 3.8.7). A second set of these features was introduced in Version 2. They involve system features concerned with keeping data about student discipline (3.8.8), storing more detailed operational accounting introduced in this version (3.8.9 through to 3.8.13 inclusive), and identifying facility usage by faculties (3.8.14 and 3.8.15). With the exception of Faculty Usage statistics, a feature that has been migrated to another system, all of the Backup Database features are effectively decommissioned, as indicated in Table 3.2. Currently, ALABS is only ever closed down temporarily (5.2). The reason for this is that a Daily Close Down (5.1) would force the execution of the Backup Database features. As no transactional records are stored using floppy disks each of these features would crash the system, that is these features are dysfunctional, see §3.2.4. Interestingly, using the Temporary Close Down feature suspends the actual decommissioning of all the Backup Database features.

The Print Forms feature (Table 3.2: 3.9) was used to print all the forms relevant to ALABS operations involving Students, Staff, Tutors and Labstaff. These forms include the Conditions of Loan Form (see Appendix A2: Text I), Conditions of Use Text (see Appendix A2: Text H), Yearly Staff Loan Form (see Appendix A2: Text J), Yearly Tutor Loan Form (see Appendix A2: Text M), and Class Form (see Appendix A2: Text O). An option existed to change the number to be printed on the top of each of these forms. The Machine Status feature (3.10) was used to flag a machine as faulty. Each
machine had a unique number. This feature was required by the terminal booking
system (Table 3.2: 2.8) so that faulty machines would not be booked by students. The
Print Terminal Usage feature (Table 3.2: 3.11) was used to print a list of students who
had taken out loans during the day. The list is grouped into laboratories assigned to the
students by Labpass and was sorted by the time the loan was raised. The Change Student
Barcode feature (Table 3.2: 3.12) was used to change the barcode of a student registered
on the system, who had replaced their student identification card. The Mark and Print
Overdue Staff Loan Letter feature (Table 3.2: 3.13) is used to reprint Overdue Loan
Letters (see Appendix A2: Text K) to Staff members who did not respond to a previous
letter. ALABS displayed one late staff loan at a time and the Labstaff member was able
to send (mark) a letter to a staff member. Usually late Staff loan letters that had been
marked were printed during the system close down but the Labstaff member could also
choose to print a letter immediately. The Hardware Movement feature (Table 3.2: 3.14)
was used to record the movement of hardware around the Microcomputer Laboratories.
This feature also accommodated hardware that had not yet been issued with a Hardware
Barcode.

The fourth group of features was the Statistical group (Table 3.2: 4), which amongst
other uses enabled, machines to be reserved (Table 3.2: 4.6), provided reports on facility
usage by laboratory (Table 3.2: 4.4) as well as by faculty membership of students (Table
3.2: 4.5). The features in the Close Down group (Table 3.2: 5) allowed the ALABS
system to be automatically closed down at the end of daily activity (Table 3.2: 5.1) or to
be shut down temporarily (Table 3.2: 5.2). This latter feature was particularly useful
when printing statistical reports. The system could be left unattended at the end of the
day and would automatically power itself down when the reports were complete. The
sixth and most recent group of features is the *Accounts* group (Table 3.2: 6), which allow student and staff network accounts to be individually created, enabled, disabled, and account passwords to be altered.

### 3.2.4 *ALABS Version History*

The Loans/Return group, the Modify Library group together with various features within the Auxiliary Commands group, especially those involved in backing up databases (Table 3.2: 3.6) and changing system parameters (Table 3.2: 3.1), represent the core functionality for the ALABS system. Not surprisingly these features were the first to be commissioned. By contrast, the Accounts features are recent additions to ALABS. These features are used to add students and staff members to the network based LOGIN system that has superceded most of the ALABS loan and return features. The following subsection describes some defining characteristics of each of the four versions of the system.

A feature is *commissioned* when it becomes available for use by users of the system and *decommissioned* when it is no longer available to the users of the system in which the feature was available. The code to implement the feature may still reside in the system, but from the point-of-view of the users it has been rendered obsolete. If a feature is *effectively decommissioned* then in principle it is still available to its users, but is either never or rarely used. We can distinguish between two different types of effective decommissioning, the first is when a feature is still available to its users, but because it is irrelevant to current operations, is never or rarely used in current practice. When an alternate system is available and preferred, then the original feature is said to be
functionally redundant since the functionality provided by the feature is no longer required or has been made irrelevant in current practice. The second type of effective decommissioning is when a feature is still available for use by its users, but if selected would fail to achieve its stated or intended purpose. The feature may provide misleading information, or it may cause a system failure. In either case the feature is said to be dysfunctional. The distinction between these two types of effective decommissioning is that a functionally redundant feature is not used although it may be used, while a dysfunctional feature should not be used, but could be used. Table 3.2 shows the four versions of ALABS and the commissioning of each feature and where appropriate the effective decommissioning or transferal of an ALABS feature to another system. The commissioning of an ALABS feature is indicated by a plus sign while an effective or actual decommissioning is indicated by a minus sign. A number of network and web-based systems have subsumed some of the features that ALABS provided in a non-networked environment. These migrated features are indicated in the table by an asterix.

ALABS has survived three technological platforms (Apple II+, PC AT, and Novell Network) and three language changes (dBASE II and assembler, dBASE III+ and Clipper). The average half-life of most information systems is approximately eighteen months. The success of ALABS is indicated by the fact that the half-life of this system was 5 years. Furthermore, it has been in continual use in one form or another for 13 years. However, when the Laboratories were eventually networked, many of the functions that ALABS performed have become irrelevant to the operations of the facility. With the exception of a few functions, ALABS became effectively decommissioned - the code still exists but is rarely used in day-to-day operations.
Table 3.2: ALABS Version History (after Clarke 1996). System features are listed in the first column. The second column classifies each system feature according to whether it directly supports technical infrastructure (t) or organisational workpractices (o). Subsequent columns indicate ALABS versions (1-4) where a feature was commissioned (+), actually decommissioned (x), effectively decommissioned (-), or migrated to another system (*).

<table>
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<td>+</td>
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<td>+</td>
<td>x</td>
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<td>2.3.10</td>
<td>Who has Borrowed</td>
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## Table 3.2: ALABS Version History (Continued)

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<td>2.4 Date</td>
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<td>2.5 Who is Late</td>
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<td>+</td>
<td>-</td>
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<td>2.6 Run Statistics</td>
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<td>2.7 Change Input Mode</td>
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<td>o</td>
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### 3. Auxiliary Commands

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<td>3.6.1.1 Pack Library Databases</td>
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</table>

### 6. Accounts Menu

<p>| | | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>6.1 Add Student</td>
<td>o</td>
<td></td>
<td>+</td>
</tr>
<tr>
<td>6.2 Add Staff Member</td>
<td>o</td>
<td></td>
<td>+</td>
</tr>
<tr>
<td>6.3 Enable/Disable Account</td>
<td>o</td>
<td></td>
<td>+</td>
</tr>
<tr>
<td>6.4 Change Password</td>
<td>o</td>
<td></td>
<td>+</td>
</tr>
</tbody>
</table>
Table 3.2: ALABS Version History (Continued).

<table>
<thead>
<tr>
<th>3.8</th>
<th>Backup Databases</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
</tr>
</thead>
<tbody>
<tr>
<td>3.8.1</td>
<td>Library</td>
<td>t</td>
<td>+</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>3.8.2</td>
<td>Deleted Library</td>
<td>t</td>
<td>+</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>3.8.3</td>
<td>Staff</td>
<td>t</td>
<td>+</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>3.8.4</td>
<td>Students</td>
<td>t</td>
<td>+</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>3.8.5</td>
<td>Tutors</td>
<td>t</td>
<td>+</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>3.8.6</td>
<td>Loans</td>
<td>t</td>
<td>+</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>3.8.7</td>
<td>Sessional Student Borrowing</td>
<td>t</td>
<td>+</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>3.8.8</td>
<td>Offense</td>
<td>t</td>
<td>+</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>3.8.9</td>
<td>Daily Machine Software Usage</td>
<td>t</td>
<td>+</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>3.8.10</td>
<td>Hourly Loans Count</td>
<td>t</td>
<td>+</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>3.8.11</td>
<td>Hourly Borrowing Rate</td>
<td>t</td>
<td>+</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>3.8.12</td>
<td>Borrowing Time</td>
<td>t</td>
<td>+</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>3.8.13</td>
<td>Down Time</td>
<td>t</td>
<td>+</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>3.8.14</td>
<td>Faculty Usage</td>
<td>t</td>
<td>+</td>
<td>*</td>
<td></td>
</tr>
<tr>
<td>3.8.15</td>
<td>New Student Count</td>
<td>t</td>
<td>+</td>
<td>*</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>3.9</th>
<th>Print Forms</th>
<th>o</th>
<th>+</th>
<th>-</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>3.9.1</td>
<td>Print Staff Borrowing Forms</td>
<td>0</td>
<td>+</td>
<td>x</td>
<td></td>
</tr>
<tr>
<td>3.9.2</td>
<td>Print Tutor Borrowing Forms</td>
<td>0</td>
<td>+</td>
<td>x</td>
<td></td>
</tr>
<tr>
<td>3.9.3</td>
<td>Print Sessional Student Borrowing Forms</td>
<td>0</td>
<td>+</td>
<td>x</td>
<td></td>
</tr>
<tr>
<td>3.9.4</td>
<td>Print Conditions of Use Forms</td>
<td>0</td>
<td>+</td>
<td>x</td>
<td></td>
</tr>
<tr>
<td>3.9.5</td>
<td>Print Class Borrowing Forms</td>
<td>0</td>
<td>+</td>
<td>x</td>
<td></td>
</tr>
<tr>
<td>3.9.6</td>
<td>Change Borrowing Form Numbers</td>
<td>0</td>
<td>+</td>
<td>x</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>3.10</th>
<th>Machine Status</th>
<th>o</th>
<th>+</th>
<th>x</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>3.10.1</td>
<td>View/Delete Down Machines</td>
<td>o</td>
<td>+</td>
<td>x</td>
<td></td>
</tr>
<tr>
<td>3.10.2</td>
<td>Add Down Machines</td>
<td>o</td>
<td>+</td>
<td>x</td>
<td></td>
</tr>
</tbody>
</table>

| 3.11 | Print Terminal Usage              | o | + | x |   |

| 3.12 | Change Student Barcode            | o | + | x |   |

| 3.13 | Mark and Print Overdue Staff Loan Letters | o | + | x |   |

<table>
<thead>
<tr>
<th>3.14</th>
<th>Hardware Movement</th>
<th>o</th>
<th>+</th>
<th>x</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>3.14.1</td>
<td>Record Hardware Move</td>
<td>o</td>
<td>+</td>
<td>x</td>
<td></td>
</tr>
<tr>
<td>3.14.2</td>
<td>List Hardware Moves</td>
<td>o</td>
<td>+</td>
<td>x</td>
<td></td>
</tr>
<tr>
<td>3.14.3</td>
<td>List Item’s Movement History</td>
<td>o</td>
<td>+</td>
<td>x</td>
<td></td>
</tr>
</tbody>
</table>

4. Statistics Menu

<table>
<thead>
<tr>
<th>4.1</th>
<th>Software</th>
<th>o</th>
<th>+</th>
<th>*</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>4.2</td>
<td>Audio-Visual</td>
<td>o</td>
<td>+</td>
<td>*</td>
<td></td>
</tr>
<tr>
<td>4.3</td>
<td>Student</td>
<td>o</td>
<td>+</td>
<td>*</td>
<td></td>
</tr>
<tr>
<td>4.4</td>
<td>Lab Usage</td>
<td>o</td>
<td>+</td>
<td>*</td>
<td></td>
</tr>
<tr>
<td>4.5</td>
<td>Faculty Usage</td>
<td>o</td>
<td>+</td>
<td>*</td>
<td></td>
</tr>
<tr>
<td>4.6</td>
<td>Booking</td>
<td>o</td>
<td>+</td>
<td>*</td>
<td></td>
</tr>
<tr>
<td>4.7</td>
<td>Staff</td>
<td>o</td>
<td>+</td>
<td>*</td>
<td></td>
</tr>
<tr>
<td>4.8</td>
<td>System</td>
<td>o</td>
<td>+</td>
<td>*</td>
<td></td>
</tr>
<tr>
<td>4.9</td>
<td>Statistics Parameters</td>
<td>o</td>
<td>+</td>
<td>*</td>
<td></td>
</tr>
</tbody>
</table>

5. Close Down

<table>
<thead>
<tr>
<th>5.1</th>
<th>Daily Close Down</th>
<th>o</th>
<th>+</th>
<th>x</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>5.2</td>
<td>Temporary Close Down</td>
<td>o</td>
<td>+</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

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3.3 ALABS Features Version 1: Formation and Commissioning

Prior to the introduction of ALABS, the Operations Supervisor primarily set software development duties for trainees. The trainees had little involvement with the service roles of the facility. However, the introduction of ALABS placed new demands on trainees by requiring them to perform additional duties. Trainees performed the bulk of the software loans and returns that constituted the largest proportion of activity until the networking of the Laboratories occurred in 1991 (see §3.2.4). Trainees also ‘enrolled’ new students onto the system, ordered disks into class sets for use by tutors who taught practical sessions in the laboratories, identified late returns of software, undertook regular patrols of the laboratories, and performed daily close down procedures which produced batch printed facility usage reports. ALABS also changed the duties and responsibilities of other laboratory staff. For example, maintaining a centralised service desk became the responsibility of the Laboratory Assistant. The commissioning of ALABS standardised and stabilised tenor relationships, that is the relative statuses and roles of trainees and other laboratory staff, and formalised the relationship between Microcomputer Laboratories staff and students. ALABS also standardised the material setting of the service desk, where all loans and returns occurred. Students and other users needing items provided their identification card at the service desk. Towards the end of each semester when we can assume the highest student familiarity with ALABS procedures, the mean duration of loans to students was in the order of 45 seconds (based on the ALABS Sessional Student Borrowing transaction logs).
3.3.1 Student Loan/Return Workpractice

No transcripts are available for Version 1 of the system. However, the author who was the Operations Supervisor at the time, the then Laboratory Assistant who is now the current Operations Supervisor, and the Applications Programmer who is now the Senior Systems Programmer, conducted enough of these to enable the Student Loans and Returns to be reliably reconstructed.

ALABS Student Loans Version 1

The field associated with this workpractice involves Students requesting the loan of items from the Microcomputer Laboratories. The items may be in the form of software, manuals, or hardware. The loan requests are processed by a Labstaff member who records them using the ALABS Student Loan feature (Table 3.2: 2.1.1). The primary social goal of this workpractice was the correct recording of the loan in order to maintain the integrity of the holdings and to not infringe the licensing agreements with the software distributors. A secondary goal was the efficient loan of items to Students.

In Student Loans, associated with the attempt to resolve a request for service (SR), there is the expectation of finding lexical items such as 'borrow', 'disk' or 'software' (see for example Lines 1 and 17 in Appendix A2: Transcript A). Alternatively, a specific product name like 'Microsoft project' (see Line 1 of Appendix A2: Transcript B) might be mentioned. Interestingly, these lexical items are not indexical, that is not unique, to Student Loans. In fact the Labstaff member would encounter these lexical items in workpractices involving Student Appends (Table 3.2: 2.1.6), Student Renewals in Versions 2 and 3 (Table 3.2: 2.1.7), Tutor Loans (Table 3.2: 2.14), Staff Loans (Table 3.2: 2.1.2) and Long-term Staff Loans in Versions 2 and 3 (Table 3.2: 2.1.3). These kind
of lexical items are referred to here as *scoped lexical items*. They are initially ambiguous and require a further resolution of the type of social subject involved in the workpractice. In practice, it was easy for Labstaff members to identify the appropriate workpractice. Staff cards are blue whereas Student Cards are white. In general, further probing was required in order to distinguish between Staff, Long-term Staff and Tutors, although familiarity between Labstaff and academic staff explains the absence from the transcripts of explicit probing to determine the type of social subject involved in these loans. The tenor relations between the Student and the Labstaff involved the former as subordinate and the later as superordinate. The social distance between them was near maximal. This workpractice formed a service encounter as the role that language played (mode) was ancillary, accompanying the work, with active process sharing between the participants, who were involved in phonic, spoken language with visual contact.

The ALABS Student Loan Qualitative Digraph is represented in Figure 3.3a using the notation developed in Clarke (1997b), the conventions for which are provided in Appendix A3. The Qualitative Element Inventory is provided in Table 3.3. Note that the code for each qualitative element uses a suffix to indicate that it is qualitatively elicited rather than linguistically determined. The Regulations and Enrolment subsequence occurs if the user is not currently enrolled on ALABS. The Materials Out and Service Request subsequence can occur when the student realises that they need additional items. By convention, all service encounter genres are diagrammed with a Greeting element at the beginning of the sequence and a Finis element at the end. As these elements are phatic they may be bypassed, indicated by curved arrows at the beginning and end of subsequent sequences. This convention has been similarly adopted for qualitative sequences where the curved arrows are dashed.
Directed graphs of the type shown in Figure 3.3a, can describe a large range of potential patterns of human communication or usage patterns, including some which may exclude the information system entirely by employing a *manual workaround*. An example of a manual workaround of the system which none-the-less still conformed in part to the Student Loan (see Clarke 1996), involved a student who had not brought their Student Identification Card with them and did not know their student number. Although the student’s surname and details could be retrieved from the system, this did not constitute proof of their identity. This meant that ALABS could not be used to record the loan. But because the student agreed to have his car license retained by the Labstaff to demonstrate his ‘good faith’, the software was lent and the loan was manually recorded. One might argue that irrespective of whether ALABS could or could not process the loan, the student was prepared to offer a form of identification. This seems reasonable at first, except for the fact that unlike student identification cards, Australian car licenses did not then use photographs of the license holder. Therefore, a car license could not be used to confirm the identity of a student! If manual workarounds are infrequent, they may be described as security breaches or a lapse in business ethics and may justify managerial disciplinary action directed at workers. Alternatively, if manual workarounds are frequent, they may be described as operational difficulties with the information system and may justify managerial disciplinary action directed at systems developers (if the system was built in-house) or may justify additional expenditure by managers (if the system was built by external consultants).
Table 3.3 ALABS Student Loan Qualitative Element Inventory.

<table>
<thead>
<tr>
<th>Code</th>
<th>Qualitative Elements</th>
<th>Function</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gq</td>
<td>Greeting</td>
<td>phatic initiation</td>
</tr>
<tr>
<td>SRq</td>
<td>Service Request</td>
<td>request for loan services</td>
</tr>
<tr>
<td>ISq</td>
<td>Identification Sought</td>
<td>student-id or equivalent retained</td>
</tr>
<tr>
<td>REq</td>
<td>Regulations</td>
<td>student regulations</td>
</tr>
<tr>
<td>Eq</td>
<td>Enrolment</td>
<td>enrolment of student requestor</td>
</tr>
<tr>
<td>MOq</td>
<td>Materials Out</td>
<td>items provided</td>
</tr>
<tr>
<td>Fq</td>
<td>Finis</td>
<td>phatic conclusion</td>
</tr>
</tbody>
</table>

Figure 3.3 ALABS Student Loan Qualitative Digraph Version 1 (a) and a qualitative sequence showing a negotiated separation between the workpractice and the ALABS Student Loan system feature (b).

(a)

(b)

Figure 3.3b shows a second qualitative sequence involving a ‘manual workaround’ of a Student Loan, observed by the author when he was the Operations Supervisor, and retold by the then Laboratory Assistant (see Clarke 1996). The workaround involved a graduate student who required software, but did not have their student card and did not recall their student identification number. In order to borrow software, the student
offered to hand over their watch as security, until the borrowed items where returned. The software was lent to the student and loan was manually recorded. This example demonstrates the substitution of the ‘mandatory’ element Identification Sought is renegotiated into an entirely new element, the Value of a retained Item. The Labstaff member and student jointly re-negotiate one type of workpractice into a completely different form of workpractice, despite the fact that the new form may not be organisationally sanctioned or supported by the system. This workpractice cannot be explained using SFL genre theory. Both major genre theories (Hasan 1985; Martin 1992, 1994) have no provision to change the function of a ‘mandatory’ element in a genre, for example IS, and consequently the sequence would be considered as either belonging to some other genre, or of not being a text at all. However, this negotiated separation is explainable as an instance of a workpractice exhibiting dialogism (Bakhtin in Todorov 1984). Systems features have a tendency to be monological, often designed with a particular set of sectional interests firmly in mind (of the designer) and often employing a distinctive managerial or analytical perspective. Most design practices lead to the production of systems that in use reduce the number of ‘voices’ in workplaces. Furthermore, those systems which have embedded security and identification features are often impossible for workers and clients to renegotiate and become ‘inescapable’ in Bakhtin’s terms.

**ALABS Student Returns Version 1**

The field associated with this workpractice involves Students returning previously borrowed items from the Microcomputer Laboratories. The items may be software, manuals, or hardware. The returns are processed by a Labstaff member who records them using the ALABS Student Return feature (Table 3.2: 2.2.1). The primary social
goal of this workpractice was the correct recording of the return in order to maintain the integrity of the holdings and to not infringe the licensing agreements with the distributors. Related to this goal was the need to be able to establish an accurate audit trail for the Loan. A secondary goal was the efficient processing of Returns. In general, Students did not need to explicitly indicate that they were returning items, and so the Request Completion qualitative element, see Table 3.4, could be bypassed. The simple provision of items satisfied the Materials In qualitative element in the workpractice. An example of the non-verbal realisation of MI in a Student Return for Version 4 of ALABS is provided in Appendix A2: Transcript C. The tenor relationships associated with Student Loans were identical to those in Student Returns, with one exception. The social distance was near maximal but somewhat reduced compared to Student Loans. This is because there is no need for Students to identify themselves, as is the case with Student Loans. This workpractice formed a service encounter, as the role that language played (mode) was ancillary, accompanying the work, with active process sharing between the participants, who were involved in phonic, spoken language with visual contact.

The Qualitative Element Inventory for ALABS Student Returns is provided in Table 3.4 and the associated Qualitative Digraph for Version 1 is provided in Figure 3.4. In representations of genres and qualitative digraphs, elements that are organised in a straight line from the start to the end symbols are referred to as occurring on the baseline. Baseline elements represent the most frequently occurring sequence, where as elements which are non-base line elements, like the subsequence of Identification Returned and Materials In below the baseline in Figure 3.4 are less frequently occurring. This subsequence is likely to occur if there are small numbers of students and the Labstaff
member can see the student approaching the service desk laden with items. Note that both the Greetings and Finis elements in the digraph are phatic and can be bypassed indicated by the dashed arcs in Figure 3.4.

Table 3.4  ALABS Student Return Qualitative Element Inventory.

<table>
<thead>
<tr>
<th>Code</th>
<th>Qualitative Elements</th>
<th>Function</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gq</td>
<td>Greeting</td>
<td>phatic initiation</td>
</tr>
<tr>
<td>RCq</td>
<td>Request Completion</td>
<td>request return services</td>
</tr>
<tr>
<td>Mlq</td>
<td>Materials In</td>
<td>items returned</td>
</tr>
<tr>
<td>IRq</td>
<td>Identification Returned</td>
<td>student-id or equivalent returned</td>
</tr>
<tr>
<td>Fq</td>
<td>Finis</td>
<td>phatic conclusion</td>
</tr>
</tbody>
</table>

Figure 3.4  ALABS Student Return Qualitative Digraph Version 1.

3.3.2  Contribution to Student Loans/Returns from the Manual System

The changeover from the manual to computer-based system raises issues that are probably applicable to other computer-based operational systems introduced into workplaces that previously used manual systems. In the ALABS system, the student loans were conducted as a face-to-face encounter as they had been in the Manual System. The ALABS system automatically recorded the transaction and therefore the student was not required to endorse the transaction by signing a document. The fact that the system had a record of the transaction, and the staff held the student card, was
enough to prove that the transaction occurred. The 'efficiency' of ALABS was the removal of the need of a written text during the conduct of each loan transaction. In fact the only written document required was when students were borrowing for the first time during an academic session. This written text was used as a formal record of their enrollment on the system and their agreement to abide by the specified conditions.

In the Manual System, the purpose of the Student Loan/Return workpractice was to produce a completed Loan Form, the transformation of service encounters into a contractual text between the Microcomputer Laboratories and the Student. The commissioning of ALABS 'streamlined' operations by removing the need for the Loan Form during the conduct of each Student Loan. It modified the purpose of this service encounter by changing its field from supporting the production of the Loan Form to supporting a data entry operation for ALABS. This change ramified through other texts associated with the Student Loan/Return Workpractice. The contractual part of the Loan Form, what remained after the 'streamlining' became a Conditions of Loan, signed by students once per session. Changing the Student Loan also altered the generic structure and register features of Student Returns. The changeover from manual to computer-supported Loans caused little problems for the client organisation, that is the changeover did not substantially change the Mode associated with Loan texts.

The Student Loans and Returns workpractices of the Manual System consisted of service encounters conducted at a service desk (refer to DC1 in §3.2.1). The purpose of the Student Loans service encounter in the Manual System was (i) to identify the type of service required (refer to DC2 in §3.2.1), (ii) to identify the requestor as possessing a valid Student Identification Card and therefore being an enrolled student at the
University (refer to DC3 in §3.2.1), (iii) to retain the Student Identification Card until all loaned items were returned, (iv) to list all items to be loaned to the student on a so-called Loan Form, (v) to get the student to sign the Loan Form to endorse the existence of the transaction, and (vi) to provide the requested items to the student. Since no transcripts exist of the Manual System, these early service encounters are diagrammed as qualitative sequences. The conventions for drawing and interpreting qualitative sequences are provided in Appendix A3. The staging of this workpractice provided in Figure 3.5a has been corroborated by the general staff who held the positions of Laboratory Assistant and Programmer when this version of ALABS was in use. The Qualitative Elements, Codes and Functions for Student Loans associated with the Manual System are listed in the Qualitative Element Inventory of Table 3.5. With reference to the above discussion, the Service Request element fulfilled point (i), while the Identification Sought element fulfilled points (ii) and (iii). The Loan Form Borrow element fulfilled points (iv) and (v), while the Materials Out element fulfilled point (vi).

Table 3.5  Student Loans Qualitative Element Inventory in the Manual System.

<table>
<thead>
<tr>
<th>Code</th>
<th>Qualitative Elements</th>
<th>Function</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gq</td>
<td>Greeting</td>
<td>phatic initiation</td>
</tr>
<tr>
<td>SRq</td>
<td>Service Request</td>
<td>request for loan services</td>
</tr>
<tr>
<td>ISq</td>
<td>Identification Sought</td>
<td>student-id or equivalent retailed</td>
</tr>
<tr>
<td>FBq</td>
<td>Loan Form Borrow</td>
<td>loaned items listed, which student endorses</td>
</tr>
<tr>
<td>MOq</td>
<td>Materials Out</td>
<td>items provided</td>
</tr>
<tr>
<td>Fq</td>
<td>Finis</td>
<td>phatic conclusion</td>
</tr>
</tbody>
</table>
Figure 3.5 Comparison Chart showing (a) the Student Loan Qualitative Sequence in the Manual System and (b) the ALABS Student Loan Qualitative Digraph Version 1, from Figure 3.3a.

The purpose of the Student Returns service encounter in the Manual System (refer to DC4 in §3.2.1) was (i) to indicate the completion of a loan, (ii) to search for the relevant Students Identification Card, using it to (iii) sequentially searched through a pile of active Loan Forms searching the students name or student identification number, (iv) for the Student to return all borrowed items and the Labstaff Member to check off each item on the Loan Form, (v) for the student to sign the Loan Form to indicate that all items were returned in good working order, and (vi) for the Labstaff member to return the retained Student Identification Card. The Qualitative Element Inventory for Student Returns in the Manual System is provided in Table 3.6, and the qualitative sequence shown in Figure 3.6a. With reference to the above discussion, the Request Completion element fulfilled point (i), the Identification Found element fulfilled points (ii) and (iii),
the Loan Form Return element fulfilled points (iv) and (v), while the Identification Returned element fulfilled point (vi). The purpose of the spoken Student Loan, generalised by the qualitative sequence of Figure 3.5a, was to complete the loan area of a written Loan Form, described in §3.2.2. The purpose of the spoken Student Return, generalised by the qualitative sequence of Figure 3.6a, was to complete the return area of the appropriate Loan Form.

**Table 3.6**  
Student Returns Qualitative Element Inventory in the Manual System.

<table>
<thead>
<tr>
<th>Code</th>
<th>Qualitative Elements</th>
<th>Function</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gq</td>
<td>Greeting</td>
<td>phatic initiation</td>
</tr>
<tr>
<td>RCq</td>
<td>Request Completion</td>
<td>request return services</td>
</tr>
<tr>
<td>IFq</td>
<td>Identification Found</td>
<td>student-id located at service desk</td>
</tr>
<tr>
<td>FRq</td>
<td>Loan Form Return</td>
<td>check returned items, which Labstaff endorses</td>
</tr>
<tr>
<td>IRq</td>
<td>Identification Returned</td>
<td>student-id or equivalent returned</td>
</tr>
<tr>
<td>Fq</td>
<td>Finis</td>
<td>phatic conclusion</td>
</tr>
</tbody>
</table>

**Figure 3.6**  
Comparison Chart showing (a) the Student Return Qualitative Sequence in the Manual System and (b) the ALABS Student Return Genre Digraph Version 1, from Figure 3.4.
3.3.3 Conditions of Loan Form: Contribution from the Manual System

As indicated in §3.2.2, a contribution provided to ALABS from the Manual System was the Conditions of Loan Form, see Text I in Appendix A2. The Manual System required students to enter into a contract with the Laboratories to ensure for the timely return of all items. The Labstaff felt that they needed to have a signed record of each student’s compliance with the rules and regulations of the laboratories. When ALABS was commissioned, there was no campus wide policy pertaining to student usage of university computing facilities. A list of requirements and regulations were drawn up by the Labstaff, the so-called Conditions of Loan form (Appendix A2: Text I), based on those in the Manual system. Students seeking to use the facilities were required to sign this form prior to them being placed on the system. As the student database was purged every session, students would sign the Conditions of Loan form every session. These forms were stored at the Laboratories. Students who failed to return software or other material would have their accounts frozen until such time as the materials were returned, see §3.4.6. In early versions of ALABS, the Conditions of Loan form (a written genre) was directly associated with the Regulation and Enrolment elements (RE1, E1) of the Student Loan genre. When a student attempted a Student Loan genre for the first time or at the beginning of a session, ALABS would not have any details about them. To complete the Student Loan, the student would need to sign a new Conditions of Loan form and the Microcomputer Laboratories Staff Member would need to enter these details to ALABS. Once this was completed at the beginning of the session, the Student and Staff member would not need to do this again until the following session. This signing of a Conditions of Loan form could be considered as an example of genre embedding (Ventola 1987, 84) involving the ‘borrowing’ of an entire genre, a written
contract, in order to complete a particular Student Loan genre. However, the relationship between the Student Loan Genre and the Conditions of Loan form was of greater significance for the Microcomputer Laboratories than the simple transformation of one genre into another, to be discussed in §4.3.

Once a student was enrolled, ALABS then took over the recording of data during the loans and returns, previously a manual operation for Labstaff. So while the Conditions of Loan Form was never directly involved in any subsequent Loans and Returns after a student enrolled on ALABS, it was none-the-less implicated in every loan and all subsequent interactions between Students and Labstaff. Students who failed to comply would be cautioned or in some cases refused service. The Conditions of Loan Forms, which each enrolled student had previously signed, allowed the Operations Supervisor to exact disciplinary measures against specific students. In fact, this occurred often enough that an Offence feature (Table 3.2: 3.1) was provided in Version 2 of ALABS so that Labstaff could apply these disciplinary measures themselves without having to interrupt the Operations Supervisor, see also §3.4.6.

Students were left in no doubt about their duties and responsibilities in relation to borrowing items from the facility, as evident in Text I of Appendix A2. Modality is the grammatical resource used by authors (and speakers) to mark the degree of certainty or uncertainty in the exchange of information (Collerson 1995, 32-36). Modal auxiliaries or modals, like ‘may’, ‘could’, and ‘must’, are the most basic way of indicating modality in texts. Referring to Text I, note that almost every one of the ten conditions of loan involves modal auxiliaries. For example, condition 3 and uses ‘is to’, which is functioning as the modal auxiliary ‘must’. Conditions 5 and 6 use the modal auxiliary
'must', while conditions 8 and 10 use 'will'. There is a high degree of certainty expressed in the use of these modals. Modulation is the grammatical resource used to modify commands and offers so as to impose obligations, make requests and suggestions and declare intentions (Collerson 1995, 38). A more complex structure is provided in condition 7, where the students' requirement to determine the condition of equipment prior to borrowing is put into a subsidiary position in the clause following the basic process of the 'borrowers obligation'. Similar modulation occurs in condition 1 and 2 where the basic process is the 'borrower agreement'. This text adamantly imposes obligations, even impossible ones as is the case in condition 7, upon students who do not have the authority to debate them. Just in case the student (borrower) forgets about these conditions, an explicit reference to the Conditions of Use, provided in each Laboratory (see Text H in Appendix 2), is made in condition 10. The text uses a considerable amount of legal lexis, for example 'approval', 'indebted', 'liable', 'indemnify', 'bailment', 'rights' associated with the facility, [student] 'privaleges' (sic) being withdrawn by the facility, 'expressly forbidden' and 'abide' and 'rescind'. The text also employs formal lexical items, for example 'as per', 'adhere', 'whereon'. Together these reflect and reinforce the unequal social relations of power between Students and Labstaff. Finally, the structural arrangement of the text into a Coda followed by a Conditions stage, and a Contractual Obligation stages, marks this text as a contract organised into a purpose-built synthetic Regulatory Genre. Interestingly, this genre is directly reused for each of the social subjects constructed by the system including Academic Staff and Tutors, see Appendix A2: Text J and Text M respectively.
3.3.4 Sequence Copying (Development): Student Loan to Student Append

Up until this point, the discussion has been focused on the Student Loans and Returns Workpractice and the influence of the Manual predecessor system in shaping the structure and function of this workpractice. This demonstrated the contribution that previous systems and the patterns of human communication they instantiate can have on shaping communication patterns in subsequent systems. Systems themselves can be considered as repositories for patterns of human communication that can form the basis for new systems features. An example of this is the Student Append feature of ALABS. The Student Append feature (Table 3.2: 2.14) was commissioned in Version 1 of ALABS and decommissioned in Version 4. The purpose of the Student Append was to provide students with the ability to borrow additional software items while still having other items on active loan. For example, a Student may wish to borrow word-processing software to complete the documentation for a programming assignment. Students were able to conduct Student Appends only after they had already undertaken a Student Loan. Because Students had a currently active Student Loan, the Microcomputer Laboratories were already holding their student identification card. The Student needed to simply request additional items. If the laboratories were busy, then the Labstaff member would probably assume that student wanted to undertake a Student Loan. It would be at the Identification Sought element, that the Student would tell the Labstaff member that they already held the student identification card. In the absence of other information, this would signal the need for a Student Append, rather than a Student Loan. However, if the laboratories were not busy, then it was possible that the Labstaff member remembered that the student already had undertaken a Student Loan, and so would select the Student Append feature. As with Student Loans, we might also expect that the Conditions of
Loan form should also apply to Student Appends, and in practice this was true. However, given that the Student Loans and Returns workpractice and the Conditions of Loan form had been finalised before the need for a Student Append feature had been identified, the Conditions of Loan form does not specifically mention the Student Append workpractice. In effect, the Student Append functions like the Student Loan, saving the needless reentry of loan details already available on the system.

Even though the Microcomputer Laboratories were already holding the Student Identification Card, Student Appends did not always proceed smoothly. Often the photographs on the student identification cards were of a poor quality. On occasion the Labstaff member would ask for the students name to help locate the card, or alternatively the student would lean over and point out their card. Interestingly enough, Student Appends were conducted with much less formality than Student Loans. A number of factors acted to reduce the unequal power continuum compared to Student Loan situations. Students needed to be actively involved in their own identification. They were already using the facility and had gone through the process of identifying themselves and so were already complying with the laboratory procedures.

Although no transcripts exist for Student Appends in ALABS, their frequency of occurrence enables confidence in the voracity of the qualitative sequence, the elements for which are listed in Table 3.7. There are considerable similarities between Student Loans, see Figure 3.7a, and Student Appends, see Figure 3.7b. The major differences between them involve the absence in the latter case of a number of elements, including (i) the Identification Sought element in which the student is required to provide a student-id or equivalent to be retailed at the Service Desk, (ii) the Regulations element
in which regulations pertaining to student use of the Microcomputer Laboratories are explained, and the (iii) Enrolment element in which a new student has their details entered into ALABS. As a student’s identification card was already being held by the Labstaff, the Identification Sought stage is substituted by the Identification Found stage, the social activity in which the students card is found amongst many, and which often involved the students themselves. As the Student Append feature is a qualitative sequence that closely mirrors another genre (Student Loan), we use the names of those genre elements from Student Loan, which have close or exact equivalents in the Student Append feature.

The Student Append feature illustrates one mechanism for system modification, the copying of generic sequences and their elaboration in order to spawn new functionality. In this case, the service encounter developed is called a dependent service encounter because it required the successful completion of a previous Student Loan. This kind of interrelationship between service encounters has not been previously identified or described in the systemic functional genre literature. As shown in Figure 3.7b, the Student Append qualitative activity sequence is undeniably similar in both morphology and function to the Student Loan genre. Given the unlikely situation of these functionally related sequences being independently elaborated, and given the argument for the dependence of Student Append, there must already have been a completed design for the staging of the Student Loan prior to completing the design for the staging of the Student Append feature. This proposition is supported by unstructured interviews conducted with the ALABS programmer. The Student Append feature was devised after the Student Loan feature, although both were designed early in the life of the system and so both were commissioned in Version 1 (see Table 3.2). According to the programmer,
in order to develop the Student Append feature, the code for the Student Loan was copied, and parts which were not relevant were simply cut away. Altering the appropriate prompts, variables, and database accesses, was all that was required to implement the Student Append feature. This account of the development of Student Append is consistent with the system code: the resulting system code is virtually identical for those components common to both Student Append and Student. This account is also compatible with the prototyping practices (Ince 1988, 62-75; Crinnion 1991, 17-18) used in the development of ALABS. In fact we can characterise this kind of development practice in terms of system genres and/or the qualitative sequences used to characterise workpractices associated with information systems. To develop a new but related function for a system, (i) make a copy of the appropriate (generic or qualitative) sequence, (ii) remove those elements which is not needed, then (iii) modify any elements which need changing. Steps (i) and (ii) are referred to collectively as Generic Ablation due to the fact that we ablate or cut away from some existing sequence in order to create a new workpractice. Step (iii) is referred to as Generic Elaboration.

Table 3.7  Student Append Qualitative Element Inventory

<table>
<thead>
<tr>
<th>Code</th>
<th>Qualitative Elements</th>
<th>Function</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gq</td>
<td>Greeting</td>
<td>phatic initiation</td>
</tr>
<tr>
<td>RAq</td>
<td>Request Additions</td>
<td>request for additional items</td>
</tr>
<tr>
<td>IFq</td>
<td>Identification Found</td>
<td>search for Student ID Card by Labstaff</td>
</tr>
<tr>
<td>MOq</td>
<td>Materials Out</td>
<td>requested items to Student</td>
</tr>
<tr>
<td>Fq</td>
<td>Finis</td>
<td>phatic conclusion</td>
</tr>
</tbody>
</table>
3.3.5 *Staff Loan/Return Workpractice*

The ALABS Staff Loan/Return workpractice enabled items (software, hardware and manual) to be provided to personnel who had been identified as such to the system. Once a staff member had been introduced to the Labstaff, and the Yearly Staff Loans Form had been signed (see Appendix A2: Text J), a Staff Barcode was assigned to Staff member in the ALABS Barcode Book. The field associated with this workpractice involves academic Staff members requesting the loan of items from the Microcomputer Laboratories. The items may be software, manuals or hardware. The Labstaff member processes the request by recording the details of the loan using the ALABS Staff Loan
feature, see Table 3.4: 2.1.2. The tenor relationships associated with Staff Loans involved a hierarchical dyad where the Labstaff member was superordinate and the Staff member subordinate. Not surprisingly however, the social distance was somewhere between maximal or minimal, certainly closer to minimal than for other loan types involving Students or Tutors. This workpractice formed a service encounter as the role that language played (mode) was ancillary, accompanying the work, with active process sharing between the participants, who were involved in phonic, spoken language with visual contact.

Staff Loans (Table 3.2: 2.1.2) consisted of the qualitative element inventory provided in Table 3.8 and exhibited the staging provided in Figure 3.8. By convention, the phatic elements Greetings and Finis can be bypassed indicated by the dashed arcs in Figure 3.8. Following G, and the specification of the designated item by the Staff member SR, the Staff Barcode was located in the Barcode Book, CS. As a matter of policy, if the Staff Member did not have a barcode then they were directed to the Operations Supervisor. The Operations Supervisor would then explain the refusal of service and request that their department follows the procedure for introducing the Staff member to the facility. If the Staff member's barcode was located, it was scanned along with the requested materials, MO. By convention, this could lead to further instances of SR and MO. The Staff Loan may conclude then or following a phatic Finis element, F.
Table 3.8  ALABS Staff Loan Qualitative Element Inventory.

<table>
<thead>
<tr>
<th>Code</th>
<th>Qualitative Elements</th>
<th>Function</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gq</td>
<td>Greeting</td>
<td>phatic initiation</td>
</tr>
<tr>
<td>SRq</td>
<td>Service Request</td>
<td>request for loan services</td>
</tr>
<tr>
<td>CSq</td>
<td>Code Sought</td>
<td>search for Staff barcode in Barcode Book</td>
</tr>
<tr>
<td>RE2q</td>
<td>Regulations</td>
<td>Staff Regulations</td>
</tr>
<tr>
<td>E2q</td>
<td>Enrolment</td>
<td>enrolment of Staff member</td>
</tr>
<tr>
<td>MOq</td>
<td>Materials Out</td>
<td>items provided</td>
</tr>
<tr>
<td>Fq</td>
<td>Finis</td>
<td>phatic conclusion</td>
</tr>
</tbody>
</table>

Figure 3.8  ALABS Staff Loan Qualitative Digraph Version 1.

The field associated with Staff Returns involved Staff members returning previously borrowed items from the Microcomputer Laboratories. The items may in fact be extremely late, and the return may have been prompted due to the issuing of an Overdue Letter (see Appendix A2: Text K) to the Staff member concerned. The tenor relationship associated with Staff Returns was identical to those for Staff Loans, even if more than one Overdue Letter had been sent to the Staff Member. This workpractice formed a service encounter, as the role that language played (mode) was ancillary, accompanying the work, with active process sharing between the participants, who were involved in phonic, spoken language with visual contact.

Staff Returns (Table 3.2: 2.2.2) consisted of the element inventory provided in Table 3.9 and exhibited the staging provided in Figure 3.9. Following an optional phatic greeting
element G, the optional provision of lexis marking a Staff return RC, materials were returned MI, followed by the immediate completion of the workpractise or the enactment of an optional phatic Finis element F prior to completion. If the Staff Member did not return one or more borrowed items within two weeks, an Overdue Staff Letter was automatically printed by ALABS during the Daily Close Down procedure (Table 3.2: 5.1). An example of an Overdue Letter from ALABS Version 2 is provided in Text K of Appendix A2. As a consequence of additional usage, ALABS Version 2 provided Labstaff members with a screen based list of Overdue Staff Loans.

Transcripts are not available for either the Staff Loan and Staff Return in Version 1 of ALABS, and so they are represented using qualitative digraphs. However, the staging of both has been confirmed in an interview with the applications programmer. An examination of the system code for the Staff Loan and Returns confirms that these features have not changed from Version 1 through to Version 4. Transcripts are available for Version 4 and are described in §4.2.4, along with the creation of a new type of Staff Loan and Return called the Long Term Staff Loan and Return, described in §3.4.8.

Table 3.9 ALABS Staff Return Qualitative Element Inventory.

<table>
<thead>
<tr>
<th>Code</th>
<th>Qualitative Elements</th>
<th>Function</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gq</td>
<td>Greeting</td>
<td>phatic initiation</td>
</tr>
<tr>
<td>RCq</td>
<td>Request Completion</td>
<td>request return services</td>
</tr>
<tr>
<td>MIq</td>
<td>Materials In</td>
<td>items returned</td>
</tr>
<tr>
<td>Fq</td>
<td>Finis</td>
<td>phatic conclusion</td>
</tr>
</tbody>
</table>
3.3.6 Multiple Sequence Copying (Social Subjects): Tutor Loan/Returns

The Tutor Loan (Table 3.2: 2.1.3) and Tutor Return (Table 3.2: 2.2.3) features were both commissioned in Version 1 of ALABS and were both decommissioned in Version 4 of ALABS. Tutors were responsible for teaching classes, see §3.3.7. Tutor Loans/Returns enabled them to borrow items not related to their classes. Tutors were either full-time academic staff or appropriately qualified casual or part-time staff. At this time, the Laboratories served many different faculties and departments, and as many of these tutors were casual employees, it was likely that a given tutor would be unknown to the Labstaff member enrolling them. New Tutors were ‘introduced’ to the Microcomputer Laboratories by a responsible Academic known to the Labstaff. To facilitate this introduction, the Academic Unit for which the tutor worked supplied a completed Tutor Information Sheet (see Appendix A2: Text L). The new Tutor's details were the added to ALABS using the Add Tutor feature (Table 3.4: 3.4). Once the tutors details were recorded, a unique two-digit barcode was assigned to them in the Barcode Book, which resided at the service desk.

Unfortunately no transcripts were available for a detailed linguistic study of the ALABS Tutor features. However, it is still possible to infer Register details as well as reconstruct the staging that occurred within these service encounters. These Tutor workpractices
constituted service encounters in that the medium used to conduct them was phonic, spoken with visual contact. The language mode associated with them was ancillary, that is talk accompanying the work, with active process sharing between Tutors and Labstaff. For all intents and purposes, Tutors undertaking Tutor Loans and Returns are treated as Academic Staff not as Students or some other tenor configuration midway between the two. None-the-less, a hierarchical dyad exists between Tutor as subordinate to Labstaff members as superordinate. The reason this is the case is that in principal, the Labstaff are the providers of the goods and services but are also in the position of being able to refuse service. Unlike Students however, the social distance between Tutors and Labstaff is less than maximal.

The staging of these service encounters is exactly the same as that for Staff Members. The code for Tutor Loans possesses only minor differences compared to the code for Staff Loans. Similarly, the code for Tutor Returns possesses only minor differences compared to that of Staff Returns. These differences involve screen titles and prompts, and the database accessed in order to verify the existence of the requester as an enrolled Tutor. The staging of Tutor Loans can be represented by the diagram in Figure 3.8 with the qualitative element inventory identical to Table 3.8, while the staging of Tutor Returns can be represented by the diagram in Figure 3.9 and the qualitative element inventory of Table 3.9. According to the Programmer, these Tutor workpractices were developed by duplicating the code used to implement the Staff workpractices. From a systemic semiotic perspective, the programmer copied multiple sequences in order to construct a new social subject. Interestingly, the regulatory text of the Overdue Tutor Letter was similarly copied for the Staff workpractices. With the exception of loan
duration, this text is identical to the Overdue Staff Letters provided in Appendix A2: Text K.

An example of an Overdue Tutor Letter, derived from the LATETUT.PRG code that printed out individual letters, is provided in Appendix A2: Text N. A language analysis of this text is revealing. The letter contains does not contain any imperative clauses, rather a command is being modified to remind the Tutor of their obligations to the “proper functioning of the Microcomputer Laboratories”. In Text N, the resource of modulation, which is used to express obligation, necessity, and inclination associated with proposals (Eggins 1994, 189), is employed in a relatively complex fashion. An initially high degree of modulation in the basic process of “[return] these items promptly” is reduced by locating it in a subsidiary position in the clause following ‘that’ as in “[Therefore,] we ask...”. The politeness marker “please” in the second paragraph is not being used to reduce social distance so much as it is being used to reinforce the formal nature of tenor relations associated with this language situation. Interestingly, “please ring me...” is a kind of modulated command called a request, which can employ politeness markers to indicate formality (Collerson 1995, 39). This request also hints at a further reduction in the degree of modulation by stating that a phone call- a relatively informal spoken language situation- will be sufficient to negotiate an extension.

3.3.7 Class Loan/Return Workpractice

The Class Loan (Table 3.2: 2.1.5) and Class Return (Table 3.2: 2.2.5) features were both commissioned in Version 1 of ALABS and were both decommissioned in Version 4 of ALABS. The major role filled by Tutors was for teaching classes in the computer
laboratories during Supervised Laboratory Times. The two-digit barcode assigned to each Tutor as they were introduced to the system, see §3.3.6, was also used to provide the Tutor details during Class Loan and Return operations, as well as Tutor Loans and Returns. Prior to the start of their class, a tutor would pick up two or more boxes of disks and a Class Form, see Appendix A2: Text O. Each box contained ten disks. A tutor, who taught the COBOL programming language for example, would require twenty DOS disks and twenty compiler disks. Because all the Supervised Laboratory Times were pre-booked using the ALABS SUPERVISOR program (see Table 3:14: 8.1), the Labstaff would prepare boxes of disks in advance of the arrival of the Tutor at the service desk. Indeed, if a Tutor failed to show up for a class, the department could be contacted so that an interim tutor could be found. Alternatively, the Tutor could be contacted using the Home and Term Address details that were provided on the Tutor Information Sheet (Appendix A2: Text L).

Unfortunately no transcripts were available for a detailed linguistic study of the Class Loan/Return Workpractices. However, it was still possible to elicit information about the Class Loans and Returns, as well as recovering the qualitative staging of these service encounters from the system code. Both the Class Loan and Return features were aspects of ALABS formalised by the Manual System, see §3.2.2 and Figure 3.2, and were directly incorporated into ALABS when it was commissioned. As a consequence, the Class/Returns workpractice represents the largest migration of patterns of human communication from one system to another. Unlike all other ALABS workpractices that were conducted in a single material setting, an unusual aspect of the Tutor features was that they required two distinct material settings. The Tutor was required to borrow and return software items from the Service Desk, and to use these items within the teaching
laboratories. Tutors involved in Class Loans received both the Class sets of disks and a so-called Class Form (see Appendix A2: Text O). Once in a laboratory, the Tutor was required to record the student number and disks details on the Class Form, so that an audit trail could be maintained for the use of each disk. The recording of details on the Class Form by Tutors and the distribution of disks to students during a Supervised Laboratory Time formed a service encounter. This service encounter is referred to as the Lab Loan. At the end of a tutorial, the Tutor was required to collect all disks from students. This involved the Tutor ensuring that students initialed or ticked off the disks loaned to them on the Class Form, also constituting a service encounter referred to here as a Lab Return. Although no transcripts are available for either the Lab Loan and Lab Return service encounters, enough Labstaff members (including the author) and students were available to recover and reconstruct both the register description and the qualitative sequences for the Lab Loan and the Lab Return.

Despite the fact that methodologically we can only accord them the status of qualitative activity sequences, Class Loans, Lab Loans, Lab Returns and Class Returns are in fact service encounters. Tutor Loans and Returns occur within the Material Setting of the Service Desk while Lab Loans and Lab Returns occur within the Material Setting of the Laboratories themselves. The Class Form constituted a text as a shared material (Sørgaard 1988, 3) bridged two material settings. This text was the means by which Tutors acted as surrogate Labstaff members responsible for conducting manual Student Loans in teaching laboratories during Supervised Laboratory Times.
The *Class Loan* service encounter enabled Tutors to acquire class sets of floppy disks with which they could conduct previously scheduled Supervised Laboratory Classes in one of the teaching Laboratories. Tutors required at least two boxes of ten disks in order for a class to boot their machines. As the requests for these items occurred at predictable times, Labstaff members prepared the required boxes of software in advance, ready to be picked up by the Tutor. These boxes needed to consist of ten reliable copies of the correct type of software. Over the passage of an academic session, the Labstaff would become familiar with most of the Tutors and so often the social distance between them gradually reduced. As with Student Loans/Returns workpractice, a Class Form was prepared and signed by a Labstaff member. The Tutor took both the Class Form and the boxes of disks into the laboratory.

The Labstaff member recorded Class Loans using the Class Loan feature (Table 3.2: 2.1.5). Because the Microcomputer Laboratories staff could report late Tutors to the departments that employed them, a hierarchical dyad could be said to exist between the Tutor as subordinate and the Labstaff member as superordinate. Due to the manual preparation steps conducted by Labstaff, Class Loans could be done very quickly. Tutors were also able to jump the queue of students waiting to be served. The Class Loan Qualitative Element Inventory is provided in Table 3.10 and the associated Class Loan Qualitative Digraph is provided in Figure 3.10.
Table 3.10  ALABS Class Loan Qualitative Element Inventory.

<table>
<thead>
<tr>
<th>Code</th>
<th>Qualitative Elements</th>
<th>Function</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gq</td>
<td>Greeting</td>
<td>phatic initiation</td>
</tr>
<tr>
<td>MRq</td>
<td>Materials Request</td>
<td>request materials for class</td>
</tr>
<tr>
<td>IBq</td>
<td>Identification Barcode</td>
<td>search for Tutor’s barcode in Barcode Book</td>
</tr>
<tr>
<td>MPq</td>
<td>Materials Provided</td>
<td>Class Set and Class Loan Form to Tutor</td>
</tr>
<tr>
<td>Fq</td>
<td>Finis</td>
<td>phatic conclusion</td>
</tr>
</tbody>
</table>

Figure 3.10  ALABS Class Loan Qualitative Digraph Version 1.

Lab Loans and Lab Returns

The Lab Loan service encounter was conducted between the Tutor and Students at the beginning of a new laboratory session. The Class Form had columns for disk identification number, student name, and student identification number (see Appendix A2: Text O). Disks were provided to Students who wrote their Student Identification Numbers on the Class Form, together with the Disk Numbers of the Software items they were about to use. Students then used these software items in the laboratory. At the end of the class and prior to leaving the laboratories, the Lab Return service encounter was conducted between the Students and the Tutor. Students returned their software to the Tutor and initialed that they had done so on the Class Form. The qualitative staging of these service encounters is trivial and so the Qualitative Element Inventories and the associated Qualitative Digraphs are omitted.
Class Returns

On the completion of all the Lab Returns, the Tutor would complete the Class Form by ensuring that the sheet included the Tutor’s name, subject and a list of students and corresponding disks (using the disk number) which each student used during their Supervised Laboratory Time. A properly completed Class Form provided an audit trail for each disk. The Tutor would take both the completed Class Form and boxes of disks back to the service desk. They were responsible for returning all the disks and the Class Form to the service desk at the end of their class. A Class Return involved the Labstaff member checked that the same number of disks lent to the tutor had been returned, including any additional disks that may have been provided to the Tutor to replace any faulty disks previously provided. A hierarchical dyad typical of ALABS service encounters involved the Tutor as subordinate and the Labstaff member who were superordinate. Interestingly, despite this hierarchical, Tutors also acted as de facto Labstaff Members in that they extended the accountability of individual students into the material setting of the Teaching Laboratories. The Class Return Qualitative Element Inventory is provided in Table 3.11 and the Class Return Qualitative Digraph is provided in Figure 3.11.

Table 3.11 ALABS Class Return Qualitative Element Inventory.

<table>
<thead>
<tr>
<th>Code</th>
<th>Qualitative Elements</th>
<th>Function</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gq</td>
<td>Greeting</td>
<td>phatic initiation</td>
</tr>
<tr>
<td>IBq</td>
<td>Identification Barcode</td>
<td>search for Tutor’s barcode in Barcode Book</td>
</tr>
<tr>
<td>MBq</td>
<td>Materials Back</td>
<td>Class Sets and Class Loan Form to Labstaff</td>
</tr>
<tr>
<td>FCq</td>
<td>Form Check</td>
<td>Class Loan Form Check by Labstaff</td>
</tr>
<tr>
<td>Fq</td>
<td>Finis</td>
<td>phatic conclusion</td>
</tr>
</tbody>
</table>
The Class Loan, Lab Loan, Lab Return and Class Return service encounters were always undertaken under tight time considerations. Tutors were concerned with getting their boxed sets of disks quickly so that they could get their classes started. This meant having to battle with students at the Service Desk who were also waiting in line to undertake Student Loans. Knowing the timetable meant that the Labstaff could organise, sort, and package, boxed sets of disks stacking them together with Class Forms in readiness for tutors. Once the tutors completed the Class Loan service encounter (see Figure 3.10), they would go to their teaching Laboratory and start undertaking Lab Loan service encounters with their students. Lab Loans required perhaps as much as ten minutes at the beginning of each two-hour Supervised Laboratory period. Students would line up at the desk at the front of a class, write their student identification number on the Class Form, pick out one or more disks from the class sets of disks, record the disk numbers on the form, and return to their computer. Early on in the session students would also use their student cards as a means of identifying themselves to the tutor. Lab Returns involved students returning disks to the Tutor, searching for their name on the Class Form and ticking it or otherwise marking it, in order to indicate that they have returned all software items. This was generally a hasty process, since both the students and the tutors are eager to conclude it. Students occasionally ticked the wrong name, which could ruin the audit trail of the Class Form. Disks were often placed into incorrect boxes by tutors. Having completed the Lab Returns, that is retrieved all the loaned items.
from students, the tutor was required to undertake a *Class Return* at the Service Desk, that is provide all boxed sets of disks and the Class Form to the Microcomputer Laboratories (see Figure 3.11).

The success of a Class Return depended on the successful completion of the Lab Return, Lab Loan and Class Loan that preceded it. Tutors relied upon Labstaff to provide them with the correct *type* of disks, the correct *number* of disks, at the appropriate level of *quality* (zero defects or no faulty disks). If one or more of the disks provided during the *Class Loan* were faulty, then delays would occur in the Supervised Laboratory class. Students would be required to move to another machine. Alternatively, students might exchange disks between themselves, in case it is the combination of problems with the disk and drive. These situations increased the likelihood of erroneous attribution of disks to students. On occasion, Tutors were forced to leave their classes to exchange faulty disks at the Service Desk (shift material setting). This situation increased both the likelihood of erroneous attribution of disks to students, as well as the possibility of mislaying any additional disks brought into the Laboratory by the Tutor after the Class Loan had taken place. Labstaff members also required vigilance because the additional disks needed to be accounted for during the Class Return. Furthermore, if the *Lab Loan* service encounter is not correctly recorded on the Class Form, either by student number, disk number or both, then the effectiveness of the *Lab Return* and *Class Return* would be compromised.

The Class Loan/Return service encounters comprise a very interesting workpractice. In effect these highly interrelated service encounters can be thought of as *nested service encounters* which span two material settings. These nested service encounters make
problematic the drawing of automation boundaries in a traditional systems analysis of an existing system. From a systems perspective, it is only the Class Loan and Class Return operations that would be explicitly specified. In effect an automation boundary would be drawn separating the material setting of the Laboratory from the material setting of the Service Desk. The Class Form would not be seen as a shared material but rather as data which was only visible at the time the Class Loan is started, and at the time the Class Return is concluded. However, from a Systemic Semiotic perspective no automation boundary exists at all, the workpractice consists of four service encounters.

Higher level organisations of genre such as the nested service encounters of the Class Loan/Return workpractice, which occurred in both the Manual System and ALABS, have not been previously identified or described in the systemic functional genre literature. Service encounters studied in the systemic functional linguistic literature are always represented as discrete and isolated entities. In part, this is a consequence of undertaking studies that only involve single texts types. Examples of studies involving isolated genres include the commercial service encounter genres examined by Ventola (1987), studies which emphasise linguistic-methodology, for example the linguistic identification of genre elements in texts (Tebble 1993), or studies which concentrate on teaching and advocating genre analysis (Hasan 1985; Eggins 1994). Interestingly, these higher-level genre structures appear to be common in relation to organisational workpractices and the information systems that support them. Augmented by a translinguistic account, this workpractice demonstrates the extension of ALABS into other material settings that the system cannot directly control, by means of communicatively organising materials and discursively positioning users within the
workplace. This is a case of *indirect integration* of workpractices, demonstrating centripetal forces that produce monologic situations (Bakhtin in Todorov 1984).

3.4 ALABS Features Versions 2/3: Diachronic Expansion

Versions 2 and 3 of ALABS correspond to a period of diachronic expansion and refinement of the features supported by the system. As the facility became known on campus, students increasingly brought their own software to use at its machines. These users did not need to go to the service desk to get items. Short of a physical inspection, ALABS could not reliably report on the number of available machines in a laboratory. So as to have an accurate record of the actual number of students in a given laboratory, ALABS Version 2 introduced the *Labpass*. A Labpass was a colour-coded card that uniquely identified a machine in a specific laboratory. When undertaking a loan, a Labpass was provided to each user along with the software that they required. When undertaking returns, users returned both the items that they had borrowed and the Labpass. The development of these features in Version 2 enabled the instigation of rules that prohibited students from using their own software (games for example) at the Microcomputer Laboratories. Only a student who had gone to the service desk was allowed to use the machines since only they had a Labpass. Staff would regularly patrol the laboratories to ensure that only students with Labpasses were using the computers, and that Labpass holders were at their designated machine and in the correct laboratory. The creation of Labpasses necessitated adding elements to Student Loans and Student Returns, see §3.4.1 and §3.4.2 respectively.
Version 2 also saw the addition of new systems features. Interestingly these new features involved the elaboration of the existing Student Loan workpractice. To permit students to work longer than the two-hour limit of Loans, Student Loan Renewals were created, see §3.4.3. In order to redistribute students across different teaching laboratories, Student Moves were created, see §3.4.4. As the use of the facility increased, Students were provided with the ability to book a machine for future use, see Student Bookings in §3.4.5. Versions 2 and 3 are combined into one section since for the most part Version 3 simply adds operational support features like MEMOs, described in §3.4.7, and Statistics features which are not considered in this chapter.

3.4.1 Element Pasting (Proxemics): Student Loans

Labpasses were introduced in Versions 2 and 3 of ALABS in order to be able to keep track of the actual numbers of students using machines in the facility. As a consequence the Student Loan of Version 1 needed to be modified with the additional element Labpass Out so that this additional item could be supplied at the time a Student Loan initially took place. A comparison chart is provided in Figure 3.12, which shows the Student Loan Genre Digraph for this version of ALABS (b) contrasted against the qualitative staging of the previous version of this workpractice (a). The additional genre element and the new arcs that link it to its predecessor and successor elements are emphasised.
Figure 3.12 Comparison Chart showing (a) the ALABS Student Loan Qualitative Digraph of Version 1 from Figure 3.5b, and (b) the subsequent Pasting of Element LO to form the ALABS Student Loan Genre Digraph of Versions 2 and 3.

A transcript that conforms to the staging of Figure 3.12b is provided in Appendix A2: Transcript A. A description of this transcript was provided in Clarke (1996) and is reproduced here because it describes a number of unusual properties. With reference to Transcript A, it is abundantly clear to the Labstaff member that the Student is completely unfamiliar with the University, the Microcomputer Laboratories and indeed their own course. The Labstaff member spends a considerable effort attempting to realise the Service Request element. Labstaff members used their experience to apply a number of surrogates for software in order to determine what the Student might need. These surrogates include subject identification (Lines 3-4), lecturer (Lines 5-6),
department (Lines 7-10) and subject offerings (Lines 11-16). Interestingly, these surrogates are sequenced by the Labstaff member in decreasing order of specificity. A subject identification would precisely determine what software was required. The Labstaff member attempts this tactic first. The inability to realise SR by using a subject identification surrogate (Line 4) leads to the use of a second tactic, an attempt to determine the lecturer. A lecturer may teach more than one subject per session, so this is clearly less useful than subject identification. The inability to realise SR by using a lecturer surrogate (Line 6) leads to the use of a third tactic, an attempt to determine the department. This is eventually successful (Line 10) and the Labstaff member uses their knowledge of subject offerings in the current session to identify the subject and therefore the required software (Line 17). At this point the Service Request element is fully realised. The use of surrogates as a tactic to realise this element exemplifies what Hasan (Halliday and Hasan 1985, 66) refers to as repairs. The resolution of this element in Transcript A demonstrates the remarkable degree of familiarity that experienced end-users would routinely draw on in the operations of the facility. This type of language activity is suggestive of ways to enhance the functionality of the system to directly support, for example, novice end-users of ALABS. This is precisely the type of activity that should be of interest to systems analysts and designers, and which is completely unavailable to them when using traditional analysis methods.

Once the Service Request element is fully realised the participants engaged in the Student Loan genre can advance to the next element Identification Sought. In Lines 18-21, this element would be considered as ‘obligatory’ and therefore genre defining according to Hasan (Halliday and Hasan 1985), but for the purposes of discussion here, it is considered to be an element with a high probability of occurrence, refer to §3.3.1.
The significance of this element is made very clear to the Student in Line 19. This is evidence of the ‘visibility of genres’ (Freadman and MacDonald 1992, 8), that is, genres must be visible to participants in order to be effective. Reflection upon each of the stages in the text is a dominant aspect of this particular transcript and occurs at almost every element. The Student unfamiliar with the Conditions of Loan form (see Appendix A2: Text I) requests a clarification of the Regulations element in Lines 29-35. The difference between Regulations and Enrollment elements is made apparent to the Student at Lines 35-36. The Student has the purpose of the Labpass explained to them in Labpass Out element at Lines 37-40.

In addition, there are another two points in Transcript A where the Student asks for information concerning the procedures at the Laboratories. In the Identification Sought element the student is required to hand over their Student Identification Card. After asking what happens to their card, a reasonable question given the function of this element, the Student asks whether they can take the software home in Lines 24-25. The Labstaff member answers the question (Line 25), but in order to prevent any more time-consuming questions, the Labstaff member counters with a question of their own (Line 26). It would have been obvious to the Labstaff member that this Student had never borrowed software. The question (Line 26) is asked in order to start the Regulations element of the Student Loan genre. In order to facilitate the smooth progression of the genre, the Labstaff member employed a tactic which Hasan (in Halliday and Hasan 1985, 66) refers to as a *re-align*, the purpose of which is to bring “...a wandering participant back to the business at hand”. After the completion of the Materials Out element, the student asks a series of questions to clarify the laboratory regulations, particularly loan duration, renewals and the use of the Labpasses. The Labstaff member
attempts to draw the genre to its conclusion by using a rising intonation at the end of responses in Lines 46 and 48.

3.4.2 Element Pasting (Proxemics): Student Returns

Using the Student Return Qualitative Digraph of Version 1 as a baseline (Figure 3.13a), the Student Return Qualitative Digraph for Versions 2 and 3 (Figure 3.13b) shows the addition of the element Labpass In. The purpose of this element is to recover the Labpass used to assigning a Student to a location, a specific machine within a Teaching Laboratory. The development of this version of the workpractice constitutes a proxemic modification to the Student Return of Version 1. The additional element and the new arcs that link it to its predecessor and successor elements are emphasised in Figure 3.13b. The other elements of this digraph are identical to those described in Table 3.4. The existence of Labpass In was directly confirmed in interviews with the current Operations Supervisor and by the recollections of the author. Indirect confirmation of this element is provided by the Labpass Out element of the Student Loans Genre Digraph in Versions 2 and 3, see Figure 3.12. In effect the Labpass In is a ‘mirror image’ of the Labpass Out element of the Student Loan described in §3.4.1. In the next chapter, these ‘mirror image’ elements are given the name of structural complements in §4.2.3 and provide fundamental insight into the diachronic change of workpractices associated with systems features. Given that there is no function to print replacement Labpasses, it can be asserted that Labpass In was a permanent feature in this version of the Student Returns workpractice of ALABS.
Figure 3.13  Comparison Chart showing (a) the ALABS Student Return Qualitative Digraph of Version 1 from Figure 3.4, and (b) the subsequent Pasting of Element LI to form the ALABS Student Return Qualitative Digraph of Versions 2 and 3.

The location of Labpass In on the digraph was a matter of convenience for the programmer and likely reflected the importance placed on recovering the items by the Microcomputer Laboratories. This is indicated by the prominent position of the Material In element along the base line, prior to the occurrence of most other elements. Usually, it is only after the items have been recovered that the Identification Returned stage is enacted, indicated by its occurrence after the Materials In element on the base line sequence.
3.4.3 Sequence Elaboration (Chronemics): Student Loan Renewals

The Student Loan Renewal (Table 3.4: 2.1.7) feature was introduced to permit students to renew items already loaned to them which had become overdue, or were about to become overdue. The default length of time for an item loaned to a student was two hours, as set by the Change System Parameters (Table 3.4: 3.2). During high usage periods, the demand for specific software items could be acute. This was particularly the case when assignment deadlines were looming for large subjects. So that students could potentially work for longer than two consecutive hours, while also preventing attempts to monopolise software items, students were expected to undergo Student Loan Renewals.

Labstaff were required to follow a set of daily, weekly, sessional and yearly procedures to ensure the correct functioning of ALABS. Some procedures were technical; others directly associated with workpractices. Daily procedures required that Trainees and the Laboratory Assistant regularly "[t]our the laboratories... [and] in peak demand periods ensure that no student spends in excess of two hours on a computer" (Clarke et al 1989, v). During peak periods, Labstaff would select the Overdue Student Loans (Table 3.4: 2.3.7) feature to determine who was late. They would then locate the Student Identification Cards for these late borrowers, tour the Laboratories to find these students. Students were requested to either renew their loan or return all borrowed items and leave the facility. Student Renewals could be granted to those students who where late and who requested one, when approached by Labstaff in a laboratory during peak periods of activity. In this case, Overdue students were asked to accompany the Labstaff member to the Service Desk, where the borrowed items would be reentered into ALABS. The student would then return to the Laboratories and continue working with
these items. In practice, if the items borrowed by a student were in demand, then any extensions to loans involving scarce items could be refused. Students refused the option of a Student Renewal were usually required to immediately undertake a Student Returns service encounter, as specified in condition 6 of the Conditions of Loan form (see Appendix A2: Text I). Student Renewals were generally granted only to those students who were late, when demand in the Laboratories was low.

The qualitative element inventory (Table 3.12) and the Student Renewals qualitative digraph in Figure 3.14b are superficially similar to a Student Append service encounter shown in Figure 3.14a. Upon the request for a Renewal of Loan, the Labstaff member locates the specific Student's Identification Card already available at the Service Desk from the initial Student Loan, and then reenters the barcode into the system. The loan is re-recorded with a new start time and the old loan record details are deleted. An interesting aspect of this workpractice is that Students were not required to hand over their items and Labpass for rescanning to the system. This was no doubt a consequence of keeping the code as simple as possible, allowing ALABS to retrieve and adjust the stored chronemic data (time stamp) for the loan. The level of disruption that could result in Students having their work 'interrupted' by a Labstaff member 'requesting' that they Renew a Loan, meant that it was not advisable to embed additional surveillance practices into this workpractice. In any case the student would be dealt with, if necessary, during the Student Return.
Table 3.12: ALABS Student Renewal Qualitative Element Inventory.

<table>
<thead>
<tr>
<th>Code</th>
<th>Qualitative Elements</th>
<th>Function</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gq</td>
<td>Greeting</td>
<td>phatic initiation</td>
</tr>
<tr>
<td>RLq</td>
<td>Renewal of Loan</td>
<td>request for loan renewal</td>
</tr>
<tr>
<td>IFq</td>
<td>Identification Found</td>
<td>search for Student ID Card by Labstaff</td>
</tr>
<tr>
<td>Fq</td>
<td>Finis</td>
<td>phatic conclusion</td>
</tr>
</tbody>
</table>

Figure 3.14: Comparison Chart showing (a) the Student Append Qualitative Digraph of ALABS Version 1 from Figure 3.7b, and (b) the dependent qualitative sequence representing ALABS Student Renewals.

3.4.4 Sequence Elaboration (Proxemics): Student Move

Student Moves were required when students had to be relocated from one laboratory to another in the facility. This situation occurred if Students were still within their current loan period, but their laboratory was about to be used for a Supervised Laboratory Time, and space in another appropriate Laboratory was available. As the facility supported a
variety of platforms, an appropriate Laboratory was one in which the same software
could be used. Students ‘kicked out’ of a laboratory by a Tutor would end up back at the
Service Desk to either enter into a Student Return service encounter or a Student Move
service encounter. To conduct a Student Move, the Labstaff would select the Swap Lab
Pass (Table 3.4: 2.1.8) feature of ALABS. They would locate the student’s identification
card previously stored from an initial Student Loan, and then rescan and retain it. They
would then retrieve the students current Labpass, scan and retain it, find a new Labpass
for a different laboratory consisting of the same machines as the previous laboratory,
and then scan the new Labpass and provide it to the student.

The qualitative elements associated with Student Moves are provided in Table 3.13. A
Student Move is a dependent service encounter in that it relies upon the enactment of a
prior Student Loan workpractice. Other examples of dependent service encounters are
the Student Appends described in §3.3.4 and the Student Loan Renewals described in
§3.4.3. A Student Move comprises most of the elements found in a Student Loan and so
the qualitative staging of the former in Figure 3.15b, is compared to the genre digraph of
the latter in Figure 3.15a. Examination of the Student Move qualitative sequence shows
that students were not required to hand over their items for rescanning into the system.
This was probably a consequence of keeping the code as concise as possible, allowing
ALABS to simply retrieve and rewrite the stored proxemic data (Labpass) associated
with their loan. As with the Student Loan Renewals, the level of disruption to Students
having their work ‘interrupted’ by Tutor ‘insisting’ that they move to another
Laboratory, meant that it was neither ‘efficient’ nor advisable to embed additional
surveillance practices into this workpractice.
The current Operations Supervisor recalled that the Student Move workpractice often angered students. This was especially the case as the facility usage had increased to the point where it was often difficult to reassign students to available Teaching Laboratories where they could continue their work. Unlike Student Loan Renewals, Student Moves meant that students might be assigned to a machine that did not work properly with the floppy disks they currently had on loan. Labstaff members would simply remind belligerent students that it was their responsibility to plan their time in the facility. The main notice board as well as the teaching laboratories had timetables showing the Unsupervised Laboratory times and those Supervised Laboratory times reserved for particular classes. A separate program called ALABS SUPERVISOR enabled these timetables to be produced. The system features supported by ALABS SUPERVISOR are listed in Table 3.14. According to Clarke et al (1989), this program provided those options that were not required for the day-to-day running of ALABS. The program contained commands that were destructive (Table 3.14: 1-3 inclusive and 6). Also included were commands which took a long-time to execute (Table 3:14: 5, 7), or commands which were best kept separate from the main system because they involved sensitive data (Table 3.14: 11, 14) or are only occasionally required (Table 3.14: 4, 8-10 inclusive, 12-13).

**Table 3.13:** ALABS Student Move Qualitative Element Inventory.

<table>
<thead>
<tr>
<th>Code</th>
<th>Qualitative Elements</th>
<th>Function</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gq</td>
<td>Greeting</td>
<td>phatic initiation</td>
</tr>
<tr>
<td>RMq</td>
<td>Request Move</td>
<td>request for change to assigned location (machine in lab)</td>
</tr>
<tr>
<td>IFq</td>
<td>Identification Found</td>
<td>search for Student ID Card by Labstaff</td>
</tr>
<tr>
<td>SLq</td>
<td>Swap Labpass</td>
<td>scan and exchange old Labpass for new Labpass</td>
</tr>
<tr>
<td>Fq</td>
<td>Finis</td>
<td>phatic conclusion</td>
</tr>
</tbody>
</table>
Figure 3.15: Comparison Chart showing (a) the Student Loan Genre Digraph of ALABS Versions 2 and 3 from Figure 3.12b, and (b) the dependent qualitative sequence representing ALABS Student Moves.
Table 3.14: ALABS SUPERVISOR functions (after Clarke et al 1989, 1-36).

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Erase Student Data Base</td>
</tr>
<tr>
<td>2.</td>
<td>Erase Tutor Data Base</td>
</tr>
<tr>
<td>3.</td>
<td>Delete A Staff Member</td>
</tr>
<tr>
<td><strong>4.</strong></td>
<td><strong>View Deleted Library Records</strong></td>
</tr>
<tr>
<td>4.1</td>
<td>Software Records</td>
</tr>
<tr>
<td>4.2</td>
<td>Hardware Records</td>
</tr>
<tr>
<td>4.3</td>
<td>Audio-Visual Records</td>
</tr>
<tr>
<td>5.</td>
<td>Batch Print Student Sessional Borrowings</td>
</tr>
<tr>
<td>6.</td>
<td>Delete Student Sessional Borrowing File</td>
</tr>
<tr>
<td>7.</td>
<td>Check And Reindex Data Bases</td>
</tr>
<tr>
<td><strong>8.</strong></td>
<td><strong>Alter Or Initialize Laboratory Bookings</strong></td>
</tr>
<tr>
<td>8.1</td>
<td>Edit Laboratory Bookings</td>
</tr>
<tr>
<td>8.1.1</td>
<td>Apple Lab 1</td>
</tr>
<tr>
<td>8.1.2</td>
<td>Apple Lab 2</td>
</tr>
<tr>
<td>8.1.3</td>
<td>Sperry Lab 1</td>
</tr>
<tr>
<td>8.1.4</td>
<td>Sperry Lab 2</td>
</tr>
<tr>
<td>8.1.5</td>
<td>Sperry Lab 3</td>
</tr>
<tr>
<td>8.2</td>
<td>Initialize Laboratory Bookings</td>
</tr>
<tr>
<td>8.3</td>
<td>Plot Laboratory Timetables</td>
</tr>
<tr>
<td>8.3.1</td>
<td>Plot Apple Lab Timetable</td>
</tr>
<tr>
<td>8.3.2</td>
<td>Plot Sperry Lab Timetable</td>
</tr>
<tr>
<td>8.3.3</td>
<td>Plot Blank Apple Lab Timetable</td>
</tr>
<tr>
<td>8.3.4</td>
<td>Plot Blank Sperry Lab Timetable</td>
</tr>
<tr>
<td>8.4</td>
<td>Change Session Name File</td>
</tr>
<tr>
<td>8.4.1</td>
<td>Session 1</td>
</tr>
<tr>
<td>8.4.2</td>
<td>Session 2</td>
</tr>
<tr>
<td>8.4.3</td>
<td>Summer Session</td>
</tr>
<tr>
<td><strong>9.</strong></td>
<td><strong>Add Or Delete Terminal Bookings</strong></td>
</tr>
<tr>
<td>9.1</td>
<td>View/Delete Terminal Bookings</td>
</tr>
<tr>
<td>9.2</td>
<td>Add Terminal Bookings</td>
</tr>
<tr>
<td><strong>10.</strong></td>
<td><strong>Print Laboratory Timetables</strong></td>
</tr>
<tr>
<td><strong>11.</strong></td>
<td><strong>Print Lab Staff Software Listing</strong></td>
</tr>
<tr>
<td><strong>12.</strong></td>
<td><strong>Print Staff Software Listing</strong></td>
</tr>
<tr>
<td><strong>13.</strong></td>
<td><strong>Change Operations Supervisors Name</strong></td>
</tr>
<tr>
<td><strong>14.</strong></td>
<td><strong>Student Black Book</strong></td>
</tr>
<tr>
<td>14.1</td>
<td>Add Student To Black Book</td>
</tr>
<tr>
<td>14.2</td>
<td>View Black Book</td>
</tr>
</tbody>
</table>
3.4.5 *Sequence Elaboration (Chronemics): Student Booking*

As with Student Moves, Student Bookings were also commissioned in ALABS Versions 2 and 3 as a response to growing demands on the facility. As can be seen in Appendix A1, the demands for Unsupervised Student Loans were considerable. Student Bookings in effect provided students with a guarantee of a reserved machine in a laboratory for a specific time slot. As Student Bookings placed considerable stress on the operations of the facility, they were only provided during known periods of high demand, for example when the assignments for large classes were due. The ALABS SUPERVISOR feature called ‘Add or Delete Terminal Bookings’ (see Table 3.14: 9) was used to create or remove laboratory terminal bookings. The Laboratory Assistant decided if bookings were required and for which dates and laboratories using the ‘View/Delete Terminal Bookings’ feature (Table 3.14: 9.1).

Once initialised using the ALABS SUPERVISOR program, actual Bookings were conducted using the ‘Book Terminals’ feature (Table 3.2: 2.8). Students were permitted to book machines one day in advance on weekdays and two days in advance on weekends. If this menu option was selected, while bookings were not in effect, ALABS simply redisplayed the Loans/Returns Menu (Table 3.2: 2). If bookings were in effect, the system required the Student’s barcode. If the student requesting the booking was not enrolled on the system, the student was enrolled as per the Student Loan workpractices. This was the only other workpractice to have enrollment elements. It provides a glimpse into the time pressures and frayed nerves that surrounded this workpractice that it was less stressful to Students and Labstaff to immediately enroll rather than to enter into an unwanted Student Loan in order to be registered on ALABS. The inclusion of
enrollment elements also indicates that a significant number of students did not work outside of their allocated Supervised Laboratory Times, until their assignments were due.

After the student was identified, the system displayed a list of laboratories, days and dates for which bookings could be taken. On selecting a laboratory, the system displayed the appropriate laboratory-booking screen. This provided a spreadsheet-like screen display showing one-hour time periods (down rows) for the twenty machines available in the laboratory (across columns). At the intersection of a row and a column, a specific machine might be free in which case it could be booked by a Student. Alternatively, a time slot (an entire row) might be closed, that is reserved for a class. The name of the class that had reserved the timeslot was provided on the right-hand side of the screen. ALABS would not allow student bookings in closed time slots because the timetable details have been previously entered using the ALABS SUPERVISOR option called ‘Edit Laboratory Bookings’, see Table 3.14: 8.1. These timetable details were removed at the end of each semester using the ‘Initialise Laboratory Bookings’ option, see Table 3.14: 8.2. Machines might also be classified as unsupervised. In this case, machines were actually allocated to a subject and only students enrolled in that subject were able to book them. Finally, a specific machine might be booked indicating that a student had already reserved it, in which case the Students name and number appear on the screen.

To book a machine, the Labstaff member toggled a machine that was either free or unsupervised. The student’s details were then associated with the machine. Students could also request that a previous booking should be deleted. A find option allowed Labstaff to find all the bookings the current student had made on the booking database.
A lab option enabled the bookings in other laboratories to be scanned, which was especially useful when the number of booked machines was high. In peak demand periods, the Labstaff member could simply keep the ‘Edit Terminal Bookings’ on the screen and enter another student's booking using the next option without returning to the Loan/Return menu. Labstaff members could insist that only those students requiring bookings would be served first and the ‘next’ option facilitated the processing of these students. Students requiring other services, Student Loans, Appends, Renewals, Moves and Returns, would not necessarily be pleased by the extensive use of this option in the Bookings feature. The ALABS booking feature is complex in terms of code, as indicated by the description above which has been derived from the available documentation (Clarke et al 1987, 152-159).

A register description was recoverable from interviews with the current Operations Supervisor. The Student Bookings share many of the register features normally associated with Student Loans. On reflection this is not surprising since it is through the enactment of this workpractice that future access to machines becomes yet another resource that can be negotiated. The field associated with this workpractice involved Students requesting future use of a machine. The primary social goal of this workpractice is the attempt to find a time-slot in an appropriate laboratory so that the student can undertake Unsupervised Laboratory activities. A secondary goal was to provide the highest packing of students in Laboratories during the available Unsupervised Laboratory times. Student Bookings were the only ALABS workpractice where Students could negotiate deferred access and use and so time references would signify this workpractice (see the discussion in §2.5). As was typical of ALABS service encounters, the tenor relationships formed a hierarchical dyad between Student and
Labstaff where the former was subordinate and the latter was superordinate. The social
distance between them was near maximal, a result that can be easily explained. One
could postulate a reduced social distance since no physical commodities were being
negotiated. But the reality of conducting Student Bookings was that Students were
generally harried due to assignment deadlines, and so were prone to being gruff with
Labstaff. Labstaff were often besieged by Students requesting Bookings, each of which
potentially required negotiations concerning available times and Laboratories. Trainees
were required to regularly patrol the Laboratories and ‘kick out’ those students who had
not got a current Labpass by requesting that all the users in a Laboratory should ‘hold up
their Labpasses’ (recall that they were colour-coded for each Laboratory). The very
decision to instigate Bookings provoked Student outbursts. This workpractice formed a
service encounter, as the role that language played (mode) was ancillary, accompanying
the work with active process sharing between the participants, who were involved in
phonic, spoken language with visual contact.

Using the documentation and the program and the code in BOOKCONS.PRG which
implemented the Edit Terminal Bookings feature, it is possible to recover the qualitative
element inventory in the Table 3.15 and the staging of the Student Bookings Qualitative
Digraph in Figure 3.16b. The staging of the Student Bookings is compared to that for
the Student Loan Genre Digraph of ALABS Versions 2 and 3 in Figure 3.16a, a
workpractice which it most closely approximates. The elements Greetings and Finis are
phatic and by convention can be bypassed indicated by the dashed lines in Figure 3.16b.
The Request Booking element which contains the first occurrences of temporal lexis,
functions in a similar fashion to the Service Request in Student Loans, see Figure 3.16a.
A major difference between Student Loans and Student Bookings is that while both
require Student Identification Cards (generally), the latter workpractice does not retain them. The broken comparison bar between Identification Sought in Student Loans and Identification Needed in Student Bookings signals this difference. In fact the author often encountered situations in which a student used their friend's card in order to reserve a machine in their absence. Operationally, this was not considered a problem from the point of view of Student Bookings. As mentioned previously, Student Bookings was the only other workpractice apart from Student Loans that enabled Students to be enrolled onto ALABS. For convenience, these elements are given the same labels as those used in the Student Loan workpractice. The second major difference between these workpractices is the Book Terminal qualitative element, the point in the service encounter where the Labstaff member operates the Edit Terminal Bookings screen as described above. The Book Terminal element of Student Booking is comparable to the Labpass Out element of the Student Loan. Book Terminal involves the allocation of future access whereas Labpass Out involves the allocation of immediate access. As neither materials are provided nor requests for additional items made, the Student Bookings workpractice simply terminates via a Finis element or the end of sequence symbol.

**Table 3.15:** ALABS Student Booking Qualitative Element Inventory.

<table>
<thead>
<tr>
<th>Code</th>
<th>Qualitative Elements</th>
<th>Function</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gq</td>
<td>Greeting</td>
<td>phatic initiation</td>
</tr>
<tr>
<td>RBq</td>
<td>Request Booking</td>
<td>request for machine booking</td>
</tr>
<tr>
<td>Inq</td>
<td>Identification Needed</td>
<td>student-id Card needed</td>
</tr>
<tr>
<td>REq</td>
<td>Regulations</td>
<td>student regulations</td>
</tr>
<tr>
<td>Eq</td>
<td>Enrolment</td>
<td>enrollment of student requestor</td>
</tr>
<tr>
<td>BTq</td>
<td>Book Terminal</td>
<td>find machine and book a <em>free</em> or <em>unsupervised</em> machine</td>
</tr>
<tr>
<td>Fq</td>
<td>Finis</td>
<td>phatic conclusion</td>
</tr>
</tbody>
</table>
Figure 3.16: Comparison Chart showing (a) the Student Loan Genre Digraph of ALABS Versions 2 and 3 from Figure 3.12b, and (b) the qualitative digraph representing ALABS Student Bookings.

3.4.6 Offence Lists: Disciplinary Procedures for Students

A rapid increase occurred in the types of servicing encounters that students could enter into with the Microcomputer Laboratories. In Version 1, the available service encounters of Student Loans, Appends and Returns were solely concerned with the provision and preservation of items held by the Microcomputer Laboratories. By Versions 2 and 3, the possible service encounters were expanded to include Student Renewals, Bookings and Moves. Student Renewals and Bookings involved a chronemic response to increasing Unsupervised Laboratory use by reducing the number of late Student Loans, and by increasing the utilisation of machines within laboratories. Student Moves involved relocating students to where machines were available, a proxemic response to increasing Supervised Laboratory Use. As a consequence of the increases in
Unsupervised and Supervised use by students, disciplinary procedures were deemed necessary. These disciplinary procedures which grew out of subsequent elaboration of the core Student Loan/Return workpractice, were maintained by regular policing of students by Labstaff trainees who were interpellated, following the concept of social subjectivity developed by Althusser (1977), by the Daily Periodic Operational Procedures (Clarke et al 1989, v).

An Offence Database feature (Table 3.2: 3.1) was commissioned in Version 2 of ALABS to record the so-called Offenses which necessitated the suspension of the Unsupervised borrowing privileges for a student. Once an offense had recorded using the Make an Offence function (Table 3.2: 3.1.1), ALABS would block the loans of items to the student outside designated tutorial times, for a specified period of time. The reason for an offense is also entered at the time the offense is raised. In general, offenses constituted breaches of Conditions of Use (see Appendix A2: Text H) which were posted in every Laboratory. Although no records could be recovered from the offense database OFFENCE.DBF, an example of an offense provided in the ALABS documentation was “eating in Sperry Lab 3” (Clarke et al 1989, 180), a clear breach of Condition 1. More generally offenses were raised when students left the facility without returning items, or who ‘lost’ a disk or a Labpass, any one of which would eventually produce a late condition (Table 3.2: 2.5).

While the ALABS Offence Database features were used for operational matters, there was unfortunately a need to have an additional layer of discipline for students who proved to be untrustworthy when using the Microcomputer Laboratories. The so-called Student Black Book was developed as part of ALABS SUPERVISOR, see Table 3.14:
14. The ALABS documentation provides "swearing at Lab Staff" (Clarke et al 1989, 34) as an example of the kind of reason that might lead to a Student being added to the Black Book. Other examples that could be recalled by Staff at the Facility included Students who where caught attempting to 'remove' equipment, or who had been disruptive in Laboratories. While the Programmer and Laboratory Assistant could add students to the Black Book, as Operations Supervisor at the time it was my responsibility to deal with extreme disciplinary cases, which were thankfully rare. When those Students requested resources or access to the facility they were simply refused. They were told to see their department head if they wanted to lodge a complaint, and on occasion these led to meetings with the head of a department or a relevant representative, the student and the Operations Supervisor. These meetings were often enough to scare the Student into complying with the regulations.

Accessing the BLAKBOOK.DBF database provided a surprise- there were 171 records. With the exception of one record which provided as a reason that a student "left the building with the Excelerator manuals", a reference to a computer aided systems engineering tool, all the remaining records sited the reason as the "late return of items". As almost none of these Black Book entries led to any disciplinary action taken by senior staff, we can conclude that Black Book entries were being used as a substitute for Offenses as a way of disciplining recalcitrant students. In practice, the difference between Offenses and Black Book entries was completely ambiguous. For those serious breaches, the distinction between Offenses and Black Book entries was basically a question of how long the Operations Supervisor could refuse service to a student at the University. Both features were used and both had their niche in the realisation of the social relations of power at the Microcomputer Laboratories. These are not simply
examples of surveillance as a social technology of power, which would constitute a standard sociological interpretation of these ALABS features. These features do not simply involve the regulation of individuals and social relations, as they constitute a fantasy of power. They involve the creation of a mode of supervision which is "no longer precisely a 'social' operation at all but an imaginary projection of codes, models, and cybernetic assemblages which, in the end, generate only the delusion of sociality" (Bogard 1996, 8).

3.4.7 Feature Reuse of MEMOs: Recording Renegotiated Student Loans

The MEMO feature in ALABS Version 3 (Table 3.4: 2.9) was added at the request of the Laboratory Assistant who wanted to use the system to assist in recording the movement of materials and items which could not be, or had not yet been, assigned a barcode. For example, some newly acquired items were immediately required by academics for teaching purposes. The feature derived its name from the 'memo field' used in dBASE II+ with which it was implemented. MEMOs demonstrate how a system feature can be used to renegotiate a workpractice, referred to here as feature reuse. Feature reuse occurs when a feature intended for some specific purpose, is used in an unorthodox manner to provide additional or novel system functionality, and represents an additional type of workpractice re-negotiation than those described above. One MEMO reuse was to record item details loaned to trustworthy students who did not have their student identification card at the time of borrowing. In principle, feature reuse of this kind may be considered by systems developers to be either as a gross violation of system use especially if it produces other technical side-effects for the system, or as a design feature if its use does not. If deemed useful by workers, a specific feature reuse
may enter into normal work procedures. Discussions with the former Laboratory Assistant and trainees indicated that this feature reuse did occur on a number of occasions.

3.4.8 *Multiple Sequence Copying (Social Subjects): Long Term Staff Loans/Returns*

ALABS Versions 2 and 3 marks an unusual event in the evolution of this system, the creation of a new set of workpractices by copying multiple existing sequences. It is noteworthy that the Staff Loans/Returns workpractices had not changed their structure in either Version 1 or 2/3 of the system. Yet while the structure of these workpractices was stable, their enactment caused considerable consternation amongst academic staff. Overdue Staff letters were generated each day by ALABS Versions 2 and 3 and issued the following day to staff members who had exceeded the loan period of two weeks. An example of an Overdue Staff Letter sent to the author is provided in Appendix A2: Text K. Recall the linguistic features of the Overdue Tutor Loan Letter described in §3.3.6. The Overdue Staff Loan letters, and consequently its linguistic features, are identical to the Overdue Tutor Loan Letter with the exception of the period of loan being two weeks for Staff rather than one week for Tutors. Despite the careful deployment of language features, Overdue Staff letters produced considerable hostility. Staff members felt that they should be able to borrow items they were using for teaching purposes for an entire session. This motivated the development of the so-called Long-term Loan and Return workpractices.

The easiest way to develop this new variant of the existing Staff member was to literally duplicate the Staff Loan and Return workpractices. This interpretation of the historical events, and the use of multiple sequence copying to develop these new workpractices,
was corroborated during interviews with the Laboratory Assistant. Further confirmation of that multiple sequence copying did in fact occur and that its purpose was to achieve identical qualititative staging comes from examining the differences between system features. The code for Staff Loans is contained in a routine called STAFFBAR.PRG and for Long Term Staff Loans the code is contained in PSTAFFBAR.PRG. Staff Returns code is contained in a routine called STAFFRET.PRG and for Long Term Staff Returns the code is contained in PSTAFFRET.PRG. STAFFBAR.PRG and STAFFRET.PRG share support routine called STAFFOUT.PRG, which tests to see if the staff member has any current borrowings, and if so lists them on the screen. Similarly, both PSTAFFBAR.PRG and PSTAFFRET.PRG share a support routine called PSTAFFOUT.PRG, which performs a similar function. In fact, apart from some cosmetic changes Staff Loans and Long Term Loans are identical, as are Staff Returns and Long Term Returns. Similarly, the support routines are identical, as is the structure of the respective databases used to store the Staff and Long Term transactions (respectively staftran.db and pstafout.db). Both sets of features use the same staff database staff_db. What is achieved socially as a result of this duplication of program code and databases is the replication of workpractices staging to be used in the creation of a new variant of the Staff social subject. The rapid prototyping of these additional sets of system features, served to reduce the production of late letters, and thereby limit the number of complaints to those staff who were late in returning items unrelated to their teaching functions.
3.5 Summary

This chapter described the development and diachronic expansion associated with Version 1 to Version 3 of ALABS. The contributions made to its workpractices from two previous systems were described, from the service encounters embedded within casual conversation which typified the Adhoc System through to the formalisation of these spoken language texts to written language texts which typified the workpractices of the Manual System.

Major ALABS system features were described and the most significant of these were analysed using the Systemic Semiotic Framework developed in Chapter 2. Where actual transcripts of spoken language service encounters were available, the Register features associated with the Context of Situation and the genre digraph of the schematic structure associated with Context of Culture were provided. Relevant written texts were also described although for the most part they utilise a single Regulatory Genre. Where actual texts were not available, the social activity was reconstructed by analysing the staging of the programs that implemented the system features. The staging of the programs enabled qualitative sequences and digraphs to be developed. The register features associated with these stages could be inferred from similar patterns available in other service encounters. Both the inferred register features and the qualitative sequences and digraphs were verified in meetings with the ALABS development team members and users, many of whom still work at the facility.

Systemic Semiotics proved to be a useful framework with which to understand the use of system features as texts in organisational contexts. The application of systemic
functional linguistics revealed inadequacies in traditional genre theory. Whilst the typical staging of workpractices can be described using schematic structures, explaining negotiated separations between the use of the system feature and the workpractice justified the inclusion of social semiotic theory. Furthermore, end-user development practices actively cut and paste what in traditional genre theory would be considered obligatory and therefore genre defining elements. Yet there was no evidence for any confusion on the part of any social subjects as to the nature of the newly redesigned and structural altered workpractices with which they were involved. Explaining these occurrences constitutes a major theoretical and methodological area of investigation for the next chapter.

Unexpected relationships involving generic/qualitative sequences and digraphs were discovered in this case study, including dependent service encounters, nested service encounters and indirect integration between workpractices conducted in different material settings. End user systems development practices could be accounted for by seeing the contribution that various system features provided developers as repositories of patterns of human communication, which were subsequently used as the basis for modeling new systems features. Various operations were identified which enabled modifications to be made to one or more sets of generic/qualitative sequences or digraphs. These included copying cutting, pasting and elaboration. Together with these structural accounts of diachronic changes to workpractices, one non-structural change in systems use- feature reuse- was also reported in this chapter.
Chapter 4: 
ALABS Contraction- Workpractice Assemblages

4.1 Introduction

The ALABS case study is continued from the previous chapter. In §4.2 significant features in ALABS Version 4 are described. This period in the end-user-development of the system corresponds to a period of contraction in the extent and significance of ALABS in the operations of the Microcomputer Laboratories.

In order to describe the diachronic changes in the system, it is useful to assemble the separate workpractice genre analyses, into a more comprehensive representation of the communicative patterns that the system was designed to promote. Several kinds of higher-level communicative patterns exist for ALABS, and are described in §4.3. Texts directly implicated in workpractices associated with systems, and those texts which are involved in discursively orchestrating workpractices (for example, policies and standard operating procedures), form what are termed here as Assemblages, see §4.3.1. ALABS consists of several Assemblages described in §4.3.2 through to §4.3.6 inclusive. Workpractices have been defined as consisting of texts and action, although action does not appear to play a major role in ALABS. However, several theoretical, methodological and substantive issues associated with action in ALABS are addressed in §4.4.

The effective decommissioning of ALABS is described in §4.5. By developing a representation of the constituent genres, workpractices, and assemblages for ALABS called a Genre Collection diagram in §4.5.1, several decommissioning tendencies become apparent. First, there was a tendency to replace core workpractices involving
texts with systems that do not require them, see §4.5.2. Second, there was a tendency to remove all proxemic action, replacing it with chronemic action, §4.5.3. Third, while ALABS system features have been all but excised from the operations of the Microcomputer Laboratories, the types of activities undertaken, and the types of participant roles designed to enact them still continue to be used within the facility. This 'persistence' of ALABS is described in §4.5.4.

In §4.6, the consequences of this diachronic case study for traditional models of genre are discussed. The implications of the case study for genre theory are briefly provided in §4.6.1. In order to account for the substantive findings of the dissertation, a new model of genre is proposed that permits a broader range of genre sequences to be considered as belonging to the same genre see §4.6.2. This model of genre is then applied to proposing a generic model of workpractice change in §4.6.3.

4.2 ALABS Features Version 4: Diachronic Contraction

Version 4 of ALABS corresponds to a period of contraction in the range of services provided by the system, and in the importance of the system as a whole for the Microcomputer Laboratories. At the time of writing (1999), while ALABS is still not completely decommissioned it is for the most part effectively decommissioned. The introduction in 1991 of ALABS Version 4 corresponded with the relocation of the Microcomputer Laboratories to a new facility located in Building 40, which unlike that of Building 20, was purpose-designed for the support of teaching in computer laboratories. Glass partitions enabled the Labstaff to see into most of the new Teaching Laboratories. The security concerns that motivated the development of Labpasses in Version 2/3 were no longer needed during Student Loans and Returns, accounting for the structural changes evident in the Version 4 workpractices described in §4.2.1 and
§4.2.2. The concept of *structural complements* is introduced in §4.2.3 to account for the end-user development practices that produced these changes. These changes also reduced the role, and consequently the number, of Trainees at the Laboratories. More significantly for ALABS workpractices however, were the substantial shifts in the economics and technology of resource provision. These shifts structurally altered the Student Loan/Return workpractices but also caused a drastic reduction in the number of Student Loan/Returns that needed to be conducted. These shifts also entirely removed the need for any Class Loans/Returns, and the role of a Tutor with respect to the system, see §4.2.4. The removal of Tutors affected other workpractices. Reducing the need to identify large numbers of teaching staff led to a consequential structural change in Staff workpractices described in §4.2.5, and resulted in a distinction being made between Normal and Long Term Staff Loans redundant, see §4.2.6.

Wholesale networking of Microcomputer Laboratories meant that the *software* loan/return texts formalised by various ALABS features became irrelevant to Labstaff, Staff and Students. The definition of what constituted a loan contracted, becoming synonymous with the loan of *manuals* to students and staff. Interestingly, this shift in the technology of resource provision actually increased the number of systems features that ALABS needed to provide. Students could only use network-based software if they had an account number. The Accounts features introduced in the Version 4 (Table 3.4: 6) enabled Labstaff to allocate account numbers to students. However, changes in enrolment procedure at the University meant that lists of enrolled students were digitally supplied to the Microcomputer Laboratories prior to the start of teaching sessions. As a consequence, the Accounts Features are generally used for enrolling late students, adding new staff, and changing the occasional password. The addition of this feature as an operational fix or corrective is referred to here as *dissipation*, a symptom of
diachronic contraction not system expansion. By the time Version 4 was made operational, software suppliers understood the value of the educational software market. Popular applications software was packaged into ‘student editions’ and often supported by third party documentation providers. Interestingly, despite being able to borrow manuals, and their prominent display in the Service Area, students are never told about the existence of this feature in the compulsory Microcomputer Laboratories Student Handbook. Consequently, Staff Loans/Returns of manuals form the bulk of ALABS activity, although department LANs and the Campus Area Network (CAN) reduced these to negligible levels.

4.2.1 Element Cutting: Student Loans

The provision of enrolment details in digital form from Student Administration meant that there was no further need for Regulations and Enrolment elements in the Student Loan Service Encounter of ALABS Version 4. These elements were cut from Student Loans. The relocation of the facility to premises that were designed for the external surveillance of most of the Teaching Laboratories from the Service Area meant that Labpasses could be abandoned. This resulted in the removal of the Labpass Out element from the service encounter. A comparison chart showing these changes is provided in Figure 4.1.
A typical Student Loan text conducted using Version 4 is provided in Appendix 2: Transcript B. As the wholesale networking of the facility had already taken place, the loans of software to students was not conducted with ALABS at the time this loan was undertaken. As a consequence, there was no ambiguity on the part of the Labstaff member as to what was required. The student clearly wanted a Microsoft project manual! The performance of this genre is so familiar to both parties, that there is an absolute economy in speech and action, the entire loan taking less than 20 seconds to complete. Note that apart from the Student stating what they want in Line 1, the remaining text is conducted non-verbally. Transcript B is typical of Student Loan service encounters with ALABS and conforms to the staging shown in Figure 4.1b. Due to the fact that we are dealing with service encounters, the phatic elements Greetings and Finis are included by convention. The second instance of Service Request occurs in
all other Student Loans and is supported by the software, but is often not realised as
evident in Transcript B due to the fact that loans generally consist of single items.
Consequently, Greetings, Finis and the second instance of Service Request are shown as
qualitative elements.

4.2.2 Element Cutting: Student Returns

The previous section described the cutting of the Labpass Out element from the Student
Loan as a consequence of relocating the Microcomputer Laboratories to a purpose-built
facility where surveillance was substantially improved. Consequently, the Labpass In
element of the Student Return genre was also necessarily removed. A comparison chart
which shows the changes in Student Returns from Version 2/3 to Version 4 is provided
in Figure 4.2.

The phatic elements Greetings and Finis are including by convention. The Request
Completion element is associated with an explicit verbal realisation, but in this
transcript the simple provision of the item in Materials In serves as a substitute for its
realisation. Consequently, Greetings, Finis, Request Completion, and the alternate
sequencing of Identification Return and Materials In provided below the base sequence,
are shown as qualitative elements in Figure 4.2b. This service encounter is realised
entirely non-verbally, but like the Student Loan in Transcript B, still follows the
elements of its genre. Non-verbal realisation of service encounters often indicates a
familiarity with the genre. The Microcomputer Laboratories staff member was a
permanent member of staff and was very familiar with the operation of system.
A Student Return text conducted using ALABS Version 4 which conforms to the staging shown in Figure 4.2b, is provided in Appendix A2: Transcript C. It is realised entirely non-verbally, but like the Student Loan in Transcript B, this transcript still conforms to the elements of its genre. Non-verbal realisation of service encounters often indicates a familiarity with the genre. The Labstaff member is also a permanent member of staff and is very familiar with the system. Student Returns in general are much more likely to be conducted non-verbally. All that a Labstaff member needs in order to resolve the existence of a Request Completion element, and therefore that a Student
Return is appropriate, is to be able to identify that the participant is a Student and to see that they are laden with Microcomputer Laboratories items.

4.2.3 Structural Complements: Co-variation in Systems Features over Time

In relation to ALABS, changes to the inventory of genre elements in service encounters like Student Loans and Returns do not occur independent of other genres in the same workpractice. This represents a finding that has not been previously reported in the systemic literature. A workpractice, hypothesised in Chapter 2 as consisting of a discursively organised collection of texts and actions, acts to constrain the kinds of modifications that might otherwise reasonably be made at the level of individual genres and qualitative digraphs. An example which demonstrates the co-variation of system features over time is the addition in ALABS Version 2/3 of both a Labpass Out element in the Student Loan genre and a Labpass In element in the Student Return genre. If the variation to genres over time were limited to single genres, then a reasonable modification that would enable students to be assigned to computers in laboratories, would be the creation of a hypothetical 'labpass ticket'. This kind of ticket would be similar to the one-use-only tickets generated at entertainment venues such as cinemas and would be valid for the duration of an individual transaction. The creation of a 'labpass ticket' element for a Student Loan in ALABS Version 2/3, would leave the Student Return genre structurally unaltered. There are several obvious reasons why such an approach was not used in ALABS. There is an obvious waste in terms of materials and time associated with production of one-use-only tickets. Also unlike cinemas, which allow access to a specific event (a movie) in space (the theatre) and time, a Labpass only provides access to space- a laboratory (and incidentally a machine). Additionally, students must return to the Service Desk to collect their Student
Identification Cards and return borrowed items, and consequently no additional effort is required by them in order to return a Labpass.

The structural co-variation of service encounter genres in the Student Loan/Return Workpractice is obvious across all ALABS versions. Using the Student Loan and Return genres of ALABS Version 1 as a benchmark, Version 2/3 sees the pasting of a Labpass Out element in the Student Loan genre and the pasting of a Labpass In element to the Student Return genre. Note that the function of the Labpass In element can be considered a complement of the Labpass Out element. In addition, the location of the elements within their respective genres is structurally similar. For example, the pasting of the Labpass In element occurs after the Identification Sought element, but prior to any materials being handed out to the student, while the pasting of the Labpass In element occurs as the last possible non-phatic stage. For this reason, the Labpass Out and Labpass In elements are referred to here as structural complements. Other elements in these genres that form structural complements include Identification Sought and Identification Returned, and Materials Out and Materials In. It is important to note that there is no a priori requirement to paste some of these elements where they were are located; Labpass In need not be the last non-phatic element in the Student Return. It is more a question of convenience for the end-user programmer as to the location of this element, which needs to be located after the Identification Return element has been enacted, but prior to the database updates at the end of the transaction. Using the Student Loan and Student Return genres of ALABS Version 2/3 as a benchmark, Version 4 sees the cutting of Labpass Out and Labpass In elements which is further evidence that they are structural complements. However, the cutting of the Regulations and Enrolment sequence in the Student Loan genre, is a consequence of technological change. The need to establish who is, or is not, a student is no longer a requirement of
ALABS, because this data is now reliably available from the Student Administration Unit in the form of Enrolments and Re-enrolments Lists. The fact these genres are co-varying in an element-by-element way is evidence supporting the proposition that generic variation is operating, in these cases, at the level of the workpractice not at the level of individual genres.

By definition, a change in a manual or computer-based system, produces detectable changes to the generic features of workpractices, through the addition, deletion, or modification of text types, and also by changes to the register features of texts associated with workpractices, through changes in field, tenor and mode. The existence of elements forming structural complements in different genres, and more generally the co-variation of genres associated within a single workpractice, are not limited to optional elements as used in Hasan's (1985) or Martin's (1992) genre theories. Structural complements problematise the existence of an obligatory-optional element distinction in diachronically changing workpractice genres and provides evidence for a 'quasispecies' model of genre suggested in Chapter 2 and described more fully in §4.6.2.

4.2.4 Multiple Sequence Cutting (Social Subjects): Class Loans/Returns

The social subject of Tutor was abandoned in Version 3 of ALABS and corresponded to a shift in the operations of the Microcomputer Laboratories, from a general service provider to a support unit for the Commerce Faculty. At that time, this change represented the largest single modification to ALABS. But why did this change occur to these ALABS features? The conventional information systems wisdom, echoed in interviews with the Labstaff, was that these changes coincided with the advent of affordable large scale networking at the laboratories. While networking technology was
available at this time, and was used as much as possible, a generic justification can also
be made for the abandonment of Tutors. Indeed, at the time Class Loans and Returns
were abandoned along with the category of Tutor, the complete networking of the
laboratories had not yet occurred. Class Loans and Returns represented a high volume
of text-traffic second only to Student Loans and Returns. But Class Loans and Returns
were also a much lengthier and more error prone type of activity compared to any other
type of transaction conducted through ALABS. Class sets of disks had to be collated,
boxed and scanned prior to use in a given laboratory by a tutor and the Class Loan form
(see Appendix A2: Text O) had to be filled in by the current operator. This required
knowledge of the types of software, the software requirements of classes and the
Laboratory timetables. Up to 15 minutes in a two hour laboratory session might be lost
in students presenting tutors with student cards, and manually entering student
identification numbers and disk numbers onto a Class Loan form. Some disks may have
been missing from their class sets, in which case Tutors had to abandon their tutorial in
order to get replacement disks at the Service Desk. Speed differences between disk
drives occasionally meant that some floppy disks refused to work with some disk drives.
Under these circumstances, students occasionally were required to swap disks amongst
each other in order to get all the available machines running the required application. At
the end of the laboratory session, students were required to relinquish their disks and
initial the Class Loan Form to indicate that they had returned them. Tutors would then
have to sort and check that all the issued disks were returned, and finally return the class
sets and Class Loan Form to the Labstaff operator who would then enter them on the
system. Some recalcitrant Tutors were reluctant to perform these duties.

Justifying organisational change solely as a consequence of changes to or improvements
in information technology is called *technological determinism* (Hampson 1991). It
suggests that social changes are a product of numerous small shifts in productive
technologies while ignoring the social, economic and historical contexts for these
changes which motivated them in the first instance (Clarke 1991). Removing the
category of Tutor also permitted the removal of two service encounter genres (Tutor
Loan and Return) which involved Labstaff. It also lead to the removal of two service
encounter genres which involved Students in classrooms (Lab Loan and Lab Returns).
Also removed was the written text (the Class Loan Form in Appendix A2: Text O)
which realised these sets of service encounters across two different material settings
(Service Desk and the Laboratories). Interestingly, these changes also led to the removal
from the system of an entire material setting (the Teaching Laboratories). In attempting
to explain why these particular changes occurred to ALABS in Version 3, we need look
no further than the generic evidence.

4.2.5 Consequential Structural Change in Staff Workpractices

The Staff Loans and Returns workpractices represent relatively stable features of
ALABS. Staff Returns for example, have not changed their structure since the inception
of ALABS. There have only been two distinct Staff Loan sequences, one associated
with Version 1/2/3 and the other associated with Version 4 of ALABS. The change in
the Staff Loan Version 4 involves the removal of the Regulations element. The removal
of this 'obligatory' element seems at first to be a relatively minor change but it is
actually related to a significant event, the removal of an entire social subject (Tutor)
described in §4.2.4. So far the structural changes we have described have been direct
structural changes due to end-user development practices, or changes necessitated by
genres implicated in structural complements, see §4.2.3. The removal of the Regulations
element in Staff Loans in Version 4 became possible and desirable due to the substantial
reduction in the number of academic staff that needed to be processed after the cutting of Tutors as a social subject from ALABS. This constitutes a consequential structural change, and illustrates how a change in one workpractice produced as a side effect an indirect change in another unrelated workpractice. The occurrence of a consequential structural change between workpractices is interesting for several reasons. Firstly, it shows that Systemic Semiotic can be usefully applied to the description of specific work practices associated with information systems use. Secondly, this example demonstrates that the analysis can adequately contextualise these workpractices, so that changes in organisational policy affecting specific work practices are likely to be detected as changes in their associated genre sequences. Thirdly, it demonstrates the interdependency between genres associated with information system use, how a change in one genre can effect a change in another.

A Staff Loan text conducted under the current version of ALABS Version 4 which conforms to the staging shown in Figure 4.3b, is provided in Appendix A2: Transcript D. The second instance of Service Request can potentially occur, but is not realised in this Transcript due to the fact that most loans are for single items. The Enrolment element (E2) is included here as a qualitative element based on an examination of the system code. However, the Regulations element that relied on the completion of a Yearly Staff Loans Form in Versions 1 and 2 (see Appendix A2: Text J) has been completely excised from this workpractice.
Figure 4.3: Comparison Chart showing (a) the Staff Loan Qualitative Digraph of ALABS Version 1 from Figure 3.8, and (b) the subsequent cutting of Element RE2 to form the Staff Loan Service Encounter of ALABS Version 4.

A detailed description of this transcript reveals interesting differences between Staff workpractices and those associated with Students. For a contrast refer to the Student Loan in Appendix A2: Transcript B. Unlike the Student Loan in Transcript B, the Labstaff member is a new trainee who is unfamiliar with the material setting of the office (see Lines 1-3) and the sequence of operations required to process the loan using ALABS. Their difficulties are evident during the recording of the Staff Loan (Lines 8), and reflected upon in Lines 27-28. In contrast to the Student Loan in Transcript A, where the borrower needs to be prompted by the Microcomputer Laboratories Staff Member, this transcript has the borrower (an Academic) prompting a novice Microcomputer Laboratories Staff Member through the genre. The Staff Loans tenor
relations permit the type of *borrower led service encounter* exemplified in Transcript D. In contrast, the tenor relations associated with Student Loans meant that borrower led service encounters are unlikely if students attempt to substantially decrease the 'social distance' between them an the Labstaff member. Unlike Student Loans, Staff Loans involve a situation in which the roles played by participants are more equal in terms of the Power Continuum. Staff Loans also tend to have slightly higher affective involvement between Labstaff and Academic Staff, revealing their closer and longer term working relationships than exist between Labstaff and Students.

Transcripts E, F, and G in Appendix A2 described in Clarke (1996) represent Staff Returns conducted using ALABS Version 4. Transcript E is unusual because the item returned to the Microcomputer Laboratories seemed not to have been recorded on the ALABS system. Therefore, most of the transcript (Lines 16-26) represents a resolution of the Materials In element. ALABS can be operated in two modes: a barcode wand mode, which is the quickest way to enter barcodes to the system, and a keyboard mode, which is used to manually enter the barcodes. The keyboard mode is used if the barcode wand is being serviced. Both of the Labstaff member (the operations supervisor) and the returning Staff member (the author) were intimately familiar with ALABS operations. The participants were able to determine in Lines 24-25, that the loaned item was not correctly recorded probably a result of a typing error while entering the barcode using the keyboard mode.

Transcript F is also an unusual Staff Return service encounter in that there were two Labstaff members present at the Service Desk at the time that the text was recorded. The Labstaff member was a trainee who had been at the facility for several months but who was clearly not experienced in operating ALABS. The other Labstaff member was the
Senior Support Programmer who had built ALABS, and the author was the Staff member returning the item. The trainee attempted to undertake the return of the items, and requested clarification at various points in the process (Lines 14, 16). After a failed attempt by the Staff member to help the trainee through the procedure, help is requested from Louie the Senior Support Programmer (Lines 21-26). The remainder of the transcript is a three-way communication. The Programmer and the Trainee jointly occupied the role of the provider of the service. The Programmer used the opportunity to train the Trainee in the Staff Return workpractice (Clarke 1996 72, 77-78).

Transcript G is a more typical Staff Return in that there is only a single Labstaff member acting to provide the service. The trainee is the same Labstaff Member as in Transcript F. As before, the Staff member returning the item is the author. The brief familiarity established between both parties in Transcript F enacted the day before is recalled in this transcript, and in the absence of another more senior Labstaff member, the trainee quickly requests assistance in completing the Staff Return (Line 4). On this occasion, the Staff member takes on the role of the trainer and invokes a borrower led return. The renegotiated roles of student and teacher are invoked again, with greater ease. This time the genre switching from service encounter to a training genre is not accompanied by any resistance on the part of the Labstaff member (Lines 4-5). The Staff member even employs a common training genre strategy, positive reinforcement to indicate approval of the Labstaff member’s enactment of the Staff Return staging (Lines 27 and 31). Transcript G is noticeably shorter than Transcript F. This is a result of there being only two participants in the service encounter, the added familiarity of the trainee with process, as well as the compliance of the trainee to a borrower led service encounter (Clarke 1996, 72).
Like the Staff Loan of Transcript D described above, the Staff Return Transcripts E, F, and G are unusual in that one of the participants, in all cases a Labstaff member, is unable to fulfil their role within the service encounter. Borrower lead service encounters, and more generally those social occasions which require training Labstaff members in order to complete service encounters, involve phenomena collectively referred to as *generic side sequencing* (Ventola 1987) described in Chapter 2. The ALABS Staff Loans and Returns provide an example of one kind of generic side sequencing called *genre switching*. Genre switching, often signalled by shifts in tenor relations, occurs when an element or sequence of elements is borrowed from a completely different genre in order to complete the enactment of the social process at hand, so that two social processes are being realised simultaneously. The switching between genres involves in these cases the move from a service encounter genre to a training genre. The training genre conforms to a Factual Procedure Genre which is used to describe “how something is done” (Martin 1985, 15). The Factual Procedure Genre consists of a Procedural Aim stage followed by a sequence of two or more Instructional Components.

Genre switching can be easily exemplified with an analysis of the Staff Return (in Transcript G). In the enactment of the Materials In stage, which requires the greatest amount of familiarity with ALABS on the part of the Labstaff member, we see the participants taking up their previously negotiated roles of student and teacher (in Line 4). This conforms to the shift in tenor relations expected of genre switching. The Procedural Aim associated with Factual Procedure Genres does not need to be realised because its function is implicit in the enactment of the Request Completion stage of the Staff Return genre. In order for the Materials In element of the Staff Return genre to be realised, it is effectively decomposed into a series of Instructional Components within a
Factual Procedure genre. A total of eleven Instructional Components are produced by decomposing the Materials In element into its constituent ALABS prompts and screens (see Lines 5-6 through to 25-26 inclusive). The academic leads by verbally stepping through the various prompts and screens while the Labstaff member indicates their compliance and acquiescence by providing the appropriate chronemic actions to operate the system non-verbally supplying the required data for each prompt. As a consequence, two social processes are enacted simultaneously. A training genre is realised through the deployment of a Factual Procedure Genre, while simultaneously a Staff Return is conducted.

It is clear that no training is provided to Trainees in the use of ALABS Version 4. The genre switching identified in the Staff Loan and Returns Transcripts indicates that ALABS as a whole is effectively decommissioned.

4.2.6 Feature Redundancy: Normal and Long Term Staff Workpractices

The Staff Loans feature has been previously described in §4.2.5. The Staff Returns in Version 4 exhibits the same staging as the Staff Return Qualitative Digraph in Version 1 of the system. The Staff Loan (see Appendix A2: Transcript D) and the Staff Returns (see Appendix A2: Transcripts E, F, and G) were not conducted as Long Term Staff Workpractices. As described in Chapter 3, §3.4.8, Long Term Staff Loans and Returns were introduced to reduce the automatic batch production of Overdue Staff Letters (see Appendix A2: Text K) which generated considerable interpersonal problems and political difficulties for Labstaff.

If the Staff Loans and Returns were the only way this type of activity occurred in Version 4, then the question becomes why are there no Overdue Letters being produced
or sent out. In order to prevent the production of Overdue Letters, ALABS is only ever Closed Down temporarily (Table 3.2: 5.2). Locked into what is in effect a systems maintenance loop, without the Daily Close Down (Table 3.2: 5.1) ever being executed no batch processing can ever occur. In Chapter 3, §3.4.7, feature reuse was described as a non-structural change in the use of ALABS associated with a period of rapid diachronic expansion. Version 4 provides another example of a non-structural change to the system, but this time associated with a period of diachronic contraction, the Staff Workpractices and the Long Term Staff Workpractices appear to be redundant features. Even as a system that is effectively decommissioned, ALABS still has the capacity to surprise. It is deeply ironic that the effective decommissioning of this system is reproduced by operations practices that never let it completely Close Down.

4.3 ALABS Workpractice Assemblages

That workpractices like Student Loans/Returns act to constrain and organise the kinds of modifications made at the level of their constituent genres and qualitative digraphs was described in §4.2.3. The mechanism proposed to account for these direct structural changes was referred to as structural complements. In contrast, an example of a consequential structural change was reported in §4.2.5, where a change in a set of workpractices produced an indirect change in an otherwise unrelated workpractice. Although, this indirect change is detectable at the level of the genre and qualitative digraph, a mechanism was not provided in order to theorise it. The local perspective afforded by genres and qualitative digraphs described in Chapter 3 and §4.2, hampers the articulation of this kind of mechanism.
Clarke (1996) proposed a new generic structure referred to as a *Assemblage*, which comprised groups of genres linked by implicit or explicit use. Assemblages employ *genre associations* in order to construct relationships between genres, which bind together sets of social subjects into particular configurations of social action, and social relations of power. Assemblages provide a larger 'regional' perspective on information systems, and so it is reasonable to look for inter-generic mechanisms at this level of description. The advantage of Assemblages is that they directly reveal the social relations of power that bind together sets of social subjects into textually realised, enacted social workpractices, literally the web of computing in the terms of Kling and Scachhi (1982). The characteristics of Assemblages are theorised in §4.3.1. Five different ALABS Assemblages, described in §4.3.2 to §4.3.5, demonstrate the importance of Assemblages and associations in explaining the end-user development and diachronic changes to this system.

### 4.3.1 Workpractices: Assemblages and Associations

Each constituent workpractice within the Assemblage marks out a component of the available *meaning potential* as a whole. The concept of meaning potential refers to the "...paradigmatic range of semantic choices that is present in the [semantic system of language], and to which the members of a culture have access in their language" (Halliday 1978 109 and 111-112). As a concept it is a 'convenient fiction' in that it would be impossible to exhaustively describe it for a given Context of Culture, an entire organisation for example. However, for a specific part of the prevailing social structure (for example, Labstaff and Students see §4.3.2), it is possible to describe the range of options that are characteristic of a specific set of Contexts of Situation- in effect this is the purpose of Assemblages.
As Assemblages consist of genres and qualitative digraphs, it seems reasonable to apply the same characteristics for genres, developed by Freadman and Macdonald (1992), to Assemblages as a whole. As a consequence, Assemblages must also be visible and exhibit the characteristics of persistence and inertia. Viewed diachronically, Assemblages must be seen as being subject to deliberate modification, and must also be ideological in that they are involved in the patterning and symbolic arrangement of genres. The social semiotic claims for genre would seem to apply equally to Assemblages. For Bakhtin, "[g]enre lives in the present, but it always remembers the past, its beginnings. Genre is the representative of creative memory in the process of literary evolution, which is precisely why genre is capable of guaranteeing the unity and a continuity of this evolution" (Bakhtin in Todorov 1984, 84), and furthermore "... the more elevated the genre, the more complex it has become and the more, and the better, it remembers its past" (Bakhtin in Todorov 1984, 85).

Significantly, Assemblages appear to be generic manifestations of intertextuality between workpractices. In this case, the workpractices are associated with an information system. Intertextuality is defined as "[t]he meaning relations which exist between texts, and the process of making sense of texts in reference to their relations to other texts" (Schirato and Yell 1996, 239). Systemic Functional Linguistics defines intertextuality in terms of direct references linking one text to another. Clarke and Mehler (1999) have employed this usage of the term to describe the generation of hypertexts from print media corpora. While this definition of intertextuality as direct reference accounts for some relationships between workpractice genres that form Assemblages, it cannot account for a large proportion of workpractice genres in some
assemblages. In contrast, social semiotics uses the term intertextuality "...more generally to describe the ways in which texts embody meanings that have already been made, in one form or another in other texts" (Schirato and Yell 1996, 239). These meanings are conventional, requiring familiarity not intuition. In other words, a user (or reader) understands specific workpractices (texts) because they have prior experience of them. The term as it is used within social semiotics is based on Julia Kristeva's reworking of Bakhtin's theory of *dialogism* and *heteroglossia* (Belsey 1980, 26). The concept of dialogism involves recognising that all texts or "utterances" function to respond to a prior text and already anticipate a response, refer to Chapter 2. However according to Todorov (1984, 61), "... not all relations between utterances are necessarily intertextual. Logical relations must be excluded from dialogism (for example: negation, deduction, etc.); in themselves, they do not imply intertextuality (though the latter may be down to them); the same is obviously true of purely formal, all linguistic relations in the strict sense (anaphora, parallelism, etc.)". Although, the Systemic Functional Linguistics and Social Semiotics definitions of intertextuality are mutually exclusive, they both explain different aspects of Assemblages. As a consequence both definitions are used when interpreting Assemblages and associations.

Assemblages are represented using Assemblage diagrams, the notation is provided in Appendix A3. These diagrams show texts that support organisational workpractices as well as those that support the technical infrastructure of the system. The distinction between texts associated with organisational workpractices and those that support the technical infrastructure was introduced in Chapter 3, §3.2.3. Workpractices have been defined in Chapter 2 as collections of one or more related texts and zero or more actions. Action could be interpreted as a movement of a written text from one material setting to another, or it could be interpreted as those actions required by the system in
order to initiate, sustain or terminate a stage in a workpractice text. Actions that initiate, sustain, or terminate a workpractice also become the points where workpractice texts associated with the support of the technical infrastructure relate to those texts that directly support the organisational workpractices. Consequently Assemblage diagrams are annotated with the atomic chronemic actions needed to trigger the appropriate feature.

4.3.2 *Assemblage A: Student Loan/Returns with Conditions of Use*

Assemblage A consists of written genres (ovals with thin lines), and a series of spoken genres (ovals with thick lines) which form the workpractices enacted by Students and Labstaff using ALABS at the Microcomputer Laboratories. These workpractices involve either negotiating the exchange of goods or the provision of services in the form of facility access. A key to the abbreviated names of each genre in Figure 4.4 is provided in Table 4.1 which also includes the full name, the type of text, and the versions in which they were commissioned and decommissioned. Table 4.2 provides the chronemic atomic actions associated with invoking various workpractice texts, or those actions related to supporting the technical infrastructure. Examples of texts conforming to the Student Loan genre are available for Versions 2 and 4, see Appendix A2: Transcripts A and B respectively. A text conforming to the Student Return genre is available for Version 4 in Appendix A2: Transcript C. A genre association, indicated by the thick black lines in Figure 4.4, joins these two service encounters to the written regulatory text Conditions of Loan. The intertextual relations which associate Student Loans and Returns to Conditions of Loan, see Chapter 3, §3.3.1 and §3.3.3, utilise direct referencing, that is the intertextual relations recognised in Systemic Functional Linguistics.
There has been an interesting transformation of the status of the Conditions of Loan text across various systems at the Microcomputer Laboratories. The Manual System transformed the informal service encounters of the Ad-hoc System, into formalised service encounters which produced a single written text record for each Loan/Return transaction. The Conditions of Loan were developed at the Laboratories precisely because there had been no relevant University policy. In the Manual System, a Conditions of Loan text was an explicit part of every service encounter of the Student Loan/Return workpractice. But when ALABS Version 1 was commissioned, the Conditions of Loan text was relegated to being negotiated the first time a student borrowed items in a given session. At the time ALABS Version 4 was commissioned, the Information Technology Services Unit had developed a university-wide Code of Practice: Student Use of Computing Facilities. This enabled the removal of the Regulations and Enrolment elements of the Student Loan Genre in Version 4. Interestingly, this Code of Practice was based on the Microcomputer Laboratories Conditions of Use and the Conditions of Loan text. The Conditions of Use was a written text posted in every laboratory that delimited the expected behaviour of students in the Teaching Laboratories, see Appendix A2: Text H.

Thibault (1989, 346), in discussing the ideological nature of genres, has remarked that genres are “... socially made and used programs for the making and regulating of certain kinds of meanings and social relations”. This association between Student Loans/Returns and Conditions of Use is an obvious manifestation of the ideological nature of genres. Its eventual modification due to the change in campus-wide computing policy exhibits a shift in ‘certain kinds of meaning and social relations’. The modification removed the burden of the Microcomputer Laboratories in administering and enforcing compliant behaviour from students. It elevated the social relations of
power between computing service providers and their users from the level of local
practice to that of officially sanctioned campus-wide policy. It also mandated a common
set of expectations, procedures and practices across all computing service providers and
helped to ensconce the newly formed ITS (Information Technology Services) as the
overarching controlling authority for all computing service providers on campus
including the Microcomputer Laboratories.

Student Appends constituted a dependent service encounter released in Version 1 but
developed after the Conditions of Loan text had been created, see Chapter 3, §3.3.4. Consequently, despite having a very similar structure to Student Loans, see Figure 3.7b,
it is not directly referenced by the Conditions of Loan text. Because no difference in
'lateness' is recognised between late items borrowed using Student Appends, and those
of Student Loans, Offenses (see Chapter 3, §3.4.6) could be generated on either. At first
appearance, it would seem that Student Appends are associated with Conditions of Loan
through a dialogic intertextual relation due to the absence of a direct reference. However, a logical relationship of succession exists between Student Loans and Student
Appends based on the fact that the latter is dependent on a prior occurrence of the
former. The logical relationship of Student Appends and Student Renewals to Student
Loans, is based on a shared structural requirement, to have already realised the IS
element in the Student Loan and therefore to already have available the requesting
student's Identification card. Logical relations of this kind are excluded from the social
semiotic definition of an intertextual relation. As a consequence, the term elliptical
intertextual reference, is developed here, and used to refer to this 'omitted' type of
direct intertextual reference. Elliptical intertextual referencing appears to be the means
by which all dependent service encounters are 'locked' into Assemblages. An elliptical
intertextual reference also binds the Student Renewal workpractice, introduced in Version 2/3 (see Chapter 3, §3.4.3) to Assemblage A. This dependent service encounter had not been specified at the time the genre association was first established. Yet it slotted into a growing semiotic web of intertextuality represented by this assemblage, and was treated as if it was directly subject to the Conditions of Loan.

Like the Student Append and Renewals, the Student Move workpractice introduced in Version 2/3 and described in Chapter 3, §3.4.4 shares the structural requirement of a previously realised IS element from the Student Loan. However, while it requires a currently active loan, it is not directly subject to any Offence procedures. This workpractice is however subject to the normal standing procedures for Labstaff, students may be requested to move if a Supervised Laboratory Time is scheduled for the laboratory. Therefore dialogic intertextual relations, as defined in Social Semiotics, link the Student Move workpractice to this Assemblage. Student Bookings workpractices introduced in Version 2/3 and described in Chapter 3, §3.4.4 involve the negotiation of future machine access. Students however were still locked into the normal standing procedures involved in the surveillance of the laboratories by Labstaff. Unused machines, even if previously booked by students, were lost if the student is ten minutes late, or failed to turn up. Student Bookings is considered apart of this Assemblage because it is implicated in the same intertextuality exhibited by other workpractices.

Assemblage A demonstrates several principles in the diachronic or ontogenetic development of ALABS. It appears that Assemblages can’t support wildly differing tenor relations within their constituent workpractices. This characteristic of Assemblages is referred to here as the principle of the conservation of social relations of power. This ALABS Assemblage consistently positions Students into specific social
relations of power from which they cannot escape. Each subsequent workpractice inherits, adopts or amplifies available subject positions already established by the Assemblage. This specificity is demonstrated by looking at the consistency exhibited in the tenor relations between Labstaff and Students previously identified in Chapter 3. Also, each newly introduced workpractice must co-exist in relation to other intertextually related workpractices within an Assemblage. In terms of the diachronic or ontogenetic development of ALABS, this is referred to as the principle of successive activity differentiation. This principle is demonstrated by the structural similarities evident in the relevant workpractices described in Chapter 3.

Figure 4.4: Assemblage A: Student Loan/Returns with Conditions of Use.
Table 4.1:  Genres identified as part of Assemblage A as shown in Figure 4.4.

<table>
<thead>
<tr>
<th>Abbreviation</th>
<th>Full Name</th>
<th>Text Type</th>
<th>Versions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Condition of Loan</td>
<td>Conditions of Loan Form</td>
<td>written; regulatory</td>
<td>1, 4</td>
</tr>
<tr>
<td>Student Loan</td>
<td>Student Loans</td>
<td>spoken; service encounter</td>
<td>1</td>
</tr>
<tr>
<td>Student Append</td>
<td>Student Append</td>
<td>spoken; service encounter</td>
<td>1, 4</td>
</tr>
<tr>
<td>Student Renewal</td>
<td>Student Renewal</td>
<td>spoken; service encounter</td>
<td>2, 4</td>
</tr>
<tr>
<td>Student Move</td>
<td>Student Move</td>
<td>spoken; service encounter</td>
<td>2, 4</td>
</tr>
<tr>
<td>Student Booking</td>
<td>Student Booking</td>
<td>spoken; service encounter</td>
<td>2, 4</td>
</tr>
<tr>
<td>Student Return</td>
<td>Student Return</td>
<td>spoken; service encounter</td>
<td>1</td>
</tr>
<tr>
<td>Offence List</td>
<td>Offence List</td>
<td>written; operational</td>
<td>2, 4</td>
</tr>
<tr>
<td>Student List</td>
<td>Student List</td>
<td>written; operational</td>
<td>1</td>
</tr>
</tbody>
</table>

Table 4.2: System related chronemic atomic actions associated with various workpractice texts and system technology (shaded) of relevance to Assemblage A as shown in see Figure 4.4. The numbers in the last column cross reference to system features in Table 3.2.

<table>
<thead>
<tr>
<th>Code</th>
<th>Description</th>
<th>Feature</th>
</tr>
</thead>
<tbody>
<tr>
<td>a</td>
<td>Student Loans</td>
<td>2.1.1</td>
</tr>
<tr>
<td>b</td>
<td>Append (Student Loan)</td>
<td>2.1.6</td>
</tr>
<tr>
<td>c</td>
<td>Student Loan Renewal</td>
<td>2.1.7</td>
</tr>
<tr>
<td>d</td>
<td>Swap Lab Pass</td>
<td>2.1.8</td>
</tr>
<tr>
<td>e</td>
<td>Book Terminals</td>
<td>2.8</td>
</tr>
<tr>
<td>f</td>
<td>Student Return</td>
<td>2.2.1</td>
</tr>
<tr>
<td>g</td>
<td>Dump Offence Database</td>
<td>3.1.3</td>
</tr>
<tr>
<td>h</td>
<td>Make an Offence</td>
<td>3.1.1</td>
</tr>
<tr>
<td>i</td>
<td>Delete an Offence</td>
<td>3.1.2</td>
</tr>
<tr>
<td>j</td>
<td>Count of Active Student Loans</td>
<td>2.3.1</td>
</tr>
<tr>
<td>k</td>
<td>Students</td>
<td>2.3.2</td>
</tr>
<tr>
<td>l</td>
<td>Overdue Student Loans</td>
<td>2.3.7</td>
</tr>
<tr>
<td>m</td>
<td>Dump Student Database</td>
<td>3.3.1</td>
</tr>
<tr>
<td>n</td>
<td>Print All Students on Database</td>
<td>3.6.1.3</td>
</tr>
<tr>
<td>o</td>
<td>Backup Databases: Students</td>
<td>3.8.4</td>
</tr>
<tr>
<td>p</td>
<td>Backup Databases: Loans</td>
<td>3.8.6</td>
</tr>
<tr>
<td>q</td>
<td>Backup Databases: Sessional Student Borrowing</td>
<td>3.8.7</td>
</tr>
<tr>
<td>r</td>
<td>Backup Databases: Offence</td>
<td>3.8.8</td>
</tr>
<tr>
<td>s</td>
<td>Backup Databases: New Student Count</td>
<td>3.8.15</td>
</tr>
<tr>
<td>t</td>
<td>Change Student Barcode</td>
<td>3.12</td>
</tr>
<tr>
<td>u</td>
<td>Statistics Menu: Student</td>
<td>4.3</td>
</tr>
<tr>
<td>v</td>
<td>Add Student</td>
<td>6.2</td>
</tr>
</tbody>
</table>
4.3.3 Assemblage B: Staff Loans/Returns with Yearly Staff Loans Form

Assemblage B consists of written genres (ovals with thin lines) and a series of service encounter genres (ovals with thick lines) which constitute the workpractices entered into by Staff and Labstaff using ALABS at the Microcomputer Laboratories. These workpractices are solely concerned with negotiating the loan and return of goods. A key to the abbreviated names of each genre in Figure 4.6 is provided in Table 4.3, which also indicates the full name, the type of text, and the versions in which they were commissioned and decommissioned. Table 4.4 lists the chronemic atomic actions associated with invoking various workpractice texts, or those actions related to supporting the technical infrastructure. An example of a text conforming to the Staff Loan genre of Version 4 is available in Appendix A2: Transcript D. Texts conforming to the Staff Return genre of Version 4 are available in Appendix A2: Transcripts E, F, and G. In §4.2.5 it was noted that the Staff Loans and Returns represented relatively stable features of ALABS. The structure of the Staff Returns has not changed since the inception of ALABS, whereas the removal of a single element has been the only structural change in the Staff Loan workpractice. The stability of these workpractices means that the social relations of power have been essentially conserved across all versions of the system. Since the inception of the system there has been no need to accrue additional activities to these social subjects.

Staff Loans, Returns and the Yearly Staff Loans text, provided in Appendix A2: Text J, form a genre association, indicated by the thick black lines in Figure 4.6. The intertextual relations associating Staff Loans and Returns to Yearly Staff Loan utilise direct referencing, those intertextual relations recognised in Systemic Functional Linguistics. Figure 4.5 shows a network classification of Loans and Returns for non-student social subjects. In (a), the least delicate classification distinguishes between
Staff and Tutors originally developed in the Manual System and consequently reused in ALABS. This distinction is largely based on proxemic considerations. Tutors borrow items for use in the Laboratories while Staff borrow items to use in their offices. This primary level of delicacy was retained in the system until Version 4, where Tutors as a class of social subject were removed from the system along with all their associated genres. In (b), a more delicate sub-classification is shown where a further distinction was created in ALABS Version 2, retained in Version 3, and abolished in Version 4. This distinction based on chronemic considerations, led to the development of what appeared to be redundant features, see §4.2.6. The justification for the development of Long Term Staff Loans/Returns was described in Chapter 3, §3.4.8. Considerable consternation resulted from the production of Overdue Staff Letters, see Appendix A2: Text K, for those who were late in returning items. In order to permit Staff Members to borrow items related to their teaching for an entire academic session, the Staff social subject in Figure 4.5 was split into two separate social subjects [Normal] Staff and Long-Term Staff. Long-term Staff were similar to [Normal] Staff in that they possessed almost identical service encounters and social relations of power. The difference between them lay in the interpretation and execution of policy that meant that for Long-Term Staff no Overdue Staff Letters were ever generated. The Yearly Staff Loans was ‘extended’ to include the new type of social subject, indicated by the dashed boxes in Figure 4.6, through the use of elliptical intertextual referencing, defined in §4.3.2.
The concept that genres reproduce social subjectivity has been described in Chapter 2, but the use of information systems can lead to social conditions whereby vastly different policy needs to be applied to essentially the same class of social subject. The principle of the conservation of social relations of power cannot be violated, so a new social subject has to be produced in order to handle the emergent policy. This forms a new principle for Assemblages, the principle of the production of social subjectivity. Genres and therefore Assemblages associated with information systems reproduce existing types of social subjectivity. But under specific conditions of social dissonance, the need to simultaneously send and not send Overdue Letters in this case, the information systems may also be involved in the production of new social subjectivity. This new type of Social Subject (Long Staff) is indicated by a new social subject symbol in Figure 4.6, connected to Labstaff by Long Loans and Returns workpractices. In order to rapidly prototype these qualitative sequences, the Staff Loan and Return code was duplicated and altered in minor ways, described in Chapter 3, §3.4.8.
As a consequence, even in the absence of transcripts, it can be established that the social relations of power were similar, as was the qualitative staging of these workpractices themselves.

Table 4.3: Genres identified as part of Assemblage B as shown in Figure 4.6.

<table>
<thead>
<tr>
<th>Abbreviation</th>
<th>Full Name</th>
<th>Text Type</th>
<th>Versions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yearly Form</td>
<td>Yearly Staff Loans Form</td>
<td>written; regulatory</td>
<td>1, 4</td>
</tr>
<tr>
<td>Staff Loan</td>
<td>Staff Loan</td>
<td>spoken; service encounter</td>
<td>1</td>
</tr>
<tr>
<td>Staff Return</td>
<td>Staff Return</td>
<td>spoken; service encounter</td>
<td>1</td>
</tr>
<tr>
<td>Overdue List</td>
<td>Overdue Staff Loans List</td>
<td>written; operational</td>
<td>1</td>
</tr>
<tr>
<td>Overdue Staff</td>
<td>Overdue Staff Loan Letter</td>
<td>written; regulatory</td>
<td>1, 4</td>
</tr>
<tr>
<td>Long Loan</td>
<td>Long Term Staff Loan</td>
<td>spoken; service encounter</td>
<td>2, 4</td>
</tr>
<tr>
<td>Long Return</td>
<td>Long Term Staff Return</td>
<td>spoken; service encounter</td>
<td>2, 4</td>
</tr>
<tr>
<td>Long List</td>
<td>Long Term Staff Loans List</td>
<td>written; operational</td>
<td>2, 4</td>
</tr>
<tr>
<td>Staff List</td>
<td>Staff List</td>
<td>written; operational</td>
<td>1</td>
</tr>
</tbody>
</table>
Table 4.4: System related chronemic atomic actions associated with various workpractice texts and system technology (shaded) of relevance to Assemblage B as shown in Figure 4.6. The numbers in the last column cross reference to system features in Table 3.2.

<table>
<thead>
<tr>
<th>Code</th>
<th>Description</th>
<th>Feature</th>
</tr>
</thead>
<tbody>
<tr>
<td>a, a'</td>
<td>Mark (a) and Print (a') Overdue Staff Loan Letter</td>
<td>3.1.3</td>
</tr>
<tr>
<td>b</td>
<td>Long Term Staff Loans</td>
<td>2.3.4</td>
</tr>
<tr>
<td>c</td>
<td>Staff Return</td>
<td>2.2.2</td>
</tr>
<tr>
<td>d</td>
<td>Staff Loan</td>
<td>2.1.2</td>
</tr>
<tr>
<td>e</td>
<td>Long Term Staff Loan</td>
<td>2.1.3</td>
</tr>
<tr>
<td>f</td>
<td>Long Term Staff Return</td>
<td>2.2.3</td>
</tr>
<tr>
<td>g</td>
<td>Overdue Staff Loans</td>
<td>2.3.8</td>
</tr>
<tr>
<td>h</td>
<td>Current Staff Loans</td>
<td>2.3.3</td>
</tr>
<tr>
<td>i</td>
<td>Dump Staff Database</td>
<td>3.3.2</td>
</tr>
<tr>
<td>j</td>
<td>Change Staff Member’s Database</td>
<td>3.5</td>
</tr>
<tr>
<td>k</td>
<td>Edit A Staff Member’s Record</td>
<td>3.7</td>
</tr>
<tr>
<td>l</td>
<td>Print All Staff Members on Database</td>
<td>3.6.1.3</td>
</tr>
<tr>
<td>m</td>
<td>Backup Databases: Staff</td>
<td>3.8.3</td>
</tr>
<tr>
<td>n</td>
<td>Statistics Menu: Staff</td>
<td>4.7</td>
</tr>
<tr>
<td>o</td>
<td>Accounts Menu: Add Staff</td>
<td>6.2</td>
</tr>
</tbody>
</table>

4.3.4 Assemblage C: Tutor Loan/Returns with Yearly Tutor Loans Form

Assemblage C consists of two qualitatively determined service encounters, described in Chapter 3, §3.3.6 and the Yearly Tutor Loans Form, a written text conforming to a regulatory genre provided in Appendix A2: Text M. The service encounters constitute workpractices entered into by Labstaff and Tutors using ALABS at the Microcomputer Laboratories. These workpractices concerned the loan and return of goods and services. A key to the abbreviated labels in Figure 4.7 is provided in Table 4.5, which also indicates the full name, the type of text, and the versions in which they were commissioned and decommissioned. Table 4.6 lists the chronemic atomic actions associated in invoking various workpractice texts, or those actions related to supporting the technical infrastructure. Note that the Add Tutor (3.4), shown as e in Figure 4.7, is located adjacent to the Tutor Form genre, because this workpractice related action is associated with the production of these types of written texts. It repeats the same
structural pattern of loan, conditions, and returns, realised as service encounter, regulatory genre, and service encounter already described for Students in Assemblage A and for Staff in Assemblage B. Like them, the Tutor genres are linked into Assemblage C through the use of direct intertextual references. But unlike A and B, this Assemblage has never had any other workpractices associated with it. Maintaining the same configuration at its decommissioning in Version 4 as it did at its commissioning in Version 1, this assemblage represents an island of relative stability in an otherwise dynamically evolving system. The excising of the Tutor as a social subject reproduced by the system, led to the removal of Assemblages C and D altogether, as well as altering the structure of one workpractice in Assemblage B.

In the introduction to this section, it was claimed that the local perspective afforded by genres and qualitative digraph hampered the articulation of a mechanism to account for the consequential structural change to Staff workpractices, described in §4.2.5. Labstaff represent unique social subjects for ALABS in that they are the end-user developers of the system as well as being involved in all Assemblages. The removal of the Tutor social subjects in Version 4 of ALABS, the largest proportion of non-student loans and returns (see Figure 4.5a), produced a substantial reduction in the number of academic staff that needed to be uniquely identified. Note also that the distinction between [Normal] Staff and Long-term Staff was abolished in Version 4. This represented a contraction in the type of non-student social subjects from 3 to 1! Labstaff members are referred to here as shared social subjects because they are involved in almost all workpractices, and certainly all Assemblages. As end-user developers of the system and armed with knowledge of all assemblages, Labstaff were able to recognise the opportunity to streamline the Staff Loan workpractice. The consequential structural
change, the removal of the Regulations element in Version 4 of the Staff Loan workpractice, is simply another example of genres and Assemblages associated with information systems, reproducing existing types of social subjectivity. This change did not alter the subject positions constructed for this class of participants by the system.

The regional perspective afforded by Assemblages, and the existence of shared social subjects who have knowledge of them, provides a mechanism to account for this consequential structural change. A new principal for Assemblages can be formed— the principal of *shared social subjects as change vectors*. Another example of this is provided in Assembleage D in §4.3.5.

**Figure 4.7:** Assembleage C: Tutor Loans/Return with Yearly Tutor Loans Form.

**Table 4.5:** Genres identified as part of Assembleage C as shown in Figure 4.7.

<table>
<thead>
<tr>
<th>Abbreviation</th>
<th>Full Name</th>
<th>Text Type</th>
<th>Versions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tutor Form</td>
<td>Yearly Tutor Loans Form</td>
<td>written; regulatory</td>
<td>1, 4</td>
</tr>
<tr>
<td>Overdue Tutor</td>
<td>Overdue Tutor Loan Letter</td>
<td>written; regulatory</td>
<td>1, 4</td>
</tr>
<tr>
<td>Tutor Loan</td>
<td>Tutor Loan</td>
<td>spoken; service encounter</td>
<td>1, 4</td>
</tr>
<tr>
<td>Tutor Return</td>
<td>Tutor Return</td>
<td>spoken; service encounter</td>
<td>1, 4</td>
</tr>
</tbody>
</table>
Table 4.6: System related chronemic atomic actions associated with various workpractice texts and system technology (shaded) of relevance to Assemblage C as shown in Figure 4.7. The numbers in the last column cross reference to system features in Table 3.2.

<table>
<thead>
<tr>
<th>Code</th>
<th>Description</th>
<th>Feature</th>
</tr>
</thead>
<tbody>
<tr>
<td>a</td>
<td>Loan: Tutor Loan</td>
<td>2.1.4</td>
</tr>
<tr>
<td>b</td>
<td>Return: Tutor</td>
<td>2.2.4</td>
</tr>
<tr>
<td>c</td>
<td>Current Tutor Loans</td>
<td>2.3.5</td>
</tr>
<tr>
<td>d</td>
<td>Items on Loan: Overdue Tutor Loans</td>
<td>2.3.9</td>
</tr>
<tr>
<td>e</td>
<td>Add Tutor</td>
<td>3.4</td>
</tr>
<tr>
<td>f</td>
<td>Print All Tutors on Database</td>
<td>3.6.1.5</td>
</tr>
<tr>
<td>g</td>
<td>Print Tutor Borrowing Forms</td>
<td>3.9.2</td>
</tr>
<tr>
<td>h</td>
<td>Dump Tutor Database</td>
<td>3.3.3</td>
</tr>
<tr>
<td>i</td>
<td>Backup Databases: Tutors</td>
<td>3.8.5</td>
</tr>
</tbody>
</table>

4.3.5 Assemblage D: Class Loans/Returns

Assemblage D consists of workpractices involved in providing software items to students during Supervised Laboratory Times when tutorials or laboratory based practicals where held, see Figure 4.8. A key to the abbreviated labels in Figure 4.8 is provided in Table 4.7. Table 4.8 lists the chronemic atomic actions associated in invoking various workpractice texts, or those actions related to supporting the technical infrastructure. This assemblage consists of an unusual configuration of qualitatively identified service encounters, a set of nested service encounters described in Chapter 3, §3.3.7, and based on workpractices first formalised in the Manual System see Figure 3.2. In fact, the Class Loans and Returns workpractices constitute the largest unaltered importation of workpractices from the Manual System into ALABS. The Class Loans and Returns workpractices are not directly mentioned in the Yearly Tutor Loans Form, nor are they bound together by elliptical intertextual references. The Yearly Tutor Loans Form (see Appendix A2: Text L) introduced in the previous section, is more applicable to personal loans of items to Tutors (see Assemblage C). This anomaly was the subject of questions during an Analysis Interview provided in Appendix A2: Transcript P, see
Lines 41-60, and 61-70. The purpose of the Yearly Tutor Loans Form and the Tutor Information Sheet was to register Tutors on ALABS, and to reinforce the idea that conditions applied to their activities at the Laboratories. As a consequence, the association between Class Loans, Yearly Tutor Loans and Class Returns is realised using dialogic intertextual relations. Missing items as a result of conducting these workpractices were simply added to a list of such items and the Tutor was reminded of them every time they entered into additional Class Loan and Return service encounters, see Appendix A2: Transcript P Lines 56-60. Similarly, dialogic intertextual relations realise another association between Class Loans, Returns and Class Forms, (see Appendix A2: Text O). This is the only example in ALABS of two associations joining the same service encounters, and indicates a degree of complexity in the workflow that was certainly apparent to the Labstaff and Tutors.
Figure 4.8  Assemblage D: Class Loans/Returns.

Tutors became defacto Labstaff, using the shared material of the Class Form, to extend the influence of the system into a material setting it could not directly control, an example of an indirect integration of the system (Clarke 1997a). From the point of view of the system, Tutors exercised on behalf of Labstaff, surveillance practices directed at Students. The Class Loan Form became a mechanism for maintaining an audit-trail, as described in Chapter 3, §3.3.7. The Lab Loan and Lab Return service encounters, which enabled Students to acquire items for the duration of the class, are associated together with the Class Loan Form by means of dialogic intertextual relations. Interestingly, this assemblage is the only one in ALABS that is realised entirely using dialogic intertextual relations. Tutors were another example of shared subjects. Recall that Labstaff were
considered as shared subjects because they were involved in all other Assemblages. Tutors are shared subjects because the constituent workpractices in this assemblage span two material settings, the Service Desk and the Teaching Laboratories, and two sets of social subjects, Labstaff and Students. In §4.3.4, the principal of ‘shared subjects as change vectors’ was introduced. It was applied to describing the role that Labstaff play in the end-user modification of a workpractice in Assemblage B, based on the removal of Tutors in Version 4 of the system. Labstaff were referred to as ‘vectors’ rather than ‘agents’, in order to resist the notion that intentionality was the basis of change in the system. By their very removal as a social subject, Tutors are also vectors of change.

Table 4.7: Genres identified as part of Assemblage D, shown in Figure 4.8.

<table>
<thead>
<tr>
<th>Abbreviation</th>
<th>Full Name</th>
<th>Text Type</th>
<th>Versions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tutor Form</td>
<td>Yearly Tutor Loans Form</td>
<td>written; regulatory</td>
<td>1, 4</td>
</tr>
<tr>
<td>Class Form</td>
<td>Class Form</td>
<td>written; operational</td>
<td>1, 4</td>
</tr>
<tr>
<td>Class Loan</td>
<td>Class Loan</td>
<td>spoken; service encounter</td>
<td>1, 4</td>
</tr>
<tr>
<td>Class Return</td>
<td>Class Return</td>
<td>spoken; service encounter</td>
<td>1, 4</td>
</tr>
<tr>
<td>Lab Loan</td>
<td>Lab Loan</td>
<td>spoken; service encounter</td>
<td>1, 4</td>
</tr>
<tr>
<td>Lab Return</td>
<td>Lab Return</td>
<td>spoken; service encounter</td>
<td>1, 4</td>
</tr>
</tbody>
</table>

Table 4.8: System related chronemic atomic actions associated with various workpractice texts and system technology (shaded) of relevance to Assemblage D as shown in Figure 4.8. The numbers in the last column cross-reference to system features in Table 3.2.

<table>
<thead>
<tr>
<th>Code</th>
<th>Description</th>
<th>Feature</th>
</tr>
</thead>
<tbody>
<tr>
<td>a</td>
<td>Class Loan</td>
<td>2.1.5</td>
</tr>
<tr>
<td>b</td>
<td>Return: Class</td>
<td>2.2.5</td>
</tr>
<tr>
<td>c</td>
<td>Items on Loan: Class Loans</td>
<td>2.3.6</td>
</tr>
<tr>
<td>d</td>
<td>Add Tutor</td>
<td>3.4</td>
</tr>
<tr>
<td>e</td>
<td>Print Class Borrowing Forms</td>
<td>3.9.5</td>
</tr>
<tr>
<td>f</td>
<td>Print All Tutors on Database</td>
<td>3.6.1.5</td>
</tr>
<tr>
<td>g</td>
<td>Dump Tutor Data Base</td>
<td>3.3.3</td>
</tr>
<tr>
<td>h</td>
<td>Backup Databases: Tutors</td>
<td>3.8.5</td>
</tr>
</tbody>
</table>
4.3.6 Assemblage E: Reports Genres

Several major modifications were made to ALABS in order to account for what was being borrowed and who was borrowing it. The production of summary statistics of the Microcomputer Laboratories usage had always been a crucial reason for the development of ALABS, especially given the climate of rationalisation which affected the University after its amalgamation with the Wollongong Institute of Education. This climate had seen the closure of Institute schools and the movement of academic and support staff to established departments within the University (Clarke 1991). Historically, the Microcomputer Laboratories had been the Institute’s computing centre, and there were real fears that the centre would be disbanded, or transformed out of all recognition. The facility was unique at the University for several reasons. It was the largest single holding of microcomputers on campus and indeed at that time was the largest facility of its type in the Southern Hemisphere. Rather than it being a single department’s holdings, a consortium of academic schools controlled the facility. The facility was set up to service specific tertiary teaching requirements in contrast to the ‘cluster facilities’ which ITS was establishing across campus which were modelled on its previous experience with establishing terminal clusters.

The Operations Manager reported regularly to a Microcomputer Laboratories Management Committee. This committee consisted of representatives from each department and the Head of ITS (as a visitor). An expected part of these meetings was the Operations Supervisors report on the status and operations of the facility. This included Summary Statistics Reports indicating amongst other things Student Loan Activity. These reports and others like the Late Returns report, used primarily for operational concerns, took a substantial period of time to produce. Typically, several hours were required to produce a single report, as well as 15 minutes to one hour per
day to process and print the daily transactions upon which these reports were based. Summary Statistics were originally provided to Management Committee meetings in tabular form, but the amount of information being collected by ALABS made assimilating and interpreting this data difficult. Because ALABS was written in a language that did not support graphics operations, a new Management Report Subsystem was written using Lotus 1-2-3, which could import selected data generated by the Statistics options (Table 3.4: 4) and plot it directly. The Management Report Subsystem helped to standardise facility activity reports to the Management Committee.

Unfortunately, no transcripts of the Microcomputer Laboratories Management Committee meetings were ever made and no reports tabled to these meetings have been located. This is an example of the empty corpus problem described in Chapter 2. Under these circumstances, the only available analysis strategy is to examine the relevant code and documentation for those system features that supported the generation and presentation of statistics and to infer from them the kinds of debates that were being made at these meetings. A further complication was that no technical documentation could be found for the Management Report Sub-system. The purpose of each spreadsheet (Graphical Reports column) and the type of graphical output generated (Type column) were deduced by examining the Lotus 1-2-3 worksheets and macros, see Table 4.9. One problem became immediately obvious. The file-naming scheme was not continuous (see the Gaps column) which appeared to indicate that files were missing. However, the semiotic concepts of syntagm and paradigm (Nöth 1995, 205) proved useful ones with which to examine the file-naming scheme. The possible values for the parts or elements within a file name are referred to as a paradigm. It is assumed that the rules of selection and combination of these elements are functional rather than arbitrary,
as is the case for other ALABS sub-systems, and that the syntagms formed by their application create functional file names.

The Management Report Sub-system file-naming schema consists of five elements, refer to Figure 4.9. Element A identifies the file as a worksheet A, while element E is a file extension. These elements can be ignored as neither change and so by definition do not form paradigms. Element C identifies the period for which the report is generated, consistent with the naming of the reports extracted from the Lotus 1-2-3 macros. Element D identifies the graph type. The simple paradigms for C and D are provided as system networks in Figure 4.9. What needs to be accounted for in the file-naming schema is the function of and paradigm for, Element B that produced the Gaps in Table 4.9.
Table 4.9: ALABS Management Report Sub-system (Version 3). The value of Machine Name is Apple, NEC, Sperry, or Usenet. The Gaps column refers to apparent omissions in the file name scheme that may have indicated missing files. The Code column cross-references the Graphical Reports to the Output column in Table 4.11.

<table>
<thead>
<tr>
<th>File Name</th>
<th>Graphical Reports</th>
<th>Type</th>
<th>Gaps</th>
<th>Code</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ws01sb.wkl</td>
<td>Software Usage by Category- Session</td>
<td>Bar</td>
<td>Ws02*.wkl</td>
<td>1</td>
</tr>
<tr>
<td>Ws01wb.wkl</td>
<td>Software Usage by Category- Week</td>
<td>Bar</td>
<td></td>
<td>1</td>
</tr>
<tr>
<td>Ws03sb.wkl</td>
<td>Software Usage by Machine Name- Session</td>
<td>Bar</td>
<td></td>
<td>3</td>
</tr>
<tr>
<td>Ws03wp.wkl</td>
<td>Software Usage by Machine Name- Week</td>
<td>Bar</td>
<td></td>
<td>3</td>
</tr>
<tr>
<td>Ws04sb.wkl</td>
<td>Usage of Specific Software- Session</td>
<td>Bar</td>
<td>Ws05*.wkl</td>
<td>1</td>
</tr>
<tr>
<td>Ws04sbdy.wkl</td>
<td>Usage of Specific Software &lt;Day name&gt;</td>
<td>Bar</td>
<td></td>
<td>4</td>
</tr>
<tr>
<td>Ws04wb.wkl</td>
<td>Usage of Specific Software- Week</td>
<td>Bar</td>
<td></td>
<td>4</td>
</tr>
<tr>
<td>Ws06sb.wkl</td>
<td>Student Statistics- New Students Session</td>
<td>Bar</td>
<td></td>
<td>6</td>
</tr>
<tr>
<td>Ws06wb.wkl</td>
<td>Student Statistics- New Students Week</td>
<td>Bar</td>
<td></td>
<td>6</td>
</tr>
<tr>
<td>Ws07sb.wkl</td>
<td>Student Statistics- Student Loans Session</td>
<td>Bar</td>
<td></td>
<td>7</td>
</tr>
<tr>
<td>Ws07sbdy.wkl</td>
<td>Student Statistics- Student Loans &lt;Day Name&gt;</td>
<td>Bar</td>
<td></td>
<td>7</td>
</tr>
<tr>
<td>Ws07wb.wkl</td>
<td>Student Statistics- Student Loans Week</td>
<td>Bar</td>
<td></td>
<td>7</td>
</tr>
<tr>
<td>Ws08op.wkl</td>
<td>Students by Faculty for Period Ending</td>
<td>Pie</td>
<td></td>
<td>8</td>
</tr>
<tr>
<td>Ws08sp.wkl</td>
<td>Student Statistics- Students by Faculty</td>
<td>Pie</td>
<td></td>
<td>8</td>
</tr>
<tr>
<td>Ws08wp.wkl</td>
<td>Student Statistics- Students by Faculty Week</td>
<td>Pie</td>
<td></td>
<td>8</td>
</tr>
<tr>
<td>Ws09sb.wkl</td>
<td>Student Statistics- Student Usage Frequency</td>
<td>Bar</td>
<td></td>
<td>9</td>
</tr>
<tr>
<td>Ws10db.wkl</td>
<td>Lab Usage- Average No. of Loans Per Hr.</td>
<td>Bar</td>
<td></td>
<td>10</td>
</tr>
<tr>
<td>Ws11db.wkl</td>
<td>Lab Usage- No. of Loans Made Per Hr.</td>
<td>Bar</td>
<td></td>
<td>11</td>
</tr>
<tr>
<td>Ws12db.wkl</td>
<td>Lab Usage- Length of Loans in Hours</td>
<td>Bar</td>
<td></td>
<td>12</td>
</tr>
<tr>
<td>Ws13sp.wkl</td>
<td>Faculty Usage by Faculty Name- Session</td>
<td>Pie</td>
<td></td>
<td>13</td>
</tr>
<tr>
<td>Ws13wp.wkl</td>
<td>Faculty Usage by Faculty Name- Week</td>
<td>Pie</td>
<td></td>
<td>13</td>
</tr>
<tr>
<td>Ws14ob.wkl</td>
<td>Bookings per Lab Per Hour</td>
<td>Bar</td>
<td></td>
<td>14</td>
</tr>
</tbody>
</table>

Figure 4.9: Elements of the Management Report Sub-system filenames scheme (right) including an identifier for worksheet A, number element B, a period element C, graph type D, and a file extension E. As elements A and E always have the same value they do not possess a paradigm, by definition. Paradigms C and D are shown on the left.
No further information on Element B could be gathered by examining the Management Report Sub-system itself. It was necessary to examine the Statistics Menu features that formed the data plotted by the Report Subsystem. By traversing the tree of menu options in order, the features of the Statistics Menu were tabulated in Table 4.11. By examining the system code, it was determined that a single file called STAT.BAT was being appended with records, one for each selected report, from which the Management Report Sub-system would batch produce graphics. Exercising a number of options in the Statistics Menu created the contents of the STAT.BAT file in Table 4.10. The paradigms for Elements C and D in Figure 4.9 correspond to the Period and Output columns in Table 4.10 respectively.

Table 4.10: Contents of the STAT.BAT file, which batches report generation requests from the Statistics sub-system. Non-graphical records are shown in gray.
Table 4.11: ALABS Statistics Menu options (Version 3). The Code column cross-references the Output column to the Graphical Reports column in Table 4.9. The numbers in the first column cross reference to system features in Table 3.2.

<table>
<thead>
<tr>
<th>Option</th>
<th>Sub-option</th>
<th>Output</th>
<th>Period</th>
<th>Code</th>
</tr>
</thead>
<tbody>
<tr>
<td>Software (4.1)</td>
<td>Software Usage by Category</td>
<td>Bar</td>
<td>Weekly</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Sessional</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Table</td>
<td>Weekly</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Sessional</td>
<td>1</td>
</tr>
<tr>
<td>Software Usage by software names</td>
<td>Table</td>
<td>On request</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Bar</td>
<td>Weekly</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Sessional</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Pie</td>
<td>Weekly</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Sessional</td>
<td>3</td>
</tr>
<tr>
<td>Software Usage by Machine Name</td>
<td>Bar</td>
<td>Weekly</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Sessional</td>
<td>4</td>
</tr>
<tr>
<td>Usage by Specific Software</td>
<td></td>
<td>Bar</td>
<td>Weekly</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Sessional</td>
<td>4</td>
</tr>
<tr>
<td>Audio-Visual (4.2)</td>
<td>New Students</td>
<td>Table</td>
<td>On request</td>
<td>6</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Bar</td>
<td>Weekly</td>
<td>6</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Sessional</td>
<td>6</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Table</td>
<td>Weekly</td>
<td>6</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Sessional</td>
<td>6</td>
</tr>
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<td>Bar</td>
<td>Weekly</td>
<td>7</td>
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<tr>
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<td></td>
<td></td>
<td>Sessional</td>
<td>7</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Table</td>
<td>Weekly</td>
<td>7</td>
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<tr>
<td></td>
<td></td>
<td></td>
<td>Sessional</td>
<td>7</td>
</tr>
<tr>
<td></td>
<td>Number of Students by Faculty</td>
<td>Pie</td>
<td>On request</td>
<td>8</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Table</td>
<td>On request</td>
<td>8</td>
</tr>
<tr>
<td></td>
<td>Student Usage Frequency</td>
<td>Bar</td>
<td>Sessional</td>
<td>9</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Table</td>
<td>Sessional</td>
<td>9</td>
</tr>
<tr>
<td>Lab Usage (4.4)</td>
<td>Average number of loans</td>
<td>Bar</td>
<td>Daily</td>
<td>10</td>
</tr>
<tr>
<td></td>
<td>Number of Loans per hour</td>
<td>Bar</td>
<td>Daily</td>
<td>11</td>
</tr>
<tr>
<td></td>
<td>Length of loans made in hours</td>
<td>Bar</td>
<td>Daily</td>
<td>12</td>
</tr>
<tr>
<td>Faculty Usage (4.5)</td>
<td></td>
<td>Pie</td>
<td>Weekly</td>
<td>13</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Table</td>
<td>Weekly</td>
<td>13</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Sessional</td>
<td>13</td>
</tr>
<tr>
<td>Booking (4.6)</td>
<td></td>
<td>Bar</td>
<td>On request</td>
<td>14</td>
</tr>
<tr>
<td>Staff (4.7)</td>
<td></td>
<td>Table</td>
<td>Sessional</td>
<td>14</td>
</tr>
<tr>
<td>System (4.8)</td>
<td>Time Tabling in Hours for Labs</td>
<td>Table</td>
<td>On request</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Time Tabling by Subject Number (Apple)</td>
<td>Table</td>
<td>On request</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Time Tabling by Subject Number (Sperry)</td>
<td>Table</td>
<td>On request</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Machine Availability</td>
<td>Table</td>
<td>On request</td>
<td></td>
</tr>
<tr>
<td></td>
<td>System Closedown Time</td>
<td>Table</td>
<td>Weekly</td>
<td></td>
</tr>
<tr>
<td>Statistics Parameters (4.9)</td>
<td>Session Dates</td>
<td>Screen</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Printer</td>
<td>Printer</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
It seemed reasonable that Element B in Figure 4.9 was related to COMMAND_NO in STAT.BAT, as the function of the other fields in this file was known. A direct correspondence was noted between the COMMAND_NO for the graphical outputs in Table 4.10, and the sub-option number in the Statistics Menu. The correspondence is provided in the Code columns of Table 4.9 and Table 4.11. Note that all the graphical functions of ALABS Management Report Sub-system listed in Table 4.9 are accounted for by the relevant sub-option number in the Statistics Menu in Table 4.11, which forms the paradigm for Element B in Figure 4.9. The 'missing' files indicated in the Gaps column in Table 4.9, are options that do not have any graphical output, see the arrows in the Code column of Table 4.11. As a consequence we can conclude that the list of ALABS Management Report Sub-system files in Table 4.9 is complete.

This example of system archeology was provided to demonstrate the usefulness of semiotics as a source of concepts for, and a way of reasoning about, systems analysis.

Having determined that the Management Report Sub-system is complete, we can now consider some specific reports in terms of another ALABS Assemblage.

This Assemblage, referred to as Assemblage E, exists between the provision of Reports, a permanent requirement of the Notice/Agenda for meetings as specified in the written Job Duty Statement for the Operations Supervisor as mandated by the Microcomputer Laboratories Committee, see Figure 4.10a. It is not surprising that the association between Notice/Agenda, Reports and the Job Duty Statement for the Operation Supervisor is realised through explicit direct references. The existence of these written texts and the use of explicit direct references is confirmed by the author who was subject to them!
This Assemblage exhibits all the characteristics of assemblages described above. The association between these texts is visible to the Operations Supervisor who is expected to provide these reports, and to the members of the Management Committee who are expected to see them. The relationship between these genres still persists some ten years after it was first established. The current operations manager still presents these types of reports to the Management Committee, although ALABS is not used to produce them. Furthermore, the connection between these genres is patently ideological. If the reports were tabled as required, then there was actually very little the Management Committee could have done if, for example, the usage of the facility declined by an alarming 30% (apart from ordering the Operations Manager to find out why). This was of course not the only or indeed the major function of these reports! The production of these reports served to reiterate the established social relations of power between the Operations Manager and the Management Committee with the latter being the more powerful of the two. These reports also served to collect 'hard data' on facility use (see below) in order to argue for additional funding from the University Capital Equipment Expenditure Committee. These reports also acted to remind the Head of ITS that while the Microcomputer Laboratories routinely collected and reported this type of in-depth operational information, ITS could not do this with their mainframe facility. An indication of the success of this strategy was borne out by the Head of ITS who conceded that the Microcomputer Laboratories was routinely processing significantly larger numbers of users than was the university mainframe.

Assemblage E is unusual in that the Reports to be tabled are dependent on texts associated with other Assemblages, and is consequently referred to as a dependent Assemblage. Assemblages A, B, and C involve relationships of unitary cardinality,
where for example one Student Loan presupposes one Student Return. Assemblage D involves the relocation of a participant and a shared material in nested service encounters. In contrast, Assemblage E reflects a non-unitary cardinality between assemblages where, for example, the provision of a Faculty Usage Report is dependent on the accumulated Student Loans, as shown by the thick arrows in Figure 4.10. At some point prior to holding a Management Committee Meeting, one of the Labstaff, Programmer, Laboratory Assistant, or Operations Supervisor would need to mark the appropriate Statistic Reports to be generated that night. For simplicity this is not indicated on Figure 4.9. For example, in order to provide a Sessional Faculty Report, a Labstaff member must have issued the appropriate request (see Table 3.2: 4.5) for the batched report. Once the requests for reports have been issued, the execution of the Daily Close Down feature (Table 3.2: 5.1) by the afternoon shift Trainee at the end of the day will provide the appropriate reports. Using as an example the Faculty Usage Report in Figure 4.10b, the execution of the Daily Close Down is indicated by the chronemic atomic action do dCD which invokes STAT.BAT, see Table 4.10, and the specific ALABS Management Report Subsystem file, Ws13sp.wkl, see Table 4.9. The next morning, the output of this and other statistics reports is provided by the morning shift trainee to the Operations Supervisor. This is indicated by the proxemic action give Reps. Both of these atomic actions are explicit requirements, mandated for trainees in the Daily Procedures listed in the ALABS documentation (Clarke et al 1989). The non-unitary cardinality exhibited in this Assemblage is likely to be a typical arrangement for management workpractices, as distinct from the unitary cardinality associated with operational workpractices in Assemblages A, B, C, and D.
The dependency between these assemblages has also been subject to *deliberate modification*. The Microcomputer Laboratories Management Committee consisted of representatives of various (ex-Institute) schools and University departments who used the facility. By far the most influential users were the School of Education and the School of Industrial and Administrative Studies. The School of Education had in the past been the major user of the facility. It had been initially responsible for shifting the Microcomputer Laboratories from its previous role as the Administrative Data Processing Unit servicing the Wollongong Institute of Education, to its new role as a microcomputer facility servicing teaching requirements. The School of Industrial and Administrative Studies had been recently absorbed into the University's Faculty of Commerce and its Information Systems courses were undergoing rapid increases in student enrolments. As ITS had no interest at that time in incurring the costs of administering the facility paid for in large part by its Schools, it was evident that the Microcomputer Laboratories were going to be subsumed within either the Faculty of Education or the Faculty of Commerce. For either faculty to claim this prize, it would be necessary to mount arguments about the greatest need- in effect mounting arguments about the greatest use. Therefore ‘hard data’ was necessary in order for either of the two major parties to mount or challenge such arguments.

The Microcomputer Laboratories needed to account for Student Loan activity by Faculty (Table 3.2: 4.5) but collecting this type of data was difficult. First year students often did not know in which Faculty they belonged. Therefore, the Laboratories staff decided to use department. Even if the student did not know which department they belonged to, the type of software they were borrowing could be used as a surrogate (see Appendix A2: Transcript A). Knowing the software being borrowed and the software used in specific courses, determined department
membership for a student. Knowing the departmental membership of a student determined their Faculty membership. The Student Loan subsystem was modified to capture the additional departmental membership when students were being enrolled on ALABS. It often fell upon the Labstaff to make a determination as to which department ‘owned’ the student. This data was organised into a Student Usage by Faculty Report (Table 3.2: 4.3), tabled at subsequent Management Committee meetings. Due to a foreshadowed debate about facility ‘ownership’, the Management Committee insisted that the existing reporting arrangement be elaborated through the inclusion of more detailed data. While both Assemblage A and E were maintained, constituent genres in both assemblages needed modifications. The Student Loan genre was modified to capture each student’s departmental affiliation at the beginning of each session. The standardised Reports needed to be modified to include Faculty membership of students.

ALABS was a crucial system because not only did it help to sustain arguments for the continued existence of the Microcomputer Laboratories in a climate of rationalisation and cost cutting, but it also helped to determine in which faculty the Laboratories was to be ultimately housed. Despite its importance, ALABS is a small information system compared to most commercial systems. The presence of a number of Assemblages in what is after all a rather modest information system indicates the importance of this kind of generic patterning for the study of information systems in organisations. It is not surprising that many Assemblages involve spoken genres, associated with written genres. This exemplifies observations by Halliday (1985b, vii) concerning the role of written language involving “...prestigious functions, those associated with learning, religion, government and trade... [associated with]... sources of authority and power...”.
Figure 4.10  A tentative reconstruction of Assemblage E: Reports Genres, an example of a dependent Assemblage. The example shown is the non-unitary cardinality between Assemblage E (a) and Student Loans/Returns from Assemblage A (b) used in generating a Faculty Usage Report.
4.3 ALABS Workpractice Actions

The previously described ALABS Workpractice Assemblages are annotated with chronemic atomic actions, either those relating to triggering a systems feature used during the enactment of a workpractice text, or those involved in the maintenance of the ALABS system itself. With respect to this diachronic case study, action does not play a major role in ALABS workpractices. However, there are several theoretical, methodological and substantive issues that are raised by actions associated with ALABS that are addressed in this section.

The types of action associated with ALABS are described in §4.4.1 together with an explanation of why proxemic actions are not evident in the Assemblage diagrams. Relationships between workpractice action and texts were theorised in Chapter 2 as being discursively organised as well as possessing predecessor-successor relationships. It is the predecessor-successor relationships that are most evident in the case study as described in §4.4.2. During analysis, predecessor-successor relationships can be used to identify the analytical completeness of a workpractice, described in §4.4.3 and §4.4.4.

4.4.1 Types of Action

ALABS was replete with so-called atomic actions, of which two kinds were identified (Clarke 1999). The invocation of particular system features by Labstaff from ALABS menus constituted time or event based atomic actions. Examples of these chronemic atomic actions are shown in the Student-Labstaff Assemblage associated with Version 2 of ALABS. A second kind of atomic action involved the movement of people or goods through space or from place to place. These so-called proxemic atomic actions
are not apparent on Assemblage diagrams. For example, the Class Loans/Returns Assemblage associated with Version 2 of ALABS conflates the relocation of the Tutor and the Class Loan Form from one material setting, the Service Desk, to another material setting, a Teaching Laboratory, shown between the dashed lines in Figure 4.10. This conflation is indicative of the atomic character of actions associated with ALABS.

4.4.2 Relationships between Action and Text

Texts and actions that constitute parts of workpractices are organised discursively and possess predecessor-successor relationships. For ALABS, workpractice actions are related to texts primarily through predecessor-successor relationships. For example, in the case of a personal computer that needed repair, the Hardware Support Officer would invoke an ALABS system feature called Record Hardware Move (Table 3.4: 3.14.1). This system feature existed because machines, which could not be repaired at the Laboratories, and might need to be sent to either a repair facility off-site or an external repairer off-campus. The Record Hardware Move required the scanning of the PC’s Barcode as well as a reason for the movement. The data was either directly entered to the system by the Hardware Support Officer, or a Trainee would assist the officer by prompting for the required information until the data entry was completed. The subsequent relocation of the PC consisted of a proxemic atomic action. This action is successive to completing a specific Record Hardware Move workpractice text. It is also the case that the Hardware Support Officer is charged with the responsibility of being accountable for the location and movement of Microcomputer Laboratories machines. In this sense, the Record Hardware Move and the proxemic action are discursively organised by a Job Statement for the Hardware Support
Officer. However, in the everyday enactment of Hardware Support, the officer was more directly influenced by the logic of first recording a move, and then actually relocating the machine. ALABS proxemic and chronemic actions were so simple that for the most part predecessor-successor relationships could be invoked to explain their existence, structure, and function in workpractices.

4.4.2 Predecessor-Successor Relationship: Material and Consequential

A proxemic atomic action conflated in the Class Loans/Returns Assemblage diagram (ALABS Version 2) was previously described in §4.4.1. The relevant proxemic action is labelled reloc Cf and links the material settings of the Service Desk and the Teaching Laboratory, see Figure 4.11. Recognising the existence of this action and the importance of predecessor-successor relationships, described in §4.4.2, provides a means to determine the analytical completeness of a workpractice description. For the purposes of this dissertation, analytical completeness involves being able to use the existence of an action, to account for the occurrence of a text in several material settings, the identification of these material settings, and the identification of the relevant social subjects enacting texts in those material settings.

With respect to the Service Desk material setting where the Class Form text is produced, reloc Cf bears a predecessor relation to the Class Form text. The existence of the Class Form in a Teaching Laboratory necessarily presupposes the existence of a proxemic action involving the relocation of this text by a responsible agent, in this case by the Tutor. With respect to the Teaching Laboratory, a material setting in which this text is not produced, reloc Cf bears a successor relation to the Class Form text. These relationships between workpractice action and text are referred to here as material predecessor-successor relationships, indicated by curved, black arrows in
Figure 4.11. The term 'material' is not being used to simply designate the Class Form as a kind of *shared material*, but rather to refer to the cultural studies terms of *materiality* or *material conditions* (Schirato and Yell 1996, 239). This term is used to distinguish between the physical aspects and conceptual aspects of communicative practices. The nature of the Class Form, as a physical paper document, constrains the kinds of communicative practice that can be enacted and the type of direct participation that is possible for actual social subjects communicating in physical workplaces.

This proxemic action is also indirectly implicated in subsequent texts. Within the Service Desk material setting, a Class Form is produced as a consequence of conducting Class Loans between Labstaff and Tutors. In a sense, *reloc CF* also enters into a different kind of predecessor relation with Class Loans. Within the Teaching Laboratory, a Class Form is used to conduct Lab Loans between Tutors and Students, and so *reloc CF* also enters into a kind of successor relation with Lab Loan. These indirect relations between workpractice actions and texts are given the name of *consequential predecessor-successor relationships*, indicated by curved, dashed arrows in Figure 4.11.
Figure 4.11: Predecessor-successor relationships between a proxemic action and texts in the Class Loan/Returns Assemblage, Version 2 of ALABS. Material predecessor-successor relations are shown using curved solid arrows while consequential ones are shown using curved dashed arrows. Observed relations are shown using black lines, while hypothesised ones are shown using grey lines.
4.4.4 Analytical Relationships: Symmetrical and Complementarity

Predecessor-successor relationships can also be used to provide other tests of analytical completeness with respect to the description of workpractices. When all workpractice texts and some actions are known, missing actions can sometimes be identified. Because the Class Loans/Returns Assemblage is an example of a nested service encounter involving two sets of genres that are structural complements of each other, an analyst can propose the existence of a ‘return’ proxemic action. The use of symmetry to propose the existence of another proxemic action is correct in this case. The proxemic action called `reloc CF`, is shown together with its material and consequential predecessor-successor relationships in Figure 4.11.

With respect to ALABS workpractices, the relations between workpractice texts and actions can also be used to reason in the reverse manner. So far actions have been used to explain the occurrence of texts in other material settings. But it is also possible to deduce the existence of unknown actions based on an understanding of the workpractice texts. This complementarity between workpractice texts and actions is a methodological consequence of the predecessor-successor relationships. There is no guarantee that symmetry and complementarity will be universally applicable in all Systemic Semiotic studies of workpractices.

4.5 Effective Decommissioning of ALABS

The effective decommissioning of ALABS is described in three parts. As the technology shifted from a centralised stand-alone system to a range of network-based, and more recently web based distributed systems, there has been a corresponding shift from text situations involving service encounters and a variety of written texts to non-text situations described in §4.5.1. This shift from text to non-text situations has
caused the removal of the small amount of proxemic actions supported by ALABS. Also, the large number of chronemic actions enacted by Labstaff during the operation of ALABS has now shifted to the enactment of a small set of chronemic actions. With the removal of service encounters, Labstaff are now involved almost entirely in chronemic actions associated with the support of the technical infrastructure associated with networks and the Internet. Students on the other hand are involved in chronemic actions associated with selecting, as well as using, software located on Microcomputer Laboratories file servers, see §4.5.2. An important substantive result from this case study is that ALABS has been responsible for standardising register aspects, especially tenor at the facility. Some of the workpractices utilised within ALABS are re-used in other systems; for example the new Central Administrative System (CAP) slated for commissioning in 2000. In this way, generic and register features can persist in organisations long after the systems that introduced them become effectively or actually decommissioned, see §4.5.3.

4.5.1 From Text to Non-text Situations

A major trend in the effective decommissioning of ALABS has been the replacement of text situations with non-text situations indicative of the move from computer based support of systems functions in ALABS to network-based technologies. This trend is evident in Table 4.12 which shows the number of written and spoken texts associated with workpractices which bound together social subjects across all versions of ALABS. The details of the table are summarised from the Assemblages provided in §4.3. Excluded from the table are reports generated directly from ALABS. Also excluded are those workpractices which involve non-unitary cardinality associated with the Management Committee, as the precise number and type of reports could not
be adequately recovered from interviews or existing sources of documentation, see discussion in §4.3.6. Note that [Normal] and Long-term refer to the classification of Staff members illustrated in Figure 4.5 and described in §4.3.3. Also note that Tutors are unique in that they were involved with both Labstaff and also Students, see Assemblage C and D in §4.3.4 and §4.3.5 respectively. All other social subjects are only involved in workpractices with Labstaff members, and with no other social subjects, indicated by dashes. Table 4.12 forms a symmetrical matrix. Cells to the right of the diagonal are not repeated and so are grayed out since there is no implied directionality in the arcs of the Assemblages that join texts to different Social Subjects. The diagonal cells are also grayed out because, by definition, it is impossible for social subjects to form text situations with themselves!

The blank cells in later versions of ALABS testify to the replacement of text situations with non-text situations. The trend from text to non-text situations is clear with respect to Students. ALABS saw the introduction of the spoken service encounters of Student Loans, Returns and Appends and the written text of Conditions of Loan in Version 1. These texts were joined by Student Loan Renewals, Student Moves and Student Booking workpractices in Version 2/3. By Version 4, the available spoken service encounters were reduced to Student Loans and Returns, while the Conditions of Loan written text common to Versions 1 and 2/3 was replaced with the Rules Concerning the Use of Computing Facilities which became campus wide policy. Although the workpractices involving [Normal] Staff have remained relatively stable and persistent across all ALABS versions, still supported for example are the Staff Loans and Returns, Version 4 saw the removal of all written texts associated with this Social Subject (Overdue Letters and Yearly Staff Loans Forms). In contrast, the Long-term Staff, a category of Social Subject introduced in Version
2/3 and involving two service encounters (Long Term Staff Loans and Long Term Staff Returns) and no written texts, no longer has any workpractices associated with it. The category of Tutor, involved in a complicated set of workpractices, no longer exists as a social subject defined by the system. There was a reduction in the number of workpractices between Labstaff and Tutors from four spoken service encounters (Tutor Loans, Tutor Returns, Class Loan and Class Return) and three written texts (Yearly Tutor Loans Form, Overdue Tutor Loan Letter, and Class Form) in Versions 1 and 2/3, to none in Version 4. Consequently, there was also a reduction in the number of workpractices between Students and Tutors from two spoken language service encounters (Lab Loan and Lab Return) and one written text (Class Form) in Version 1 and 2/3 to none in Version 4.

Table 4.12: From text to non-text situations. Spoken texts (bold) and written texts associated with social subjects across all versions of ALABS excluding texts involving the Management Committee.

<table>
<thead>
<tr>
<th></th>
<th>Labstaff</th>
<th>Students</th>
<th>[Normal]</th>
<th>Long-term</th>
<th>Tutor</th>
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<td>1</td>
<td>2/3</td>
<td>4</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Labstaff</td>
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</tr>
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<td>Students</td>
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<td>2,1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>[Normal]</td>
<td>2,2</td>
<td>2,2</td>
<td>2</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Long-term</td>
<td>2,1</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Tutors</td>
<td>4,3</td>
<td>4,3</td>
<td>2,1</td>
<td>2,1</td>
<td>-</td>
</tr>
</tbody>
</table>

4.5.2 From Proxemic to Chronemic Action

Directly related to the trend in replacing text situations with non-text situations, described above, is the removal of all proxemic actions associated with ALABS. As noted in §4.4, proxemic action was rarely found in ALABS. Proxemic actions were also atomic, that is they did not exhibit the kind of structural complexity usually found in other types of information systems, for example manufacturing information
systems (Clarke 1999b). This is presumably a characteristic of administrative information systems, a point described more fully in §5.2.2.3. The proxemic actions reloc CF and reloc CF', described in §4.4.3, were excised when Tutors were cut from the available Social Subjects supported by ALABS. As reports are not furnished from ALABS or any other replacement system, the give Reps proxemic action described in §4.3.6 has also been completely removed.

In contrast, there were a large number of atomic chronemic actions associated with invoking various ALABS systems features. These have been tabulated for each of the Assemblages described in §4.3.2 to §4.3.6 inclusive. In general, there has been a shift from the large number of chronemic atomic actions enacted by Labstaff using ALABS, to a much smaller set of chronemic atomic actions enacted by Students as they select network based applications in Teaching Laboratories using systems that replaced ALABS. These systems are described more fully in §4.5.4.

4.5.3 Persistence of ALABS

The technological changes, which have lead to the effective de-emphasis of ALABS in the operations of the Microcomputer Laboratories, are evident in the changes in Mode, especially in changes to Channel. The Labstaff spent much of their shifts serving behind the counter. The Field relationships for all the laboratory staff have consequently changed as a result of networking. While there have been major changes to Field, that is, changes to the social actions and activities in which participants are engaged, the de-emphasis of ALABS has not been enough to completely replace these workpractices in all instances. Furthermore, some of the social actions and activities (Field) and the roles and relationships of and between participants (Tenor), which
ALABS effectively stabilised and standardised, are still evident today at the Microcomputer Laboratories.

ALABS has had features removed entirely- some features have been actually decommissioned. Features have been effectively decommissioned- they still exist in the system but are never used. Some features have been removed from the province of ALABS and subsumed by other systems, for example many of the reporting functions were subsumed by various network administration features. Despite vast shifts in technologies from those that were available when ALABS was first developed and the subsequent de-emphasis of this system from the current operations of the Microcomputer Laboratories, many register aspects of these workpractices and some genres that ALABS helped to standardise, still persist. The attraction of workplace computerisation for management is probably the increased control and standardisation that generally results by computerising workpractice functions. These can be viewed using Systemic Semiotics as shifts in field (social activities and actions), tenor (roles and relationships of and between participants) and mode (performative aspects of texts), as well as additions, deletions, and modifications to genres and qualitative sequences which constitute the communicative repertoire of workpractices in workplaces. It is the ‘regularities in practice’ which genres represent, their ‘visibility’ particularly when implemented as information systems features, as well as their characteristic of being ‘subject to deliberate modification’ (Freadman and Macdonald 1992, 8-9) that may motivate management to undertake workplace computerisation.

In the case of the Microcomputer Laboratories, ALABS was used to ensure the continued existence of the facility during a period of great change at the University.
Despite the effective decommissioning of ALABS in daily operations, the tenor relationships introduced with ALABS effectively remain the same. As already noted, some of the field relationships introduced and standardised by ALABS, are also still evident although certainly much less central to the current operations of the facility than they had been in the past. This leads to the following observations. Information systems features can persist, well after the need for it has passed, and long after the platforms upon which it was built have become obsolete. This concept of persistence is theorised here in terms of Systemic Semiotics. While similar conclusions have been reported in a case study of an office automation system (Pipek and Wulf 1999), no attempt has been made to theorise the term and in this sense move beyond the trope. Information systems can persist in organisations not only as systems, sub-systems, programs, and functions, but also as collections of genre and qualitative digraphs- as preferred activities and ways of performing work, and as standardised roles and social relations of power between participants that systems development practices construct for organisations. Arguably, an information system may persist longer as patterns of communication than they ever could as source code.

Uncontested genres are likely to be reused and may therefore re-occur time and again in organisations. A minor example of this is the persistence of an enrolment feature in ALABS for getting (late) students onto the network, which has been reused in the LOGIN system at the Laboratories. There are alternatives to this enrolment procedure used at other installations on campus through so-called anonymous ‘guest’ accounts. Here we have an instance of generic inertia (Freadman and Macdonald 1992, 8). This may explain why organisations find it difficult to completely decommission some systems, certainly the case with ALABS at the Microcomputer Laboratories. Another
example of generic inertia is the persistence of Staff Loans/Returns workpractices, which is a feature still available through ALABS. Generic inertia is often associated with systems, which have proved to be indispensable to the organisation in the past. Information systems that were considered successful may have been so precisely because they successfully rework, entrench or extend existing workplace genres.

Generic cut and paste operations also demonstrate genre's capacity to be 'subject to deliberate modification' (Freadman and Macdonald 1992, 8-9). Prior to the ALABS system being developed, the issuing of software was very informal, but it is possible to see some of these elements recycled in the subsequent system, see Chapter 3, §3.2.2, §3.3.2 and §3.3.3. Rather than relying on familiarity to identify staff members, ALABS relied on university staff and student identification cards. Instead of manually recording software titles the system was able to record the precise issue and copy number. So the identification of individual agents and the allocation of software and other resources to them served the same generic ends in the manual system as it did when ALABS implemented and standardised these features. A common situation occurs during the conversion of an existing manual system to a computer based information system, that is, parts of the existing system are generalised and standardised. The manual loan genre was reused in the development of ALABS. The ALABS Student Loan genres were elaborated by generically pasting new elements for the accurate identification of users and for machine allocation. The identification and loan elements of the manual system prior to ALABS were pasted into this genre. When it came time to add a Labpass feature in Version 2, the appropriate element was simply pasted into the genre after the identification and borrowing elements,

As already noted, the ALABS system is effectively decommissioned. The types of operation that ALABS still supports bear a generic resemblance to the former versions of ALABS (those versions prior to the emergence of widespread networking at the Microcomputer Laboratories). The current version of the system (Version 4) is normally used to 'put late students on the system', that is, students who enrolled late and were therefore not automatically allocated an account on the network. This is reminiscent of the initial enrolment of students on ALABS. Of course, other service encounters such as Tutor Loans and Returns became unnecessary with the emergence of networking and were cut entirely from the genre collection represented by ALABS. Tutor Loans and Returns represented the 'most effort' per client type and were an 'attractive' client type to cut from the system when it became possible to do so.

During the course of its formation and commissioning described in Chapter 3, §3.3, and its diachronic expansion in §3.4, ALABS was the only administrative operational system at the Microcomputer Laboratories. It also represented the only system that had been developed at the facility, serving the primary responsibility of distributing and preserving items held at the facility. At the time of writing (1999), the current applications portfolio at the Microcomputer Laboratories can be divided into three groups (Athanasiadis 1999). The first group involves the support of networks at the Laboratories. The second group of systems consists of those that were developed to support and administer teaching functions at the facility. The third group of systems are network-based applications that replace ALABS and ALABS SUPERVISOR features, see Table 4.13. The existence of the first group involves the support of the
new network-based technical infrastructure and is recognition of the fact that network vendors do not provide the kinds of management features required by large educational facilities. The Microcomputer Laboratories has marketed the PQ system to other universities. The second group of systems supports the secondary responsibility of the Microcomputer Laboratories, the support of the teaching process itself. Once the operational integrity of the facility was guaranteed it was only reasonable to support the next most important function of the Microcomputer Laboratories. Nor should it be surprising that this function would need to be supported by various purpose-built systems. The third group of systems in the current applications portfolio follows the technological trend of creating client-server applications for operational support. Interestingly, network technologies promote the centralisation of administrative functions. The Central Administrative System (CAP) currently under development will recreate some ALABS features, particularly the Accounts features (Table 3.2: 6). CAP will also manage information concerning subject accounts, which were the responsibility of the LOGIN systems. The ALABS 'Backup Databases: Faculty Usage' feature (Table 3.2: 3.8.14) was migrated to the LOGIN systems, and will be actually decommissioned when CAP becomes operational. The functionality of the ALABS Statistics Menu features was migrated to the LOGIN systems and the Software Metering Program (SMP). Statistics were generated using in effect the same Assemblage E described in §4.3.6, as late as 1998. However, there is now no requirement for these reports to be tabled, although they can still be made available if any operational need emerges for them (Nicastri 1999).

Interestingly, ALABS will still provide Loan and Return workpractices for Staff (Table 3.2: 2.1.2 and 2.2.2) as well as providing a central repository of item holdings
for the Microcomputer Laboratories (Table 3.2: 1.1 and 1.3). ALABS SUPERVISOR will still exist to create timetables (Table 3:14: 8). It appears very difficult indeed to actually decommission all of the ALABS functionality from the workpractices of the Microcomputer Laboratories.

Table 4.13: Current Applications Portfolio at the Microcomputer Laboratories
(after Athanasiadis 1999)

<table>
<thead>
<tr>
<th>Group</th>
<th>Applications</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Network Support</td>
</tr>
<tr>
<td></td>
<td><em>Printer Management System (PQ) Version 2.0d</em>&lt;br&gt;PQ allows the MicroLabs staff to examine and manipulate jobs on the printer queues of the interconnected Novell file servers. First commissioned in 1992.</td>
</tr>
<tr>
<td>2</td>
<td>Teaching Support and Administration</td>
</tr>
<tr>
<td></td>
<td><em>SUBMIT Version 2.01</em> (Microcomputer Laboratories 1992)&lt;br&gt;Server-based assignment submission system, extended to include automated assignment marking and distribution of lecture materials. First commissioned in 1988.</td>
</tr>
<tr>
<td>3</td>
<td>Network-based Applications (replacing ALABS functionality)</td>
</tr>
<tr>
<td></td>
<td><em>LOGIN System Version 1.1 for DOS</em>&lt;br&gt;A server-based login system running under DOS (Dodds and Athanasiadis 1995), first commissioned in 1992 when the Microcomputer Laboratories relocated to Building 40.</td>
</tr>
<tr>
<td></td>
<td><em>LOGIN System Version 1.0 for Windows 95</em>&lt;br&gt;Same as above but for Windows 95 operating system</td>
</tr>
<tr>
<td></td>
<td><em>Software Metering Program (SMP) Version 1.4</em>&lt;br&gt;Network license management system, first commissioned in 1995.</td>
</tr>
<tr>
<td></td>
<td><em>Tutorial Enrolment System (TES) Version 2.2</em>&lt;br&gt;(first commissioned Microcomputer Laboratories 1990)</td>
</tr>
<tr>
<td></td>
<td><em>Central Administration System (CAP) Version 0</em>&lt;br&gt;Supports student accounts currently implemented with ALABS Accounts feature. This system will also support the Student Loans (manual) currently conducted with the ALABS Student Loan feature. It will be designed to support the management of subject accounts currently conducted through a feature in the LOGIN system. This system will replace PQ.</td>
</tr>
</tbody>
</table>
4.6 Towards a Generic Model of Workpractice Change

4.6.1 Implications of the Case Study for Genre Theory

In using systemic-functional linguistics, especially the formulation of genre by Hasan, to examine transcripts of these service encounters, the study has provided ethnographic evidence and actual transcript evidence which seems to be in conflict with some of Hasan's claims for genre. For example, Hasan claims that the Contextual Configuration can be used to predict what elements must occur, the so-called obligatory elements. According to Hasan, if an obligatory element were to be absent, then the text is either a non-text or does not belong to that genre. Ethnographic evidence suggests that on admittedly rare occasions an obligatory element was renegotiated into a completely different element, yet the genre was successfully enacted. Without an obligatory/optional element distinction genres become much broader categories than Hasan would permit. By moderating the predictive claims made about the Contextual Configuration, we can remove the obligatory/optional element distinction that Hasan employs. This alters the nature of genres from a species view to that of a quasispecies. Furthermore, several of the ALABS (Staff Loan and Return) transcripts provided evidence of what Ventola refers to as generic switching. Generic switching cannot be accommodated by Hasan's linear Generic Structure Potential.

By studying transcripts associated with the use of various ALABS functions over time, we can see changes in these service encounter genres. Changes to these genres are the result of deliberate modifications to the ALABS system. Three types of changes take place over time with these genres, generic cutting—where one or more elements are removed, and generic pasting were one or more elements are added, and
a combination of these two called *generic elaboration*, where genre elements are both added and removed. Interestingly, generic cutting and pasting has also included obligatory elements. Despite rather drastic changes in some genres over time, the ultimate goals of these genres have *persisted*. Networked technologies have diminished the importance of ALABS to the Microcomputer Laboratories. Software loans to students (the reason ALABS was initially developed) are no longer conducted since students use software by merely logging onto a network. Yet the Student Loans Genre still persists for those occasions when students need a manual. Networks installed in departments mean that Academic Staff do not need to borrow software from the Microcomputer Laboratories, but Staff Loans and Returns Genres still persist for those occasions when manuals are required. One set of workpractices which were once available through ALABS but which no longer exist, are the so-called Class Loans/Returns and Tutor Loan/Return. Network mounted software entirely removed the need for boxed class sets of software to be loaned and returned to Tutors. The persistence of systems in organisations is linked to the longevity of the goals of its constituent genres.

It would seem that even modest information systems like ALABS consist of many genres. It is not surprising then that some of these genres seem to be closely associated with each other. We referred to these closely associated genres as forming an *Assemblage*. Assemblages seem to be ideologically motivated aggregates of genres, a kind of ‘between genre’ connectivity that marks out the specific use of this information system in its (situational and cultural) organisational context. Despite the fact that only a subset of the ALABS genres have been examined here, five Assemblages have been located.
The main outcome of this dissertation is that Systemic Semiotic analysis provides a way of analysing and describing work practices in workplaces as they are realised linguistically. Because the work practices studied here are associated with the use of an information system, we can use genre analysis to study the changes that have taken place with the information system (ALABS) in its organisational context (Microcomputer Laboratories). An information system in use comprises many genres and Assemblages, and viewed from this perspective, information systems have some interesting characteristics: one of which is that of persistence. The persistence of systems, their longevity in organisations, is linked to the ideological congruence, consistency and the relevance of their constituent genres and Assemblages.

4.6.2 Genre as Quasispecies

As described in Chapter 2, traditional theories of genre consider a text as being a member of a genre if and only if the text possesses all of the obligatory elements presumed to be necessary for defining the genre. In all other circumstances, the text either belongs to some other genre or is in fact a non-text. Work conducted by Ventola (1987) problematises obligatory elements as genre defining by showing that in some service encounters these elements may be entirely absent. In the Student Loan/Return workpractice described in Chapter 3, §3.3.1, the obligatory element Identification Sought was renegotiated into the Value of a retained Item. This indicates that not only can we expect the omission of genre-defining elements, but that knowledge of the service encounter by a social subject can lead to the active renegotiation of its structure. This results in a Student Loan by another means.

Diachronic changes to workpractices also revealed that one or more obligatory elements, and entire genre sequences, could be successfully substituted with others.
While the social purposes achieved by these workpractices were left in tact, the staging used to achieve them was altered. Despite the stability of the registers studied here, there have been some notable changes in the structural arrangement of elements in specific genres as a result of ALABS end-user development. While some sequences have proved to be enduring, for example staff Returns where no changes have occurred since the inception of the system, there have been three distinct types of structural arrangements (Versions 1, 2/3 and 4) for Student Loans. There have also been three distinct Student Returns, although the staging in Version 1 and 4 are identical. These changes have been associated with obligatory elements Labpass Out, Regulations and Enrolment elements for Student Loans and Labpass In for Student Returns.

Over time, several schematic structures are likely to emerge for a given context of situation in a workplace. Each schematic structure serves the same general purposes, but does so by (i) employing an commonly used genre element selection from the genres element inventory; (ii) employing an unusual genre element selection from the genre's element inventory; or by (iii) the active renegotiation of a genre element into an element with a novel function, which results in a new schematic structure. By allowing similar sequences to be included within the membership of a genre, necessitated by the findings in this longitudinal case study, a new structure is formed (Eigen 1993) which is referred to here as a genre quasispecies. Genre quasispecies have several advantages in that they emphasise that a variety of sequences that can be mobilised by participants while still satisfying similar generic aims.
4.6.3 Generic Model of Workpractice Change

The structural units of analysis provide the basis for a generic model of workpractice change, illustrated in Figure 4.12. These units are related to the analysis steps involved in constructing the different entities and since the analysis is conducted ‘bottom-up’, the first unit to consider is the genre and qualitative element. The second unit to consider is the genre and qualitative sequences that are built out of the elements below. Sequences are merged to form digraphs and ultimately collapsed to form a third unit of diachronic change. The fourth unit of diachronic change is the formation of assemblages and attendant associations from the collapsed and assembled genres and qualitative digraphs. The fifth and final unit of diachronic change is that of social subjects within genre collections. In principal, diachronic workpractice changes can occur at any of these units. In operational systems like ALABS, proxemic or chronemic actions are subservient to workpractice texts and so are not considered here. Operations that could in principal be associated with these structural elements include cutting, pasting, elaboration, and copying for elements, sequences and digraphs. These basic operators do not apply to larger composite structures such as Assemblages, Associations, and Collections. For example, it would be hard to imagine the effect of ‘copying’ or ‘elaborating’ a social subject, although adding them or removing them is reasonable (the latter did actually occur in ALABS).

The actual structural and non-structural diachronic changes to ALABS are provided in Table 4.14. The first column lists each of the actual structural units for which a change has been identified, within which are listed the type of operations responsible for the change, and the relevant workpractices that have been changed as a consequence. The second column provides a rationale for the change, the next column
shows the version of ALABS in which the change occurred, and the last column provides a reference to a description of each change within the dissertation.

**Figure 4.12**: Generic Model of Workpractice Change showing the structural units (bold) that could in principle be implicated in diachronic change.
### Table 4.14: Structural (a) and Non-structural (b) Diachronic Changes to ALABS

<table>
<thead>
<tr>
<th>Unit/Operation/Workpractice</th>
<th>Rationale</th>
<th>Version</th>
<th>Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>1</td>
<td>2/3</td>
</tr>
</tbody>
</table>

#### (a) Structural Diachronic Changes

<table>
<thead>
<tr>
<th>Elements</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Pasting</strong></td>
<td></td>
</tr>
<tr>
<td>Student Loans</td>
<td>Proxemics</td>
</tr>
<tr>
<td>Student Returns</td>
<td>Proxemics</td>
</tr>
<tr>
<td><strong>Cutting</strong></td>
<td></td>
</tr>
<tr>
<td>Student Loans</td>
<td>Proxemics</td>
</tr>
<tr>
<td>Student Returns</td>
<td>Proxemics</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Sequences</th>
<th>* indicates multiple sequences</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Sequence Copying</strong></td>
<td></td>
</tr>
<tr>
<td>Student Appends</td>
<td>Social subjects</td>
</tr>
<tr>
<td>Tutor Loans/Returns*</td>
<td>Social subjects</td>
</tr>
<tr>
<td>Long Terms Staff Loans/Returns*</td>
<td>Social subjects</td>
</tr>
<tr>
<td><strong>Sequence Cutting</strong></td>
<td></td>
</tr>
<tr>
<td>Class Loans/Returns*</td>
<td>Social subjects</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Sequence Elaboration</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Student Renewal</td>
<td>Chronemics</td>
</tr>
<tr>
<td>Student Move</td>
<td>Proxemics</td>
</tr>
<tr>
<td>Student Booking</td>
<td>Chronemics</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Digraphs</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Copying</strong></td>
<td></td>
</tr>
<tr>
<td>Yearly Staff Loans Form</td>
<td></td>
</tr>
<tr>
<td>Yearly Tutor Loans Form</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Assemblages</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Structural Complements</td>
<td>✓</td>
</tr>
<tr>
<td>Assemblages</td>
<td>✓</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Collection</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Cutting (Tutors)</td>
<td>Social subjects</td>
</tr>
</tbody>
</table>

#### (b) Non-structural Diachronic Changes

| MEMOs            | Reuse | ✓ | §3.4.7 |
| Normal/Long Term Staff Workpractices | Redundancy | ✓ | §4.2.4 |

Interestingly, not all of the relevant operators are evident in this case study. **Missing operators** include elaboration and copying at the unit of the element, pasting at the level of sequences, and cutting, pasting and elaboration at the level of digraphs. It is also interesting to note the **disposition** of changes to ALABS in terms of elements, sequences and digraphs, which appear to be related to end-user development practices. For example, at the level of the element only insertions and deletions occur.
Sequences on the other hand have been removed, copied, and modified for a variety of reasons including changing the workpractice proxemics, chronemics and social subjects. Finally, the duplication of entire digraphs is relatively rare and it has been limited to the duplication of written regulatory genres, see Texts J and M which are identical in almost all respects. At higher level units operations on assemblages involving structural complements and Assemblages are apparent across all versions of the system, and the deletion of the Tutor in the caused the removal of multiple sequences. It is not surprising that sequences and elements constitute the most used locus of end-user development practice while higher units such as assemblages and genre collection itself, are used for less frequent but more drastic changes to the entire system.

Several regularities were observed in the diachronic changes that took place at the level of the workpractice assemblage in ALABS. The regularities are referred to as principles although no claim is being made about their universality across other systems. It was noted in §4.3.2, that there is a conservation of social relations of power for constituent workpractices in assemblages. In §4.3.2, it was also noted that each additional workpractice had to be compatible with other current workpractices in the assemblage, a principal referred to as successive activity differentiation. However, on at least one occasion a new social subject was constructed in order to permit different social relations of power to operate in specific conditions- this principal was referred to as the production of social subjectivity, described in §4.3.3. Finally it was noted that on two occasions, social subjects that were involved in more than one set of distinct workpractices, so called shared subjects, were implicated in diachronic changes to the system, a principle referred to as shared subjects as change vectors, described in §4.3.4.
The intertextual relations that occurred within ALABS Workpractice Assemblages, §4.3.2 to §4.3.6 inclusive are provided in Table 4.15. Typically the types of intertextuality that realised associations in ALABS was direct intertextual relations. With the exception of Assemblage D, all other assemblages at the very least utilised direct intertextual relations. Two out of the five assemblages described in this study, have dialogic intertextual relations, and Assemblage D consists entirely of them.

There appears to be no correlation between the *persistence of workpractices and the type of intertextual references* employed in their associations. For example, the Assemblage D did not have any direct or elliptical intertextual references at all, yet it was one of the most complicated assemblages in terms of the number and interrelationships between its workpractices and also one of the most persistent. However, there appears to an interesting relationship between the type of intertextual reference employed in associations and the ontogenetic sequence of development for workpractices in their respective assemblages. For those assemblages which were subject to ontogenetic accretion of new workpractices (Assemblages A and B), the initial workpractices employed direct intertextual references in their associations. Once those intertextual relations were established, additional related workpractices utilised elliptical intertextual relations. Finally, dialogic intertextuality was used to associate additional workpractices. As a consequence Assemblages C and E which did not have any ontogenetic development sequences for their constituent workpractices, consisted entirely of direct intertextual relations in the respective associations. This is not surprising in the case of Assemblage E because it was related to ALABS Management functions, and therefore consisted entirely of written texts where direct
inter textual references should be expected. The only exception to this relationship between the ontogenetic sequence of development and the type of inter textual references used in their respective associations was Assemblage D. It was however the only large scale importation of workpractices from the Manual System, and its very nature as the most 'manual' group of workpractices, may explain its reliance on dialogic intertex tuality.

Table 4.15: Genre and qualitative digraphs involved in specific types of intertextuality used in realising associations in Workpractice Assemblages. Italicised names indicate written texts.

<table>
<thead>
<tr>
<th>Assemblage</th>
<th>Intertextual Relations</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Direct</td>
</tr>
<tr>
<td>A: Student Loans/Returns</td>
<td>Student Loan</td>
</tr>
<tr>
<td></td>
<td>Student Return</td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Conditions of Loan</strong></td>
<td></td>
</tr>
<tr>
<td>B: Staff Loans/Returns</td>
<td>Staff Loan</td>
</tr>
<tr>
<td></td>
<td>Staff Return</td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Yearly Form</strong></td>
<td></td>
</tr>
<tr>
<td>C: Tutor Loans/Returns</td>
<td>Tutor Loan</td>
</tr>
<tr>
<td></td>
<td>Tutor Return</td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td>D: Class Loans/Returns</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td>E: Report Genres†</td>
<td>Notice/Agenda</td>
</tr>
</tbody>
</table>

† shared material counted twice (once per material setting)
‡ dependent Assemblage
4.7 Precise

In this and the previous chapter, a diachronic case study of a small operational system called ALABS was described using Systemic Semiotics. ALABS has been in use at the Microcomputer Laboratories since the mid-1980s, although over time various features have been reworked. Currently, ALABS is effectively decommissioned as network based technologies made many of its features obsolete.

The purpose of this chapter was to trace the diachronic contraction in Version 4 of the system, particularly the element and sequence cutting that occurred in Student Loans and Returns and the excising of all systems features associated with Tutors. As a consequence of identifying structural complements between workpractice genres, the concept of Assemblages was proposed in order to describe the systematic modifications being made to sets of discursively related genres. For those system features for which texts were not available, a similar structure called a Qualitative Assemblage was developed to represent sets of related qualitative sequences, or to relate one or more qualitative sequences to one or more genres. The Class Loan, Lab Loan, Lab Return, and Class Return form a pair of Qualitative Assemblages consisting of nested service encounters. Some assemblages can also be in a state of dependency with other assemblages.

The role of actions in workpractices was also described, although ALABS did not exhibit any complex action sequences. The identification of action associated with workpractices assisted in determining the analytical completeness of ALABS Assemblages. By developing the concept of a Genre Collection, a number of trends became apparent in the diachronic expansion, contraction, dissipation and effective decommissioning of ALABS. These trends include the movement from text to non-
text situations, and the removal of proxemic actions to chronemic ones, associated with the migration of ALABS features to other systems, or the abandonment of ALABS workpractices altogether. Despite this ALABS continues to persist (Clarke 1996) in the kinds of activities undertaken, and the types of participant roles designed to enact them. This attribute of persistence has also been reported in a case study of a groupware application (Pipek and Wulf 1999).

Finally, the implications of this case study for genre theory have been discussed which have led to the proposal for reformulating the concept of genre as quasispecies to account for the structural variety in workpractices identified in this study. A generic model of workpractice change based on the quasispecies concept has also been outlined.
Chapter 5: Conclusions

5.1 Introduction

This chapter provides a summary and discussion of the contributions of the dissertation in §5.2 together with further proposals for research in §5.3. The research contributions are organised into theoretical contributions in §5.2.1, methodological contributions in §5.2.2, and substantive contributions in §5.2.3. This organisation promotes a more succinct summary of the substantive and methodological contributions as a consequence of the development and deployment of Systemic Semiotic theory. Where relevant, these contributions are situated within broader debates in the semiotic and information systems literatures. The further research section §5.3, discusses several important topics including, tool support for methods in §5.3.1, a proposed information systems development methodology based on systemic semiotics in §5.3.2, and three proposed extensions to the analysis in §5.3.3. These research proposals are organised from the smallest and most specific research project often based on exploratory studies, through to the largest and most general future research programs.

5.2 Contributions

5.2.1 Theoretical Contributions

5.2.1.1 Semio-linguistic approach to theorising information systems

This dissertation employed Systemic Semiotics to describe the workpractices associated with a system in its organisational contexts. It represents the fourth distinct semio-informatic analysis methodology following ISAC, developed by Lundeburg et al (1981)
from a research proposal suggested by Langefors (1966/1973), MEASUR (Stamper 1992), and PAM (Kolkman 1993). In contrast with these approaches, this dissertation does not use any theory of the sign as the basis for a semio-informatic analysis of an information system. A semio-linguistic or text-semiotic approach (Nöth 1990) is developed here which utilises the fact that many features of information systems instantiate patterns of human communication (texts) and action. As a consequence, this work is closer theoretically to Work Language Studies, which have at times also utilised concepts from Systemic Functional Linguistics (Andersen and Holmqvist 1988). Each text associated with an information system feature “...typifies a communicative ‘act’ that is recurrent and therefore ‘significant’ as a cultural ‘fragment’” (Crawshaw 1991, 101). The Systemic Semiotic concept of text is explicitly theorised in relation to its specific situational and organisational cultural contexts. The concept of genre has proved to be of use in describing the recurrent patterning by which information systems features are negotiated by social subjects. Analysing the structure and composition of genres provides the means by which patterns of human communication associated with information systems use can be understood synchronically and diachronically in relation to specific situational and organisational contexts.

5.2.1.2 Genre as Quasispecies

Neither of the models of genre developed within the systemic functional linguistics literature (Hasan in Halliday and Hasan 1985; Martin 1992, 1994a, 1994d), were sufficient to describe the use of, or structural changes to, the genres associated with ALABS workpractices over time (Clarke 1996). Hasan’s model of genre defines a specific genre
using a Contextual Configuration- an instance of field, tenor and mode. For Hasan therefore, genre is associated with register. Martin’s model theorises genre as a distinct stratum from register, enabling genre to be viewed as a system. A major similarity between these models of genre is that for both Hasan and Martin, a distinction is drawn between obligatory and optional genre elements. Hasan’s model of genre in particular emphasises both theoretically and methodologically the distinction between obligatory and optional genre elements. Obligatory genre elements are genre defining in that if a text does not possess all its obligatory elements then it is deemed to be either a text belonging to a different genre or an instance of a non-text. A consequence of the obligatory-optional element distinction is that a given genre is viewed taxonomically as a ‘crisp’ cluster (Bandemer and Gottwald 1995, 178), or a kind of species. Martin’s model of genre places less emphasis on the genre defining characteristics of obligatory elements, while still recognising them methodologically. Indeed Martin’s model emphasises the adaptability of a canonical genre to a particular context of situation. Ventola (1987), a student of Martin, demonstrated that genre elements which would have to be classified as obligatory need not be present in actual texts. In this dissertation, the author reported on an obligatory element in a service encounter associated with the ALABS Student Loan feature being negotiated into a completely different function. Given these observations it is difficult to reconcile a practical distinction between obligatory and optional elements and the membership of a text to a specific genre.

As an alternative to the obligatory-optional element distinction and the species view of genre that results, this author advocates considering genres as a kind of quasispecies (Eigen
1993). A genre quasispecies requires no partitioning of genre elements into obligatory or optional types. Each element within a genre sequence can be considered as having a certain frequency of occurrence in a genre sequence. Some elements are likely to occur more frequently than others, and indeed a given element may occur in every text that is analysed. Considering genre elements in this way, as members of a genre inventory with an observed frequency of occurrence means that a given genre can possess more than one possible structural configuration of elements. Considering genre as a quasispecies would enable the synchronically disparate genre sequences of texts described by Ventola (1987), to be considered as members of the same genre despite the absence of genre elements which would otherwise have a high frequency of occurrence in these sequences. Indeed, a quasispecies view of genre can be used to explain the existence of canonical genres proposed by Martin (1992) and used extensively in educational applications of systemic functional linguistics. The canonical genre becomes a prototype or cluster centre, with alternate genre sequences at various distances from the cluster centre. When a genre sequence's element utilisation and structural arrangement are very different from that of the canonical sequence or prototype, then the genre sequence could be thought of as 'very distant' from the cluster centre of the quasispecies (Bandemer and Gottwald 1995, 177-182). Considering genre as a quasispecies also enables diachronically related genre sequences, like those associated with the ALABS system features described in this dissertation, to be considered as members of the same genre despite the element cutting, pasting and elaboration exhibited between successive diachronic instances. Theorising genres as quasispecies, creates the conditions under which descriptions of genres as persistent features in workplaces can be made.
Chapter 2 described the Systemic Semiotic workpractice framework, which enables information systems features to be linked to specific situational and organisational cultural contexts. The framework enables the creation of contextual descriptions of information systems features in terms of one or more text types and zero or more action types. In this section, the discussion is limited to the description of text types using the concept of genre, the most relevant component of the framework for this study. Although the action types identified in this study are simple, discussion of them is deferred until latter as other studies have indicated that specific analysis elicitation practices, see §5.2.2.2, are required in order to describe complex action sequences, see §5.2.2.3.

The major systemic functional linguistic approaches to genre (Hasan in Halliday and Hasan 1985; Martin 1992) focus exclusively on the empirical characterisation or canonical description of single, isolated text types. Even allowing for the redefinition of genre as described in §5.2.1.2, the workpractices associated with ALABS frequently consist of more than one genre. One possible approach for extending genre theory to account for these multiple text types would be to modify the concept of genre itself to provide connections between associated genres. This approach would be similar to the development of inter-process coordination (Keen 1997; Tolis and Nilsson 1996; Tolis and Nellborn 1999) used in business modeling research (Rummler and Brache 1995; Davenport 1993, Hammer and Champy 1993). Another possible approach is to argue that the multiple genres found in many of the ALABS workpractices are related to each other through metafunctional
organisation, a mechanism proposed by Feez (1997) in which ideational, interpersonal and textual relations are projected across successive genres. Unfortunately, what is not clear is precisely which relation or combination of relations should be used in order to classify genres as belonging to the same workpractice, and how close these relations need to be in order for two genres to be considered metafunctionally organised. Neither modifying the concept of genre to account for coordination between genres nor the use of metafunctional organisation seem appropriate for describing how multiple genres can form workpractices. The connections between genres are not located at the level of genre- the linguistic staging of specific text types- but rather at the level of enacted social practice.

Rather than attempting to re-deploy existing systemic functional linguistics concepts to theorise workpractices, the approach used in this dissertation has been to develop a Systemic Semiotic workpractice framework by complementing systemic functional linguistic accounts of context with social semiotic theory. While systemic functional linguistics does bear some responsibility for theorising context (Martin 1992), it cannot ever completely account for it. Consequently, the translinguistic social semiotic theory of Bakhtin was used in this dissertation to alleviate the effects of amongst other things, the text/context dichotomy within systemic functional linguistics (see Freadman and Macdonald 1992, 69) by construing systems use in terms of enacted social practice. The multiple genres associated with workpractices can be considered as being discursively organised. Social subjects, including Students, Tutors, Academic Staff and Labstaff, enter into an already existing network of social actions and activities, social relations of power, and textual strategies in order to enact workpractices by negotiating the various systems
features of ALABS. This does not mean that the social actions and activities, social relations of power, and textual strategies are already determined for social subjects by the technology. It is rather to suggest that social subjects are multiplex (Lemke 1988) and bring to social situations a large repertoire of roles with which they can negotiate and at times actively renegotiate social-cultural practices including those of systems use.

Using the idea that workpractices consist of multiple genres that are discursively organised, new concepts were developed to enable the description of information systems features in terms of multiple genres. In Chapters 3 and 4, the author observed explicit between-genre linkages joining several sets of genres associated with ALABS system features. Genres involved in these arrangements are referred to as genre assemblages, and the links between them are called genre associations. Genre associations are persistent links between genres that are ideologically motivated (Clarke 1995a, 19; 1996). A genre association may not necessarily be apparent during the normal conduct of a workpractice, but may become so when the workpractice is being renegotiated. The characterization of an information system requires the description of its workpractices in terms of its constituent multiple genres. Having defined the relevant genres, genre assemblages, and associations for the workpractices associated with a system in its organisational contexts, a composite view of the system called a genre collection can be produced.

5.2.1.4  Generic Model of Workpractice Change

Systems development lifecycles are concerned primarily with the characterization of the evolution of systems. Scacchi (1989, 5) argues the case for a strict division of lifecycles into
two distinct types. *Prescriptive lifecycles* specify the stages that developers need to perform in order to transform a specification into a system. These lifecycles achieve a level of portability across many actual development projects only by omitting, or ignoring specific details concerning how an actual system was developed. However, various studies have demonstrated that developers continually ‘negotiate’ these prescriptions in order to be able to actually complete the required development activities (Goguen 1994, 176-179; Button and Sharrock 1994). *Descriptive Lifecycles* characterise the changes made to a system as a consequence of the organisation in which the system has been developed and used, and by definition, produce descriptions which cannot be generalised across different development projects. The dominance of prescriptive lifecycles over descriptive lifecycles is due in no small measure to the relative simplicity of devising general models and the desirability for the information systems profession for creating models which are portable across many actual development projects.

The generic model of workpractices described in Chapter 4, enables a system to be characterised in terms of its constituent genres, workpractices consisting of genres and actions, genre assemblages, and genre collections. The specific changes made to a system can be described at several levels of *granularity* (Jorna 1998). The smallest unit of change is that of individual genre element(s). Typical operations exemplified by the case study have included element cutting, pasting or elaboration within individual genres. The next largest unit of change involves commensurate changes made to several genres that have elements arranged as structural complements. The next highest unit of change involves sets of related genres. The case study has demonstrated that cutting, copying or elaboration can
involve many genres, and in one case all the genres associated with a particular social subject were effected. As a form of systems analysis, Systemic Semiotics merges the concerns of prescriptive lifecycles— the analysis is built ‘bottom-up’ in distinct stages— with those of descriptive lifecycles— changes to a system over time can be described in term of units used to form the system descriptions in the first instance. This interesting feature is a consequence of a semio-informatic practice that theorises the relationship between workpractices and the organisational contexts in which they occur and evolve.

5.2.2 Methodological Contributions

Methodological contributions of this dissertation include developments in four specific areas, considering individual workpractices and groups of related workpractices from a systemic semiotic perspective, the use and development of text-semiotic analysis methods and notations, and the use of action to establish the completeness of workpractice descriptions.

5.2.2.1 Texts, Genres, System Features and Workpractices

In traditional Systems Analysis, the definitions of, and distinctions between, core categories of action, activity, task and process are often so ambiguous, arbitrary or abstract as to not be readily identifiable by those organisational participants who are involved in enacting them. Even in the fields of Business Process Reengineering, Business Reengineering, Process and Activity Mapping, no consensus definitions on these core categories have emerged despite a considerable and growing literature. For example, in a review of the Process Mapping literature, Larkin (1994, 15-16) cites no fewer than six definitions for ‘business process’
and nine definitions of 'process'. Core categories are often defined in terms of hierarchies of processes, activities, and tasks, organised in terms of the number of people who perform them, the size of the team required to manage them, and/or their strategic or operational relevance to the organisation (Zairi and Letza 1994, 32). The concept of text can reduce the difficulties associated with identifying and applying these core categories. By definition, texts are patterns of human communication and so constitute, conceptually and operationally, a unit that is concrete, tangible and readily understood by those who have a specific stake in them, and more generally by any social subject. The texts that are of interest in the analysis of existing information systems are those spoken and written texts which can be directly observed as occurring in relation to the use of the system by relevant stakeholders. Each semiological transaction (Stamper 1987) involving an information system produces a text. Even small operational information systems may be intensively used, that is have relatively high levels of 'text traffic' during the enactment of specific workpractices. An indication of the extent to which ALABS was used is provided in Appendix A1 that shows a density plot of Unsupervised Software Loans to students conducted during the first four hundred days of ALABS operation. Consequently, information systems are more usefully described in terms of the genres which define these text types and which account for a range of typical realisations, see Chapter 2.

From a systemic semiotic perspective, the relationship between a system feature and the workpractice text is one of interjection, that is the system imposes data requirements of the participants involved in the negotiation of the system feature. Participants involved in the use of the system feature can conform to these requirements, comply with the discourses
associated with it. This forms a monological situation in which there is integration between the system feature and the enactment of the social practice. Alternatively, participants involved in negotiating the system feature can contest these requirements. This dialogical situation either leads to the cessation of the workpractice text, or a negotiated separation in which the system feature is bypassed—manual workaround—whereby the social practice is enacted using other means. Information systems generally comprise two different sets of systems features. The first set of features comprises those required to directly support organisational workpractices. The second set of systems features comprises those operations required to support the technical infrastructure of the information system itself. ALABS systems features are classified accordingly in Table 3.4. System features which support organisational workpractices should arguably explain the existence of those system features which support the technical infrastructure, as well as being the raison d’être for the information system itself. A significant distinction exists between these two sets of system features. System features that support organisational workpractices are frequently realised by texts that the information system itself encodes, supports or instantiates. For example, an academic seeking to borrow a manual from the Microcomputer Laboratories enters into a service encounter with a Labstaff member using the ALABS Staff Loan feature. This system feature acquires data provided during the enactment of this type of text, and in turn supports this type of communicative activity between Labstaff and Academics. However, system features that support the technical infrastructure of the information system are not generally realised through texts that the information system itself directly encodes, supports or instantiates. Backing up the Sessional Student Borrowing Database, is likely to be a consequence of a Labstaff meeting, but the text of this meeting is in no way encoded,
supported or otherwise instantiated in that system feature itself. For the purposes of this study, only those system features that directly support organisational workpractices have been considered. The classification of systems features into those that support organisation workpractices and those that support the technical infrastructure mirrors the infological (human-centered) and datalogical (machine-centered) distinction developed by Langefors (1993).

Workpractices are operationally defined units that can consist of one or more text types and zero or more action types. Small operational information systems like ALABS typically instantiate many different ‘text types’. An example of a workpractice supported by an ALABS system feature comprising a single text type is the Student Append. Although requiring a currently active Student Loan, a Student Append is an example of a workpractice that requires only a single text to complete, and therefore a single genre to describe the structural variety of texts of this type. However, workpractices are often realised by more than one text. For example, a Staff Loan can be conducted by means of a single service encounter text type, yet the purpose of the Microcomputer Laboratories is not just to loan software to various types of user but also to preserve items in its care. To accomplish this purpose, after a certain period of time Staff are required to return items by means of a Staff Return service encounter. In this way a complete Staff Loan/Return workpractice consists of at least two service encounter texts. Similarly, the Student Loan and Return service encounters are bound discursively by a written text, the Conditions of Use Form signed by the student at the beginning of each session, which specified the rules and regulations by which students were permitted to borrow items from the facility. This
text functioned to bind the service encounters together through regulating practices that permitted the facility to exact discipline on students who for example failed to return items when required. While the Conditions of Use Form was not apparent during the conduct of the Student Loan/Return workpractice its effects were always immanent. It was directly immanent in all interactions between Labstaff and Unsupervised Student activities, including for example the Student Append previously mentioned. It was also indirectly immanent through the operations of a third party—-a Tutor who acted as a surrogate for a Labstaff member during the loan and return of items in Supervised Laboratory activities.

5.2.2.2 Workpractice Assemblages, Associations and Intertextual Relations

In the ALABS case study, a number of genre assemblages were identified primarily consisting of service encounters. The existence of a number of distinct Genre Assemblages in the ALABS case study enables the characteristics of genre association to be determined. These include material setting, context of situation, occurrence frequency, triggering event and cardinality. In Genre Assemblage A, the enactment of the Conditions of Use genre requires that it be handled at the point of the service encounter both in time and space. While both the service encounter and the regulatory genre are 'located' within the same material setting, the context of situation differs only is some respects. The enactment of the regulatory genre is of such operational significance for the Microcomputer Laboratories that a check for its relevance is made during every Student Loan. This characteristic is called occurrence frequency. Potentially, every Student Loan service encounter undertaken may cause the Conditions of Use regulatory genre to occur. This regulatory genre only occurs when the search for the existence of the student-borrower determines that the student is not
currently enrolled. This characteristic of genre associations is called the \textit{triggering event}.

Parenthetically, associations appear to be similar to what are referred to as triggers or trigger events in the Business Process Reengineering literature, and to the Trigger and Signal Analysis Method in the MEASUR methodology (Stamper 1992). With respect to the \textit{cardinality} of the association, in Genre Assemblage B many instances (texts) of the Student Loan are required to 'make' a Faculty Usage Report. Genre Associations appear to be a generic correlate of 'intertextuality' (Kristeva in Nöth 1990, 323; Todorov 1984, 60).

Intertextual relations realise associations that bind together sets of genres and qualitative digraphs into workpractice assemblages. Three types of intertextual relations have been identified in ALABS, \textit{direct intertextual referencing} from Systemic Functional Linguistic theory (Lemke 1995), \textit{elliptical intertextual references} proposed in this dissertation, and \textit{dialogic intertextual relations} from Social Semiotic theory (Todorov 1984).

5.2.2.3 \textit{Analysis Methods and Notations}

In order to study an information system using systemic semiotics, texts are collected in the workplace and analyzed to reveal their constituent genre elements which are discrete, functional stretches of language identifiable in specific situational and cultural contexts. Genre elements are arranged into genre sequences, which represent a particular patterning of a text. A genre sequence will describe many actual texts in a workplace, and represents one preferred way of organising language to achieve a given social end. A genre will consist of one or more of these genre sequences and represents the variety of alternate ways in which given social ends are achieved within specific cultural and situational contexts. Parallels exist between genre analysis, the analysis of canonical situations, a method
employed in the semiotic analysis of communicative processes (Moles in Sebeok ed/ (1986, 122), a number of qualitative analysis methods and styles (Crabtree and Miller 1992, 3-28).

A difficulty with any diachronic study is how to elicit workpractices for which texts have not been, or cannot be, collected. This methodological problem has been referred to as the Empty Corpus Problem (Anderson 1992) and it appears to impose a limit on what can be analysed using a semio-linguistic theory of workpractices. A Partial Resolution to this problem involves the recognition that in some cases an indirect text (language-about-work) can be elicited by using a probe (Clarke 1999), and an empty corpus situation in which a probe cannot be used. It was therefore possible to elicit texts about workpractices associated with systems features that are no longer available, from those participants who use to be involved in enacting them. This methodological development enabled many of ALABS features to be explored. The elicited texts could be examined for elements, which could help in reconstructing the qualitative sequence of the workpractice. In those cases where participants could not remember exactly what happened, system code, and/or documentation could be consulted with the aim of reconstructing the sequence. A similar notation to that used for genre sequences and digraphs, was used for describing qualitative sequences and digraphs. Action and action sequences can be similarly elicited and documented.

New notations were devised to support the description of Genre Sequences and Qualitative Sequences, the specification of Genre Digraphs and Qualitative Digraphs used for describing text and action types associated with workpractices, as well as Comparison
Diagrams enable one or more sequences and/or digraphs to be structurally compared. Genre Assemblage diagrams and Genre Collection diagrams provide higher level representations (larger granularity) of workpractices associated with information systems in organisations.

5.2.2.4  Action Sequences and Types

Action associated with ALABS took the form of atomic actions, particularly chronemic atomic actions associated with the selection of system options from menus, or proxemic atomic actions involved in the relocation of texts and social subjects from one material setting to another. However, while ALABS actions were structurally simple, they were very important methodologically in determining the relative completeness of a workpractice description. This is due to the fact that ALABS workpractice actions were associated with workpractice texts primarily by predecessor-successor relationships. Predecessor-successor relationships could be used to identify those texts directly consequent to the action, so-called material predecessor-successor relationships, or those texts which are indirectly implicated with a workpractice action, so-called consequential predecessor-successor relationships. Symmetry could be used to propose the existence of other missing proxemic actions, particularly under circumstances where the workpractice texts and action possess structural complements, or are arranged into nested service encounters. Under similar conditions, the complementarity between workpractice texts and actions can also be used to identify missing texts.

There is a conspicuous absence of any complex action sequences associated with ALABS workpractices. The prevalence of atomic actions and the absence of action sequences
appear to be a characteristic of administrative information systems. This contrasts with research conducted on a warehouse manufacturing information system (Clarke 1999), which suggests that the complexity and types of action may be one characteristic that could be used to distinguish between these types of system. In that study, the action sequences associated with warehousing operations were found to exhibit alternate enactment paths, and were arranged into distinct types. These action sequences were discursively organised, their enactment subject to regular review, difficulties in their enactment were the subject of regular Quality Reviews, and non-conformance to expected standards would result in the filing of Incident Reports. The structure and function of these action sequences were a consequence of this discursive organisation. The tentative distinction between workpractice texts and actions associated with Administrative Information Systems and Manufacturing Information Systems is provided in Table 5.1.
Table 5.1: Workpractice Texts and Action as distinguishing characteristics of Administrative versus Manufacturing Information Systems (after Clarke 1999).

<table>
<thead>
<tr>
<th>Administrative IS</th>
<th>Manufacturing IS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Action</td>
<td></td>
</tr>
<tr>
<td>Simple atomic actions (chronemic or proxemic) consisting of single elements</td>
<td>Complex action sequences consisting of many elements arranged into distinct types of action.</td>
</tr>
<tr>
<td>Workpractice action/s are related to the texts primarily through predecessor-successor relations. Chronemic actions typically trigger texts while proxemic actions involve the relocation of participants and/or texts.</td>
<td>Action sequences are related to the workpractice primarily through discursive organisation involving multiple texts. Action sequences become a dominant component of workpractices.</td>
</tr>
<tr>
<td>Apart from needing to be completed in a given time frame, administrative actions are typically not pre-specified.</td>
<td>Action may be strictly pre-specified by explicit regulations, best practice standards, codes of conduct, or legislation.</td>
</tr>
<tr>
<td>Texts</td>
<td></td>
</tr>
<tr>
<td>Workpractices primarily consist of texts with relatively simple action</td>
<td>Workpractices primarily consist of action, texts tend to be written rather than spoken</td>
</tr>
<tr>
<td>Direct text situations generally prevail so there is little need for active elicitation</td>
<td>Indirect texts and Empty Corpus Situations prevail and so analysts must observe and actively elicit</td>
</tr>
</tbody>
</table>

5.2.3 Substantive Contributions

The dissertation represents one of the few extended studies conducted into organisations using systemic functional linguistics. Other examples include a number of recent organisational case studies including an investigation into the semiotics of employment within the Commonwealth Employment Service (Lenga 1996), and a case study of the Internal Revenue Service in the USA (Sullivan 1996). This dissertation also constitutes the first application of Systemic Semiotics to the study of an information system, as distinct from information technologies (see for example, Cross and O’Brien 1992). The case study
demonstrates the interdependence between information system features (texts) and its organisational contexts (situational and cultural).

5.2.3.1 Systemic Semiotic Study of an Information System

Systemic functional linguistics is most commonly applied to the study of educational and pedagogic practices within primary and secondary schools curricula (Halliday and Martin 1993, Shea 1988). These applications focus on the explicit teaching of canonical genres within a number of curricula, including Secondary History, Geography, Science, and English programs. The goal is to equip students with the kinds of linguistic resources need in order to be literate in these disciplines, as well as giving them the means to mobilise the discursive power that these linguistic resources provide. It is therefore not surprisingly, that an interest in ‘ways of saying and ways of meaning’ in society and its institutions, to paraphrase Hasan (in Cloran et al 1996, 191-242) should also lead to a similar interest within organisations. Since organisational applications of systemic functional linguistics are virtually non-existent compared to the weight of work conducted in education, it would be reasonable to expect that workplace applications might closely follow the successful and productive educational trajectory. Some recent publications utilise this trajectory in organisational applications of systemic functional linguistics. However, the substantive findings presented in this thesis, attest to the complexities of linguistic processes in socio-organisational practices, and suggest the need for caution in the move from pedagogic to workplace applications of systemic functional linguistics. As valuable as this trajectory is, if researchers were to exclusively focus on for example workplace literacy or genre
instruction along the familiar trajectory established within education, grossly simplified accounts of organisations are likely to result.

5.2.3.2 Diachronic Changes within ALABS

Semio-informatic studies usually focus exclusively on the synchronic characterisation of information systems. A significant contribution of this dissertation has been the attempt to construct a diachronic or longitudinal case study of an information system using a semiotic framework. This kind of study is necessary in order to describe and explain the contextual relationships between ALABS and the Microcomputer Laboratories and the influence of end-user development on ALABS workpractices. de Saussure (1993, 179) raised two crucial questions relevant to undertaking diachronic studies of language which must necessarily be addressed in semio-linguistic longitudinal case studies of information systems. The first question involves diachronic identity, which concerns the justification for considering a unit to be the same or different from one period to another. The second question involves determining the diachronic unit that has been the subject of the change, given that there need not be a correspondence between diachronic units and synchronic units used in an investigation.

For this study, the diachronic identity of genre elements rests on the systemic functional linguistic procedures by which they are identified in texts. Given that ALABS is in large part effectively decommissioned, qualitative elements are by necessity extensively employed in this study. These are either elicited from non-text situations or reconstructed from empty corpus situations and therefore involve varying degrees of qualitative interpretation. As a consequence the synchronic and diachronic identity of qualitative
elements is subject to greater risk than that of genre elements which can be analysed linguistically. In this study there was a direct correspondence between the synchronic unit (genre elements and qualitative elements) and the diachronic unit. Conformation that elements (genre and qualitative) did in fact constitute the diachronic unit of this study, was provided by examining the structure of specific genres associated with a number of workpractices across successive versions of ALABS.

End-user modifications to system features produced structural changes to their respective genres. Three kinds of structural operations have been used to develop the phylogenetic account of ALABS workpractice genres provided in this dissertation. Single elements have been added to genres- referred to as *element pasting*, or removed from genres- referred to as *element cutting*. In some cases genres have been subject to the addition and removal of elements- referred to as *generic elaboration*. The Student Loan/Return workpractice provides examples of all three. Version 1 of the Student Loan Genre was modified in Version 2 by the inclusion of a single element (*Labpass Out*), an example of element pasting. This simple structural change enabled the Labstaff to allocate machine resources and to manage student loads within the facility. However, by the time Version 4 of ALABS was released, the complete networking of the laboratories had already taken place. This meant that the vast majority of students could simply walk into an available laboratory and select a computer application from a network server rather than borrowing disks using a service encounter. Consequently, the *Labpass Out* element was deleted from the Student Loan genre because it was no longer needed, an example of element cutting. Similar structural changes were made to the Student Return Genre, Version 2 of which saw the
inclusion of a single element (Labpass In), and its subsequent removal in Version 4. Both
the Student Loan and Return genres were subject to several episodes of generic elaboration
across successive versions of ALABS. Significantly, the genres that comprise this
workpractice are referred to as structural complements because a structural change made to
one of them necessitates a corresponding structural change be made to the other (see
§4.2.4). While not previously identified in the systemic functional linguistics literature,
these structural complements demonstrate the existence of synchronic and diachronic
interdependencies that can exist between genre. Changes to workpractice genres could
always be explained by reference to changes in the immediate conditions of the
Microcomputer Laboratories, or by changes in the broader organisational context that had a
direct affect on the functioning of the unit.

Changes to ALABS workpractices were not simply limited to structural operations on
single genres, but also included various kinds of modifications occurring at a variety of
different scales. This was not so much a question about the existence of other ‘larger’
diachronic units, as it was a question of ‘granularity’ or how simple generic operations
involving small units (genre and qualitative elements) could affect extensive changes to an
entire information system. There are several examples where copying entire sequences of
elements expanded the functionality of ALABS. One case involves the use of sequence
copying to develop a Student Append feature from the Student Loan of Version 1.

Workpractice assemblages and associations were also an important mechanism in the
evolution of both manual and computer based systems in organisations. A number of
principals emerged as a consequence of tracing the development of ALABS workpractice assemblages, which now need to be applied to other case studies to see if they represent fundamental aspects of higher order structure in workplaces or simply tendencies within the diachronic development of the system considered here. The Systemic Semiotic Workpractice Framework defines workpractices in terms of organisational contexts, while workpractice assemblages and associations enable these workpractices to be visualised. Interestingly, this approach produces descriptions that link social actors to social practices, in an analogous manner to so-called web models (Kling and Scacchi 1982, Kling 1987) used in accounting for the consequences of implementing and deploying computer based technologies within single organisations. As with web models (Kling and Iacono 1991, 71) the Systemic Semiotic Workpractice Framework has been used to explain and to take into account the social context of computerisation and the infrastructure that supports organisational activities. Unlike web models, the Systemic Semiotic Workpractice Framework provides an explicit contextual theory and a related set of methods that helps to explain how social subjects, in negotiating various systems features, enter into an already existing network of social actions and activities, social relations of power, and textual strategies.

5.2.3.3 Diachronic Changes across Systems

The dissertation describes the contributions made by two manual predecessor systems to several workpractices that were eventually implemented in ALABS. The relationships between these workpractices were contextually and functionally described. A considerable amount of ALABS end-user development involved the modification of readily available
patterns of human communication from within its own repository of workpractices. Yet to claim that a specific system feature can be modeled using a genre, is to also tacitly acknowledge the existence of one or more genres which may have preceded it. Every genre associated with a systems feature necessarily refers back to some prior pattern of human communication. In some cases where no previous systems have been available or developed, the so-called green field situation, specific systems features are likely to be modeled on culturally available patterns of human communication. As the first operational-level administrative support system, the Ad hoc system represented a green field situation for its organisation. With no prior examples upon which to directly base its workpractices, its users simply drew upon the most relevant and culturally available pattern of communication. In this case, the spoken language service encounter genre was the only generic resource available for demanding and offering goods and services so it was used as the basis for workpractices in the Ad hoc system.

For many organisations, readily available sources of prior patterns of human communication are other information systems. The workpractices of the Manual System were based on the Ad hoc system that preceded it. Similarly, a number of core workpractices in ALABS were based on the Manual System that preceded it. In terms of genres or text types, the shift from the Ad-Hoc to the Manual System involved changing the Student Loan and Return activities to a situation requiring a formal spoken service encounter, involving manual written records. The shift from the manual system to ALABS Versions 1-2/3, involved the replacement of the manual written record with a data record, see Chapter 3. The shift from ALABS Versions 1-2/3 to ALABS Version 4, involved the
modification to the Student Loan and Return workpractice in order to include additional
data for each transaction, while simultaneously removing at least one entire category of
participant, see Chapter 4. It is only with the widespread introduction of networking that the
effective decommissioning of ALABS features occurred, replaced by a Network LOGIN
System which did not require any spoken language texts at all, refer to Chapter 4. Rather
than thinking of these changes in terms of technological determinist arguments, the actual
explanation involves considering changes to the social structure of the Microcomputer
Laboratories. While there is a shift from spoken and written texts to non-texts in the
transformation from ALABS to the Network LOGIN System, these changes in
workpractices occur because of deliberate social policies to reduce the degree of interaction
(face-to-face contact) between Lab staff members and clients.

Not only was the number, type and structure of text types changed as a consequence of the
deliberate selection of networked technologies, but the introduction of network
technologies also affected the attendant action types. The shift from the Manual System to
ALABS Version 1-2/3 involved reducing the production and physical movement of paper
during the Student Loan and Return service encounters, while simultaneously increasing the
amount of written texts in the form of management reports. This tendency continued when
shifting from ALABS Versions 1-2/3 through ALABS Version 4.

The genre-based approaches to systems analysis developed in this dissertation provide what
most systems analysis techniques do not, an approach to characterising patterns of work as
patterns of human communication and action which are defined socially and contextually.
The Systemic Semiotic definition of genre also provides both a novel vocabulary and
perspective into systems use and end-user development of systems. End-user modification of a system over time exhibited an intimate knowledge of the staging of work by end-user developers. Changes to the ALABS genres most often involved incremental changes at the level of elements, genres, genre assemblages and entire genre collections. The ALABS end-user developers were so familiar with the staging of these texts, that the modifications they made involved the least amount of change to the system features that supported or instantiated the relevant workpractices. This claim can be substantiated by examining the structural similarities exhibited between successive diachronic instances of given ALABS genres. As described in Chapter 4, there has also been migration of system features first implemented in ALABS, to a variety of new applications in the current application portfolio for the Microcomputer Laboratories.

5.3 Further Research

5.3.1 Tool Support

In order to apply systemic semiotic analyses developed in this dissertation to other studies, particularly to large-scale projects, tool support will be required. The necessity of these tools has been established in a workpractice analysis (Clarke 1995b) and in studies of elicitation during systems analysis (Clarke 1997c). Three groups of tools for Project Support, Text Data Collection, Text/Data Analyses, described in Table 5.2, have been proposed to support systemic semiotics in organisational semiotic and semio-informatic applications.
Table 5.2: Proposed Tool Support for Systemic Semiotic studies (after Clarke 1995b). An asterix indicates that one or more commercially available tools may provide some or all of the functionality proposed by a specific tool.

<table>
<thead>
<tr>
<th>Tool Group</th>
<th>Name</th>
<th>Purpose</th>
</tr>
</thead>
<tbody>
<tr>
<td>Project Support</td>
<td>SiteBook*</td>
<td>record contact and time-management details across multiple sites in a project</td>
</tr>
<tr>
<td></td>
<td>PhotoBook*</td>
<td>organise images of material contexts</td>
</tr>
<tr>
<td></td>
<td>avCAM</td>
<td>support for the audio-visual transcription of meetings (Clarke 1992a, 1992b)</td>
</tr>
<tr>
<td></td>
<td>SoundStage</td>
<td>distinguish separate speakers in group situations from audio field recordings</td>
</tr>
<tr>
<td></td>
<td>FloorPlan*</td>
<td>record site characteristics and spatial data</td>
</tr>
<tr>
<td>Text/Data Collection</td>
<td>Prox</td>
<td>annotate proxemics in the workplace</td>
</tr>
<tr>
<td></td>
<td>WinCHAT</td>
<td>assist analysts during the process of transcription (Clarke 1994)</td>
</tr>
<tr>
<td></td>
<td>Dispa*</td>
<td>remove ambient environmental noise and enhance field audio recordings</td>
</tr>
<tr>
<td></td>
<td>REBUS</td>
<td>text corpus exploration and visualisation tool (Clarke and Mehler 1999)</td>
</tr>
<tr>
<td></td>
<td>GASP</td>
<td>graphically represent genres, genre assemblages and genre collections (Clarke 1995b, 1998)</td>
</tr>
</tbody>
</table>

Since the description of these groups of tools (Clarke 1995b), there has been considerable development of personal computer based applications. The functionality of the proposed Project Support tool SiteBook is now available in a number of personal and group based contact management systems. Within the Text/Data Collection tool group, the proposed functionality of PhotoBook is well covered by currently available image management systems and the development of digital video cameras with still-frame capabilities enables this functionality to be extended to include captured video sequences. Recently there have been photogrammetric systems announced with functionality similar to that of FloorPlan although the price is still prohibitive. Research work will need to be undertaken to implement avCAM and SoundStage. With respect to avCAM, the sophistication of
currently available multimedia development environments means that much of the display functionality of this system could be readily built. The design of the optics of avCAM requires a convex mirror to form a spherically distorted view of all participants in a meeting simultaneously (Clarke 1992b). An image processor would remove the spherical distortion to form corrected views of each participant. Interestingly, a similarly designed camera is now commercially available. While the ability to support multimedia transcription has been a secondary goal of the CHAT transcription system (MacWhinney 1995, 4), these capabilities are still at an early stage of development. Within the Text/Data Analysis tool group, commercial sound editing environments that support audio plug-ins can provide the kind of noise modeling intended for Dispa.

The kind of analysis developed in this dissertation, and the type of systems development methodology proposed in §5.3.2 below, suggests that large analysis projects would be best undertaken using a number of small teams in the field. This type of organisation suggests the use of a highly distributed (web-based) architecture to implement an environment that can support Systemic Semiotic analysis. The selection of commercially available software to implement the functionality of some of the tools described above should be based in part on the availability of web-based solutions. Similarly, tools that do not have commercial equivalents should be developed using a distributed (web-based) object environment architecture (Bandarpalle and Ratnakar 1998). The development priority for tools has been for those tools that support Text/Data Analysis, particularly WinCHAT, REBUS and GASP all of which will employ this architecture. While a detailed functional specification and interface design for WinCHAT has been available for some time (Clarke 1992b, 1995b),
this tool is currently being redesigned for XML implementation. The Rebus tool, which will be used to examine and visualise hypertext corpora, is still at a relatively early stage in development. It requires the completion of a formal model that will describe some specific Intersentential Resources of Cohesive, Intrasentential Resources of Theme and Information, and Coherence of texts. Recent work on Rebus is reported in Clarke and Mehler (1999).

The Genre and Action Sequence Processor tool (GASP) is currently being developed for entering, storing, manipulating, and displaying genre and action sequences and digraphs (Clarke 1995b, 1998). On demand, an embedded web server generates an HTML-based prototype that mimics the stages within the entered sequence or digraph. The tool is being built to incrementally develop executable prototypes as a by-product of the analysis, an attribute that is also found in the MEASUR methodology (Stamper 1992). The mathematical basis for these notations is directed cyclical graphs. Evidence for the computability of these notations is provided by the Church-Turing thesis (Dahlback 1995, 3) and by Bohm and Jacopini (1966). The Church-Turing thesis states “that any process that can be given a sufficiently precise description can be simulated on a computer” (Dahlback 1995, 3). From Bohm and Jacopini's (1966) thesis, it can be proved that these sequences and digraphs are machine executable, in that they consist of some or all of the three requisite properties of sequence, selection, and repetition. These sequences are computable because they consist of at least a sequence of elements, and may also exhibit a subsequence of one or more elements that reoccur. By definition, genre and action sequences do not possess the property of selection since they consist of time-ordered elements. Genre and action digraphs are aggregates of two or more sequences, and so by definition contain
selection. From a methodological perspective, GASP is related to the kinds of tools that have been developed within the computational linguistics, discourse analysis and artificial intelligence communities. Examples of these related systems include those developed for Frames (Minsky 1975), Frame-based Knowledge Representation Languages (Goldstein and Roberts 1977; Bobrow and Winograd 1977), Scripts (Schank and Abelson 1975, 1977; Cullingford 1981), Plans (Schank and Abelson 1977, Wilensky 1978, 1981); MOPS-Memory Organization Packets (Schank 1980, 1981; Wilensky 1982), Information Formats and the work of the New York University Linguistic String Project (Sager 1972, 1978; Hirschman, Grishman and Sager 1976; Grishman and Hirschman 1978).

5.3.2 Systems Development Methodology

The Systemic Semiotic Workpractice Analysis developed in this dissertation is being extended into a complete development methodology called Systemic Functional Systems (SFX). When completed, SFX will be the third explicitly semiotic methodology to be developed within IS, after the work of Ronald Stamper (1992) and the MEASUR methodology (Methods for Eliciting, Analysing, and Specifying User Requirements), and Martin Kolkman (1993) with the PAM methodology (Problem Articulation Methodology). PAM evolved out of the MEASUR research program (Kolkman 1993, 8). The key aspects of SFX include a derivation of the staging used in the methodology called the Bifurcated Cycle in §5.3.2.1, the recursive deployment or tessellation of the methods throughout the workplace in §5.3.2.2, and the use of explicitly theorised elicitation techniques in §5.3.2.3.
5.3.2.1  *Bifurcated Cycle*

The Bifurcated Cycle consists of three stages. Two stages (Genre and Register) represent the two contextual strata recognised in the Stratified SFL model (Martin 1992), while the remaining stage (Text) represents the tri-stratal organisation of language. As there is no specific directionality implied between the context and language strata in the Stratified SFL model, Figure 5.1 shows a *bifurcated cycle* consisting of two loops running in opposite directions. The loops are joined at all the stages by double-ended arrows making it possible to traverse the stages in any order. With reference to Figure 5.1, during the course of analysis, a text is examined in order to identify its register features (field, tenor, and mode) indicated by the path \( R^+ \). The text will also be examined to identify its genre features (constituent elements and sequencing) indicated by the path \( G^+ \). Note that there is a path \( RG \) that implies that the generic features of the text must be commensurable with its register features. Similarly, the path \( GR \) implies that the register features of the text must be commensurable with its genre features.

The bifurcated cycle can also be used during the course of design, in which one of a possibly large set of texts could be constructed from pre-specified register (\( R^- \)) and genre features (\( G^- \)). In effect, the bifurcated cycle describes the analysis or design of texts as *inverse* processes. Although this suggestion is not novel within theoretical discussions of the analysis and synthesis of systems (Klir 1969), in the context of systems development methodologies considering analysis and design as inverse processes is a significant divergence from traditional development practice. Although based on completely different
theories, a similar economy of method as exhibited by the bifurcated cycle in SFX, can be found in the REMORA methodology (Rolland and Richard 1982).

**Figure 5.1:** A single Bifurcated cycle (centre) showing the analysis/design stages for a single text (after Clarke 1998).

During the analysis/design of a text, an individual bifurcated cycle can enter into several sets of states. A Bifurcated cycle is *instigated* (I) when a candidate text becomes the focus of analysis or when a text must be designed. A bifurcated cycle can be *terminated* (T) when it is no longer considered relevant to the analysis/design activities. This is an indication of an error involving the existence of a text during analysis, or the necessity of a text during design. Dashed lines in Figure 5.1 indicate Instigation and Termination states. A bifurcated
cycle can enter into *thawing* (W) or *freezing* (Z) states. A thawed cycle is one which is the focus of any form of analysis/design activity. A thawed cycle may be frozen at a latter time. A frozen cycle is one, which is not the focus of any form of analysis/design activity. During this state, the analysis/design is considered to be complete or sufficient. A frozen bifurcated cycle may be thawed latter. Thaw and Freeze states are indicated by solid arrows to the left of the central bifurcated cycle in Figure 5.1. A bifurcated cycle may enter into an *association* (A) with another bifurcated cycle, as a result of persistent discursive relations between the respective texts. Alternatively, two previously associated bifurcated cycles may be *dissociated* (D) when a persistent link can no longer be sustained between them. The states of Association and Dissociation are indicated by solid arrows to the right of the central bifurcated cycle in Figure 5.1. The states referred to as spawning and merging provide the means to expand or contract the scope of the analysis or design. These states enable SFX to be described as an evolutionary systems development methodology (Crinnion 1991).

With reference to Figure 5.2a, *spawning* (S') a new bifurcated cycle from an existing one is a consequence of satisfying one or more of six distinct states. A new cycle is spawned when a text does not conform to pre-specified register features of the Context of Situation, Sr+, or when the Context of Situation cannot be used to adequately predict the actual register features of the text, Sr-. A new cycle may also be spawned when a text does not conform to pre-specified generic features of the quasispecies instantiating the Context of Culture (Sg+) or when the Context of Culture cannot be used to adequately predict the actual generic features of the text (Sg-). Similarly, if the Context of Situation cannot assist in drawing
inferences about, or is incompatible with, the Context of Culture Srg, or vice versa (Sgr), then a new bifurcated cycle is spawned.

With reference to Figure 5.3b, merging two existing bifurcated cycles (M'M'') into a single cycle is a consequence of satisfying one or more of six distinct states. Two cycles can be merged when texts belonging to different bifurcated cycles share a Context of Situation, Mr+, or where a common Context of Situation could explain the actual register features of texts in both cycles, Mr-. Similarly, bifurcated cycles can be merged if texts belonging to different cycles share a common quasi-species instantiating a Context of Culture, Mg+, or where a common Context of Culture could explain the actual generic features of texts in both cycles, Mg-. Similarly, if the Contexts of Situation for existing bifurcated cycles are compatible with a single Context of Culture (Mrg), or vice versa (Mgr), then the bifurcated cycles may be merged.
Figure 5.2: Spawning (S') a new bifurcated cycle (Text') from an existing bifurcated cycle (Text) in (a). Merging (M' and M'') two bifurcated cycles (Text' and Text'') into a single bifurcated cycle (Text) in (b). Refer to §5.3.2.1.
5.3.2.2  **Tessellation: Recursive Deployment of Methods**

A strong claim is occasionally made, concerning the prevalence of recursion in natural and social systems. The prevalence of recursion observed in living organisms is occasionally extended to language in organisations, and consequently human society (Scarrott 1982, 67). While not denying that some aspects of these phenomena can, should and are, modeled using recursion, it is also true that to see recursion as a dominant or ubiquitous aspect of social systems would require a considerable leap of faith. To consider language as inherently recursive is to fall into the trap of confusing an artifact, a common machine representation for language, with the phenomena itself, symptomatic of the 'wishful thinking' and reductionism found in many linguistic engineering applications (Nauta et al 1993, 1).

While recursive methods are unusual in the information systems methodology literature, two semiotic methodologies namely MEASUR (Stamper 1992), and PAM (Kolkman 1993) utilise explicitly recursive formalisms. In the case of MEASUR and PAM, the Collateral Analysis, Systems Morphology and Contention Management methods are recursively applied. The methods used in SFX, organised by the bifurcated cycle, are applied to each text as it is encountered until all text types (genres) are identified and the relationships between genres (assemblages and associations) are described. In this case, the deployment of SFX can be considered as a *tessellation* through an abstract semiotic space of the system under examination in its organisational contexts (Clarke 1996), see Figure 5.3. The major advantage of recursive methods, and by extension methods that are based on tessellation, is their economy of expression (Kolkman 1993, 84).
5.3.2.3  Genre-based Elicitation

Systems analysts attempt to understand specific organisational workpractices, however the work of systems analysts is rarely recognised as itself comprising institutionally mandated workpractices. These analysis workpractices could also be studied using the same framework as developed here, with the aim of providing a communicative systemic semiotic theory for systems analysis. One example where the traditional ‘rules of thumb’ fall short of providing useful assistance for analysts in the field is when eliciting requirements during meetings. Apart from providing suggestions concerning appropriate interview formats that could be used when gathering requirements, or which methods to use when documenting identified requirements, no infological theory exists to assist analysts during the conduct of interviews. There is a prevailing belief, informed by positivism, that requirements are ‘gathered’ as if they were objective facts to be merely recognised and organised. A systemic semiotic view of a requirement is that it is negotiated in the process of enacting institutionally mandated analysis workpractices. Indeed social subjects often possess remarkably different understandings about the same organisational workpractices. These differences are encoded in the ways social subjects talk about their work. It is not simply an issue of asking the correct questions in order to find out what is going on and what is needed, what is equally as important is how these questions are posed and to whom.
Figure 5.3: The deployment of SFX Methodology as a tessellation, where (a) shows a material setting, (b) shows texts (dotted circles) in the material setting jointly identified by users and management, (c) shows the classes of texts or genres (solid line) in the material setting, (d) shows genres assemblages in which sets of genres are connected together by a genre associations (thin lines), and (e) shows how the analysis proceeds to the ‘next’ material setting by following an association that links genres across material settings.
Transcripts of authentic client-analyst interviews were collected during a series of small analysis projects, reported in Clarke (1997c). The results of these case studies indicated that during early analysis stages, analysts typically construct turns designed to 'keep the client talking'. This finding has been interpreted as the analyst attempting to recover the system of lexical items necessary for identifying field. In contrast during latter analysis stages, analysts use probes to elicit texts that have specific generic structures and informally employ elicitation strategies to clarify previous answers and plan subsequent questions. However without formal elicitation methods, analysts may elicit inappropriate text types from specific social subjects. Eliciting an activity structured Factual Recount genre from a manager may mean in the best case that the manager is unable to construct a text, or in the worse case they may provide the analyst with inaccurate information. These studies suggest that methods utilising canonical genres may assist analysts in becoming familiar with workpractices in workplaces. Analysts could be taught the probe, re-align, and repair strategies (Hasan in Halliday and Hasan 1985, 66-67) for, and generic structures of, relevant canonical genres in order to elicit requirements from social subjects. A genre-based systems analysis interview cycle based on action research is proposed for improving the interview practice of systems analysts, see Figure 5.4. It consists of a Planning stage in which the canonical genres, and their associated probes, realigns and repairs are reviewed in a Pre-interview phase for use in a forthcoming meeting. During the Interview phase, the interaction between analysts and organisational social subjects is recorded for use during a Post-interview phase. The interaction is transcribed and formally analysed and evaluated in order to determine the type and success of various textual strategies utilised. The Genre-
based systems Analysis Interview Cycle could form the basis of interview methods that use explicitly theorised elicitation techniques.

**Figure 5.4:** Proposed Genre-based Analysis Interview Cycle (Clarke 1997c)

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**5.3.3 Extensions to the Analysis**

This dissertation has been primarily concerned with the development of a Systemic Semiotic Workpractice Analysis and its application. Three extensions are proposed here which will form the basis of subsequent research. The first extension is referred to as *Workplace Analysis* and is proposed in order to account for the communicative and semiotic organisation of the workplaces in which workpractices are conducted, see §5.3.3.1.

The only points at which the existing Workpractice Analysis and the proposed Workplace Analysis have intersected in this dissertation has been with reference to workpractices in previous systems that were the basis of several ALABS workpractices, and in the analysis and description of chronemic and proxemic actions. A Workplace Analysis of the
Microcomputer Laboratories would require an analysis of the facility in its organisational contexts, together with the communicative organisation and semiotic characteristics of materials, time, space, and social subjects. While the existing Workpractice Analysis and the proposed Workplace Analysis would be sufficient to providing a more complete description of an information in its organisational contexts, a more comprehensive analysis is required if the aim is to characterise the semiotic activity of an entire unit or organisation. Therefore, a second analytical extension referred to as Organisational Analysis is proposed in §5.3.3.2, which requires the description of all systems in use to form a comprehensive workpractice analysis. Finally, the methodologies by which systems are analysed are themselves subject to the same kinds of analysis that are developed in this dissertation. A program of semiotic meta-analysis of the methodologies is proposed in §5.3.3.3.

5.3.3.1 Workplace Analysis

The relationship between workpractices and workplaces is one of mutual construal, and so an effective Workplace Analysis will necessarily refer to workpractices, and vice versa. Although reference has been made to organisational units prior to the Microcomputer Laboratories, this has been done only for workpractices in previous systems that formed the basis of several ALABS workpractices. An appropriate Workplace Analysis would seek to describe the social, economic, and historical conditions that form the context of a specific workplace. Such an analysis necessarily involves a discussion of the socio-political practices and the communicative organisation of social subjects not immediately related to workpractices. Against the backdrop of these conditions is the broader communicative organisation of materials, time, and space.
Materials were communicatively organised within the Microcomputer Laboratories so that ALABS could appropriately function. Using the semiotics of objects, it should be possible to explain how these materials were themselves the subject of design practices. Numerous examples of the communicative organisation of materials associated with ALABS are available in the Microcomputer Laboratories. Specific barcodes were produced for different types of items. Quick Identification Labels were developed so that Labstaff could distinguish its items from those owned by its users. Functional colour coding of software items promoted efficient sorting at the Service Desk. In fact, loanable items exhibited considerable material and informational redundancy. This redundancy was not so much designed as it was ‘accumulated’, new ways were found to communicatively organise materials in response to the demands of increasing facility usage and novel system uses.

Time was communicatively organised within the Microcomputer Laboratories, an aspect of Workplace Analysis that can be studied using Chronemics, the semiotics of time proposed by (Poyatos 1972; 1976; Bruneau 1977; 1980; 1985). In part, the workplace organised a number of temporal aspects associated with ALABS. For example, one of the duties of the Laboratory Assistant was to allocate laboratory time amongst the competing units, schools, departments and faculties. The socio-cultural practices by which the Laboratory Assistant transformed Unallocated Laboratory Times to Allocated Laboratory Times are a result of the chronemic aspects of higher education timetabling, that organised some the functional characteristics of ALABS especially the distinction between Supervised and Unsupervised loans. Given the considerable use of the facility, reporting functions needed to be performed ‘After Hours’ and led to the development of Batch Command Processor (see 3.6 in Table
3.4), used especially Reports, as well as explicit Close-Down Procedures (see 5.1 in Table 3.4).

Space was communicatively organised within the Microcomputer Laboratories, an aspect of Workplace Analysis that can be studied using Proxemics, the semiotics of space. Several ALABS features changed as a consequence of relocating the Microcomputer Laboratories from the material setting which it was developed (Building 22) and operated through Versions 1-2/3, to another material setting (Building 40), where it operated as Version 4. Unlike the material setting of Building 22 where the Teaching Laboratories were spatially distributed, the design of the facility in Building 40 included windows that permitted uninterrupted views of the interiors of most of the Teaching Laboratories from the Service Desk. The Labpasses, introduced in Version 2/3 as a consequence of the theft of a keyboard during an Unsupervised Laboratory Time, were removed from the Student Loan and Return service encounters. In part, this was due to the changes to the proxemics that resulted from the relocation of the facility. The surveillance practices that were an aspect of the standing orders of Trainees were also altered accordingly.

5.3.3.2 Organisational Analysis

While workplace and workpractice analyses are suitable for meeting the aim of this study, that is creating a description of an information system in its organisational context, a more comprehensive analysis is required if the specific aim is to characterise the semiotic activity of an organisation. Such a comprehensive analysis of an organisation is called an Organisational Analysis. An effective Organisational Analysis of the Microcomputer
Laboratories would require a comprehensive workpractice analyses of all information systems in use. Recall that a number of additional and significant end-user developed information systems are currently in use at the Microcomputer Laboratories, as described in Chapter 4. Of importance to Organisational Analysis is the category of texture. Texture is a theoretical construct used to explain the range of language use between complete non-texts through to fully-fledged texts, as described in Chapter 2. In order to characterise texture in workplace language, long duration corpora will need to be collected and complex dynamic visualisation methods will need to be applied, similar to those created by Sheelagh Carpendale and colleagues at Simon Fraser University, British Columbia, Canada.

5.3.3.3 Meta-analysis

Just as information systems in organisations can be theorised as texts in context, so too can any systems development practices. Tebble (1991) was able to characterise the generic structure potentials of certain developer-user interactions. A consequence of that study is that all so-called social process methods (Crinnion 1991) such as user interviews, structured walkthroughs, and phase sign-offs, could be analysed using systemic semiotics. Every systems development methodology consists of a set of formal methods and deliverables, and these also constitute texts. Most methods and deliverables are recognisable to analysts regardless of the specific methodology they might use. The very fact that methods and deliverables are recognisable across methodologies hints at their generic nature (Freedman and MacDonald 1993).
The only large scale and sustained comparative methodology study conducted to date, the Comparative Review of Information Systems methodologies or CRIS project (Olle et al eds/ 1988a, 1988b, 1986, 1983, 1982), focused exclusively on particular methods and tools in published methodologies. Useful though this comparative work is, it cannot be extended beyond a consideration of the technical ‘surface’ features of methodologies. Genre analysis could be applied to providing a semio-linguistic description of formal information systems development methodologies. This would enable the creation of a complementary project, a GEneric Review of Information Systems methodologies (GERIS), characterising the schematic structures and elicitation practices utilised in a range of methodologies. The study of systems analysis interviews (Tebble 1991, Clarke 1996c) demonstrates the possibility of a GERIS project. A GERIS project would emphasis the generic aspects of methodology with a special emphasis on the communicative aspects of systems development, including but not limited to, issues of discourse, textuality, and social subjectivity. A tradition exists of meta-modeling systems development methodologies. Numerous theoretical and methodological benefits can result, including for example determining the similarity between methods, and therefore whether they can be used interchangeably. Distinct theoretical foundations for meta-modeling have been proposed including a process and goal perspective (Röstlinger and Goldkuhl 1996), a data and goal perspective (Bubenko 1993), a data and process perspective (Brinkkemper 1996), and an intentions, concepts and ‘ways of working’ perspective (Nilsson 1999). The GERIS project could form a fourth, text-semiotic basis for the meta-modeling.
Appendix 1:
ALABS Active Student Loans each Hour

One of the statistics files kept by ALABS was an hourly count of currently active unsupervised student loans. The function of this appendix is to use data from this file to illustrate the extent and significance of the Student Loan/Return Workpractice at the Microcomputer Laboratories and also to demonstrate the importance of ALABS in the overall operations of the Microcomputer Laboratories (circa 1986-1987). Figure A1.1 shows the number of active unsupervised student loans over each day across two shifts from 8:30am to 10:30pm, for the period from the 3rd March 1986 through to the 6th September 1997. This period corresponds approximately to the first 400 days of ALABS operations. Note that each loan, contributing to the hourly count of active student loans, represents a text conforming to the generic staging of the ALABS Student Loan Service Encounter (see Figure 4.5a). The y-axis labels are shown using only integers for each operational hour to reduce label size. The x-axis labels are provided every 20 operational days. The data are represented using a ‘reverse’ density plot where pure white areas represent zero active student loans in a given hour, and pure black areas represent the maximum number of active student loans over the period (69). In order to emphasise the overall trend, the plot has been globally smoothed using an averaging function which suppresses local high frequency variations in the count data.

Over this period, the facility consisted of 5 teaching laboratories with 20 computers each, three Sperry PC Model 25s laboratories and two Apple IIe laboratories, giving a Maximum Possible Load (MPL) of 100 machines. However, it was rare for any of the laboratories to
be completely loaded since on average two machines out of twenty would not be operating reliably. This was particularly the case with the older Apple laboratories. Therefore, the Largest Possible Load (LPL) for the facility was more likely to be 90 machines. The largest number of active student loans in an hour (69) was recorded on the afternoon of Friday 22 May 1987 from 13:30 to 14:30 which represents close to 77% machine utilisation of the LPL for the facility. The second largest number (53) was recorded one month earlier on the afternoon of Wednesday 22 April 1987 during a two hour period from 13:30 to 15:30 which represents 59% machine utilisation of the LPL for the facility. As the tutorials for larger classes were scheduled for earlier in the week, it was not surprising that peaks in unsupervised student loans occurred later in the week when there was a greater possibility for students to gain access to a machine in order to undertake their own unsupervised work. The fact that the second largest number of active student loans occurred mid-week, implies that the facility must have been operating near peak capacity assuming that at least one class was running during that hour. Given that the number of active student loans is not neatly divisible by either the LPL or MPL, implies that at least one or two tutors were allowing students to use machines for classes other than those they were supervising. This was a relatively common practice amongst tutors, and a tacit acknowledgement of high levels of student demand during times of scarce machine resources.
Figure A1.1:

Density plot of the active unsupervised student loans over each day across two shifts from 8:30am to 10:30pm, for the period from the 3rd March 1986 through to the 6th September 1997 (right). The legend is shown below.
Appendix 2:
Selected Transcripts and Texts

Transcript A: Student Loan 1 (ALABS Version 2)

System Feature: Table 3.2: 2.1.1; Chronemic atomic action: Table 4.2: a
Genre Digraph: §3.4.1 and Figure 3.20b; Genre Assemblage A: §4.3.2 and Figure 4.3
Staging: refer to Clarke (1996)

L = Microcomputer Laboratories Staff Member; S = Student

L What software do you want? 1
S I don't know 2
L Which subject are you enrolled in? 3
S I'm not sure? 4
L Ok, Who's the lecturer 5
S Oh, I didn't catch the name 6
L Which Department? 7
S Commerce 8
L No that's a faculty, not a department! 9
S Oh, Information Systems 10
L Is it a first year course? 11
S Yeh 12
L How does AICA111 sound? 13
S Yeah, I think that's it 14
L Are you learning BASIC? 15
S Yeah we’re learning programming 16
L Ok, you need a DOS disk. 17

Can I have your Student Card?
S I don't have it 18
L We can't give you any software unless you have your student identification card 19
S [Looks through wallet] Oh, yeah I've got it 20
L All right, give it to me please 21
S [Student hands over student identification card]
L Do I get it back 22
S You get the card back when you give us the software back 23
L Can I take the software home 24
S No, you can only use the software in one of our three PC labs 25
L [ALABS has no record of the student]
S [Lab Staff must enter the Student details into the ALABS database]
L This your first time here? 26
S Yeah 27
L Thought so, you've got to fill out one of these forms 28
S [Hands over the Rules and Regulations for using the Laboratories, students must sign]
L What's this about? 29
S It's the rules and regulations for these Laboratories. Read them and sign down the bottom.
[Staff member hands over the pen]

**S** Don't tell me I have to do this every time I want to get a disk.

**L** No, you only have to do this once at the beginning of each session.

**S** What happens if I don't sign it.

**L** Then you don't get any software.

**S** [Student reads document and signs]

**L** Can I have the disk now?

**S** No, I have to enter your details.

[Staff member enters details onto ALABS]

**S** Now can I have the disk.

**L** Yes, but you'll need one of these.

[Staff member picks out a lab pass, and swipes it with the Barcode wand]

**S** What's that?

**L** It's a lab pass. It allows you to go into a particular lab and use the machine with the same number as on the card. All the machines are numbered.

[Staff member hands the lab pass to the student]

**S** What happens if I want to go have a smoke?

**L** Fine, that's Ok. Just make sure you're in the right laboratory. When you want to leave make sure that you bring both the disk and the Labpass back. Otherwise you don't get your card and you don't get to borrow anything else. Ok? That is for PC Lab 2, there's a map on the notice board, tells you where it is.

**S** Can I go to any other lab?

**L** Sure but you can only work in Lab 2, Ok? The pass is for Lab 2; you must bring the software back in two hours or less - we can renew it for you if you need more time.

**S** How do I renew the software?

**L** Just bring the software and Labpass back to us and we can renew the loan for you, Ok?

**S** Where Lab 2?

**L** All the labs are on the map on that notice board. Lab 2 is across the foyer on the right-hand side, OK?

**S** Ok, thanks.

---

**Transcript B: Student Loan 2 (ALABS Version 4)**

*System Feature:* Table 3.2: 2.1.1; *Chromemic atomic action:* Table 4.2: a

*Genre Digraph:* §3.4.1 and Figure 3.20b; *Genre Assemblage A:* §4.3.2 and Figure 4.3

*Staging:* refer to Clarke (1996)

**L = Microcomputer Laboratories Staff Member; S = Student**

<table>
<thead>
<tr>
<th>Action</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>S</strong></td>
<td>Microsoft Project! [Hands over Student Card]</td>
</tr>
<tr>
<td><strong>L</strong></td>
<td>[Retains Card]</td>
</tr>
<tr>
<td><strong>S</strong></td>
<td>[Hands over software]</td>
</tr>
<tr>
<td><strong>L</strong></td>
<td>[Gets manual from shelf]</td>
</tr>
<tr>
<td><strong>S</strong></td>
<td>[Student takes manual]</td>
</tr>
<tr>
<td><strong>L</strong></td>
<td>[Records loan using keyboard]</td>
</tr>
<tr>
<td><strong>L</strong></td>
<td>[Hands manual to student]</td>
</tr>
</tbody>
</table>
Transcript C: Student Return (ALABS Version 4)

System Feature: Table 3.2: 2.1.1; Chronemic atomic action: Table 4.2: a
Genre Digraph: §3.4.1 and Figure 3.20b; Genre Assemblage A: §4.3.2 and Figure 4.3
Staging: refer to Clarke (1996)

L = Microcomputer Laboratories Staff Member; S = Student

<p>| | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>S</td>
<td>[Hands back manual]</td>
<td></td>
</tr>
<tr>
<td>L</td>
<td>0[Retrieves Card]</td>
<td>MI</td>
</tr>
<tr>
<td></td>
<td>[Records return using keyboard]</td>
<td>IR</td>
</tr>
<tr>
<td></td>
<td>[Returns Student Card to student]</td>
<td></td>
</tr>
<tr>
<td>S</td>
<td>0[Student takes Student Card]</td>
<td></td>
</tr>
</tbody>
</table>

Transcript D: Staff Loan (ALABS Version 4)

System Feature: Table 3.2: 2.1.1; Chronemic atomic action: Table 4.2: a
Genre Digraph: §3.4.1 and Figure 3.20b; Genre Assemblage A: §4.3.2 and Figure 4.3
Staging: refer to Clarke (1996)

L = Microcomputer Laboratories Staff Member; A = Academic

<p>| | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>Hi, I'm wondering whether I can borrow your Roland DXY-880 Plotter manual for a moment</td>
<td>G</td>
</tr>
<tr>
<td>L</td>
<td>Do you see it there?</td>
<td>SR</td>
</tr>
<tr>
<td>A</td>
<td>Yes, yes, its there, its in the second bookshelf, no, no... the second bookshelf and its about number two on that shelf, that's it</td>
<td></td>
</tr>
<tr>
<td>L</td>
<td>0 [finds manual selects staff loan from ALABS menus]</td>
<td></td>
</tr>
<tr>
<td>A</td>
<td>been busy?</td>
<td></td>
</tr>
<tr>
<td>L</td>
<td>[laughs]</td>
<td></td>
</tr>
<tr>
<td>A</td>
<td>[laughs] sorry</td>
<td></td>
</tr>
<tr>
<td>L</td>
<td>[reaches prompt which says enter staff number] right, what do, you usually put in your name...</td>
<td></td>
</tr>
<tr>
<td>A</td>
<td>yes just the name [says surname]</td>
<td></td>
</tr>
<tr>
<td>L</td>
<td>0 [types in surname, system then requests exact search on name]</td>
<td></td>
</tr>
<tr>
<td>A</td>
<td>ah, no you don’t want an exact match because &gt;[in response to screen prompt]</td>
<td></td>
</tr>
<tr>
<td>L</td>
<td>[types in N for no] &lt; that right</td>
<td></td>
</tr>
<tr>
<td>A</td>
<td>you want...</td>
<td></td>
</tr>
<tr>
<td>L</td>
<td>yeh, that, that's...</td>
<td>CS</td>
</tr>
<tr>
<td>A</td>
<td>ok so you found it, so you type F</td>
<td></td>
</tr>
<tr>
<td>L</td>
<td>0 [types in F]</td>
<td></td>
</tr>
<tr>
<td>A</td>
<td>ah, type number 3 for my number</td>
<td></td>
</tr>
<tr>
<td>L</td>
<td>0 [types in 3]</td>
<td></td>
</tr>
<tr>
<td>A</td>
<td>and you want to press any key to continue [gets past the list of borrowed items]</td>
<td></td>
</tr>
</tbody>
</table>
**Transcript E: Staff Return 1 (ALABS Version 4)**

*System Feature: Table 3.2: 2.1.1; Chronemic atomic action: Table 4.2: a
Genre Digraph: §3.4.1 and Figure 3.20b; Genre Assemblage A: §4.3.2 and Figure 4.3
Staging: refer to Clarke (1996)*

*L = Microcomputer Laboratories Staff Member; A = Academic*

<table>
<thead>
<tr>
<th>L</th>
<th>0 [presses a key]</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>press any key to continue</td>
</tr>
<tr>
<td></td>
<td>[starts code that requests barcode of item]</td>
</tr>
<tr>
<td>L</td>
<td>0 [presses a key, on screen prompt requests barcode of item to be borrowed]</td>
</tr>
<tr>
<td>A</td>
<td>enter the ... DXY...</td>
</tr>
<tr>
<td>L</td>
<td>0 [types in barcode]</td>
</tr>
<tr>
<td>A</td>
<td>quit to quit</td>
</tr>
</tbody>
</table>

[laughs] yep
well sometimes its 'q' and sometimes its 'quit'
yeh, I think its q for staff members [laughs]
yeah must be some crazy convention
yeah [laughs]
it's got nothing to do with borrowing [laughs walks away with manual]

<table>
<thead>
<tr>
<th>A</th>
<th>That's for you &gt; [hands manual to Lab staff member]</th>
</tr>
</thead>
<tbody>
<tr>
<td>L</td>
<td>&lt; thank you, Rod [accepts manual from Rod]</td>
</tr>
<tr>
<td>A</td>
<td>Well I'll return that for you</td>
</tr>
<tr>
<td>L</td>
<td>0 [swipes the books barcode and scans it, ALABS beeps indicating no such loan exists]</td>
</tr>
<tr>
<td>A</td>
<td>Now you don't expect me to remember my staff number or anything?</td>
</tr>
<tr>
<td>L</td>
<td>&lt; I don't need that I found it already</td>
</tr>
<tr>
<td>A</td>
<td>I'm the only person called Clarke that's why</td>
</tr>
<tr>
<td>L</td>
<td>Could be [laughs]</td>
</tr>
<tr>
<td>A</td>
<td>Was it? [is that how you found my staff record without a number?]</td>
</tr>
<tr>
<td>L</td>
<td>Wow this is all the things you have [large list of LATE borrowed items on the screen]</td>
</tr>
<tr>
<td>A</td>
<td>Oh tons yeah &gt;</td>
</tr>
<tr>
<td>L</td>
<td>&lt; tons</td>
</tr>
<tr>
<td>A</td>
<td>What else have i got?</td>
</tr>
<tr>
<td>L</td>
<td>Oh i'll tell you [in a moment] &gt; [re-swipes barcode, still no such loan exist]</td>
</tr>
<tr>
<td>A</td>
<td>&lt;yeah</td>
</tr>
<tr>
<td>L</td>
<td>Item not found, A11LB.....5, oh [surprise, repeats swipe, then enters by keyboard]</td>
</tr>
<tr>
<td>A</td>
<td>It is yours!</td>
</tr>
<tr>
<td>L</td>
<td>Item not found</td>
</tr>
<tr>
<td>A</td>
<td>Maybe it wasn't ever recorded or something</td>
</tr>
</tbody>
</table>
L < I don't know, I'll try something else, A11..LR05, still not found..8 items on loan,... ok found it sorry [varies some of the characters in the barcode using keyboard]

A Was that one found?

L No, you’ve got Excellerator, all the Excellerator stuff, i think its the old version of Excellerator [recites the items on loan as recorded by ALABS]

A Well I can, I can return that because I got the... [new version]

L ...ah, this was what, this number, its number six your suppose to have that's why it couldn't find it [barcode recorded in ALABS didn't match the manual barcoded]

A ...ah so it must have been keyboard entered or something

L I don't know, but it was wrong... ya know, someone ... but thank you for being so kind

A [salutations exchanged A departs the service desk]

Transcript F: Staff Return 2 (ALABS Version 4)

System Feature: Table 3.2: 2.1.1; Chronemic atomic action: Table 4.2: a
Genre Digraph: §3.4.1 and Figure 3.20b; Genre Assemblage A: §4.3.2 and Figure 4.3
Staging: refer to Clarke (1996)

L1 = Microcomputer Laboratories Staff Member (Counter); L2 = Support Programmer; A = Academic

<table>
<thead>
<tr>
<th>A</th>
<th>F</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>could I return this RC</td>
</tr>
<tr>
<td>A</td>
<td>HI,</td>
</tr>
<tr>
<td>L1</td>
<td>Yeh</td>
</tr>
<tr>
<td>A</td>
<td>thanks, I’m a staff member so it will be on the system...despite the fact that I look like a student</td>
</tr>
<tr>
<td>L1</td>
<td>[selects return from main menu] staff...number?</td>
</tr>
<tr>
<td>A</td>
<td>I don't know my staff number. If its keyboard entry you can search for the name.</td>
</tr>
<tr>
<td>L1</td>
<td>[types in a number but the machine does not recognise the code] reboots machine</td>
</tr>
<tr>
<td>A</td>
<td>kick it in the head!</td>
</tr>
<tr>
<td>L1</td>
<td>[starts ALABS, selects staff return] staff number?</td>
</tr>
<tr>
<td>A</td>
<td>... don't know &gt;</td>
</tr>
<tr>
<td>L1</td>
<td>&lt; don't know</td>
</tr>
<tr>
<td>A</td>
<td>no?</td>
</tr>
<tr>
<td>L1</td>
<td>oh</td>
</tr>
<tr>
<td>A</td>
<td>I know my name though, so...</td>
</tr>
<tr>
<td>L1</td>
<td>can you put it in through here</td>
</tr>
<tr>
<td>A</td>
<td>ah well try typing the name in [spells out surname]</td>
</tr>
<tr>
<td>L1</td>
<td>[still trying numbers] how many numbers on a staff card</td>
</tr>
<tr>
<td>A</td>
<td>ah, type in something like 22222</td>
</tr>
<tr>
<td>L1</td>
<td>[enters this number but the system rejects it], ah sugar [brings up a list of staff loans]...[states staff members correct name]</td>
</tr>
<tr>
<td>A</td>
<td>that's it &gt;</td>
</tr>
</tbody>
</table>
L1 [tries to bring up individual loan record] 20
A < that's me, ok Return it, oh ... I don't know (how to return item)... have you just listed what I owe, what I've got? 21
L1 yeh... Louie, how do I return this 22
L2 Just put it on the shelf [laughs] MI 23
A oh yeah right, thank you [ironic] 24
L1 That's the guy 25
L2 Yeh we know that... yeh, right type in the barcode 26
L1 < at this point 27
L2 yeh after you find him... Return 28
L1 0 [types R for Return] 29
L2 Staff 30
L1 [types S for Staff] Staff Number? 31
A C [lists all staff with loans whose surname starts with 'C'] 32
L1 C 33
A 3 [number of the particular staff member's name on list] 34
L2 3 35
L1 Here I go! [system requests barcode], right 36
L2 He likes, He likes to have everything in his office 37
A yeh, yeh 38
L2 Right type in the barcode 39
L1 0 [Types in the Barcode] 40
L2 q, yeh that's it 41
A q...u...i...t 42_
L2 some of them [options] accept q others quit F 43
A ok, thanks 44

Transcript G: Staff Return 3 (ALABS Version 4)

System Feature: Table 3.2: 2.1.1; Chronemic atomic action: Table 4.2: a
Genre Digraph: §3.4.1 and Figure 3.20b; Genre Assemblage A: §4.3.2 and Figure 4.3
Staging: refer to Clarke (1996)

L = Microcomputer Laboratories Staff Member (Counter); A = Academic

A Return this? [hands over manual], RC 1
L Been busy? 2
A ah, so so 3
L How did I do this last time? 4
A [leans over counter to look at ALABS screen] that's ah, 2 for Return 5
L 0 [selects option 2] 6
A 2 for Staff 7
L 0 [selects option 2] 8
A ah, lets see if, well just type in the name I think [staff member recites surname] 9
L 0 [types in the name] 10
A ah, no, return, you don't want an exact match [as the name is incomplete, no] 11
L 0 [types N for no] 12
A that's me, so just type in the number 3 [the staff record matching the search] 13
L 0 [types in three] Ml 14
A [first screen of borrowed items is displayed] return 15
L 0 [types a return to get to the second page of items borrowed] 16
A oh, arh F [to indicate that staff record has been found] 17
L 0 [types an F] 18
A arh, next number, next to the correct staff, yes OK 19
L 0 [types in 3] 20
A there we go, its one of those [the item is in the list], oh, press any key to continue 21
L 0 [presses key to get to next stage in return] 22
A press any key to continue, enter the barcode [of the item] 23
L 0 [presses a key, then enters the barcode of the item at the prompt] 24
A return 25
L 0 [types return and enters barcode] 26
A bingo, q...u...i...t to quit 27
L 0 [types quit] 28
A ah, ye OK, return to continue back to the main menu F 29
L 0 [types return] 30
A bingo! right!
EFFECTIVE AS FROM 2ND SESSION 1986

MICROCOMPUTER LABORATORIES UNIVERSITY OF WOLLONGONG

CONDITIONS OF USE

1. No student may EAT, SMOKE or DRINK in the laboratories.
2. No student shall MISBEHAVE (talk loudly, run, interfere with another students work) while in the laboratories.
3. No student shall play GAMES or do work which is not directly relevent to University Course work in Laboratories.
4. No COPYING of software is allowed in the Laboratories.
5. No equipment is to be MOVED, OPENED, or in any way interfered with except by lecturers or Microcomputer Laboratories Staff.
6. Printers and paper are to be used sparingly. Where possible a computer connected to a printer is to be used only for PRINTING PURPOSES.
7. Laboratories staff are available for assistance with MACHINE PROBLEMS and/or PROBLEMS related to operational difficulties. No assistance with tutorial or class exercises will be given by laboratory staff.
8. ALL BAGS ARE TO BE LEFT OUTSIDE THE LABORATORIES, in the space provided.
9. RETURN ALL BORROWED ITEMS BEFORE THE EXPIRING PERIOD OF THE LOAN.
10. All laboratory items are to remain within the Microcomputer Laboratories, Ground Floor Building 22.
11. All students must REPORT to the office to obtain a Lab. pass, before entering any Laboratory outside tutorial times.
12. All students must remain on their ASSIGNED machine, unless printing.

**** FAILURE TO OBSERVE THE ABOVE CONDITIONS OF LABORATORY ****

**** USE MAY LEAD TO EXCLUSION FROM THE LABORATORIES. ****
PROCEDURE FOR BORROWING

STUDENTS requiring software and/or audio visual should complete this SESSIONAL form and obtain the approval of a member of the Microcomputer Laboratories Staff. Failure to meet any or all relevant conditions will result in the borrower being indebted to the Microcomputer Laboratories and liable for replacement charges of all equipment and goods borrowed, as per University Regulations concerning Failure to Pay Charges.

CONDITIONS OF LOAN FOR ALL BORROWERS

1. The borrower agrees to indemnify the University of Wollongong against loss or damage arising from his/her bailment of goods.
2. The borrower agrees to properly maintain, use and transport any equipment or goods in an approved manner.
3. Any loss or damage is to be reported immediately to the staff of the Microcomputer Laboratories.
4. The equipment is to be returned before expiry of the allocated period of loan. Extensions may be granted when the borrower returns borrowed items.
5. All equipment and/or goods must remain within building 22 of the University of Wollongong.
6. The Microcomputer Laboratories reserves the right to rescind loan/borrowing privileges at any time whereon the borrower must return all borrowed equipment and/or goods to the Microcomputer Laboratories Staff.
7. It is the borrower's obligation to determine the condition of equipment or goods prior to borrowing said goods.
8. Students will be required to submit their Student ID card for holding by the Microcomputer Laboratories until they return all equipment and/or goods.
9. Copying, reproduction, or distribution of borrowed items is expressly forbidden and subject to complete withdrawal of borrowing and usage privileges.
10. Students will adhere to the conditions of laboratory use as displayed in each laboratory area.

I will abide by the conditions stated above:

STUDENT NAME (BLOCK LETTERS): ..............................................................
STUDENT NUMBER: ........................................... STUDENT SIGNATURE: ..............................................................
STUDENT BARCODE: .......................................................... WITNESS INITIALS: ..............................................................
COURSE/DEPARTMENT: .......................................................... DATE: ..............................................................
**PROCEDURE FOR BORROWING**

Staff requiring software, hardware or audio visual should complete this yearly form and obtain the approval of a member of the Microcomputer Laboratories staff. Failure to meet any or all relevant conditions will result in the borrower being indebted to the Microcomputer Laboratories and liable for replacement charges of all equipment and goods, as per University Regulations concerning Failure to Pay Charges.

**CONDITIONS OF LOAN FOR ALL BORROWERS**

1. The borrower agrees to indemnify the University of Wollongong against loss or damage arising from his/her bailment of goods.
2. The borrower agrees to properly maintain, use and transport any equipment or goods in an approved manner.
3. Any loss or damage is to be reported immediately to the staff of the Microcomputer Laboratories.
4. The equipment is to be returned before expiry of the allocated period of loan. Extensions are granted only by the borrower completing a new loan.
5. All equipment and/or goods must remain within the University of Wollongong premises.
6. The Microcomputer Laboratories reserves the right to rescind loan/borrowing privileges at any time whereon the borrower must return all borrowed equipment and/or goods to the Microcomputer Laboratories staff.
7. It is the borrower’s obligation to determine the condition of equipment or goods prior to borrowing said goods.
8. Copying, reproduction or distribution of borrowed items is expressly forbidden and subject to complete withdrawal of borrowing and usage privileges.

**DETAILS**

I will abide by the conditions state above:

<table>
<thead>
<tr>
<th>STAFF NAME (BLOCK LETTER):</th>
<th>STAFF NUMBER:</th>
<th>SUBJECT(S) TAUGHT:</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
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<table>
<thead>
<tr>
<th>DEPT/SCHOOL/UNIT:</th>
<th>STAFF SIGNATURE:</th>
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<table>
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<tr>
<th>OFFICE NUMBER:</th>
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<tr>
<th>INTERNAL PHONE NUMBER:</th>
<th>HOME PHONE NUMBER:</th>
<th>DATE:</th>
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</table>
MICROCOMPUTER LABORATORIES

OVERDUE ITEMS

C. Nicastro
Microcomputer Laboratories
University of Wollongong
Wollongong N.S.W. 2500
10/07/90

RODNEY CLARKE
BUSINESS SYSTEMS

Dear RODNEY,

Our records have indicated that the items listed below are overdue. Therefore, we ask that you return these items promptly. Staff loans are of 2 weeks duration only. The proper functioning of the Microcomputer Laboratories requires that resources borrowed by staff be return within this time period.

If an extension of the loan is required, or the return of items is not currently possible, please ring me at the Microcomputer Laboratories (ext: 3895).

Date Borrowed: 24/06/90 Time: 09:50:54

<table>
<thead>
<tr>
<th>BARCODE</th>
<th>ITEM</th>
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<tbody>
<tr>
<td>1</td>
<td>ALLOTOL01 LOTUS MAGELLAN QUICK LAUNCH</td>
</tr>
<tr>
<td>2</td>
<td>ALLOT1001 LOTUS MAGELLAN IDEA BOOK</td>
</tr>
<tr>
<td>3</td>
<td>ALLWORG91 MICROSOFT WORD 5 SAMPLER</td>
</tr>
</tbody>
</table>

Yours Sincerely

C. Nicastro
Operations Supervisor
TUTOR INFORMATION SHEET

NAME: .................................................................

TUTOR NUMBER: ..............

EMPLOYING DEPARTMENT: ................................................

SUBJECTS TUTORING: ................................................

HOME ADDRESS: ................................................................

SUBURB: ......................... POST CODE:............

PHONE NUMBER: .................

TERM ADDRESS: ................................................................

SUBURB: ......................... POST CODE:............

PHONE NUMBER: .................

* ATTACH DEPARTMENT'S LETTER TO THE BACK OF THIS FORM
PROCEDURE FOR BORROWING

Tutors requiring software, hardware or audio visual should complete this yearly form and obtain the approval of a member of the Microcomputer Laboratories staff. Failure to meet any or all relevant conditions will result in the borrower being indebted to the Microcomputer Laboratories and liable for replacement charges of all equipment and goods, as per University Regulations concerning Failure to Pay Charges.

CONDITIONS OF LOAN FOR ALL BORROWERS

1. The borrower agrees to indemnify the University of Wollongong against loss or damage arising from his/her bailment of goods.

2. The borrower agrees to properly maintain, use and transport any equipment or goods in an approved manner.

3. Any loss or damage is to be reported immediately to the staff of the Microcomputer Laboratories.

4. The equipment is to be returned before expiry of the allocated period of loan. Extensions are granted only by the borrower completing a new loan.

5. The Microcomputer Laboratories reserves the right to rescind loan/borrowing privileges at any time whereon the borrower must return all borrowed equipment and/or goods to the Microcomputer Laboratories staff.

6. It is the borrower's obligation to determine the condition of equipment or goods prior to borrowing said goods.

7. Copying, reproduction or distribution of borrowed items is expressly forbidden and subject to complete withdrawal of borrowing and usage privileges.

8. All loans are of one week duration.

DETAILS

I will abide by the conditions state above:

TUTOR NAME (BLOCK LETTER): ..............................................................

TUTOR NUMBER: ............... SUBJECT(S): .........................................

DEPT/SCHOOL/UNIT: ............................ ...........................

STAFF SIGNATURE: ............................ WITNESS SIGNATURE: ..............

DATE: ........................................
Dear first name,

Our records have indicated that the items listed below are overdue. Therefore, we ask that you return these items promptly. Tutor loans are of 1 week duration only. The proper functioning of the Microcomputer Laboratories requires that resources borrowed by tutors be return within his time period.

If an extension of the loan is required, or the return of items is not currently possible, please ring me at the Microcomputer Laboratories (27 0893).

Date Borrowed: dd/mm/yy       Time: hh:mm:ss

Yours Sincerely

<OpsSuper Name>
Operations Supervisor

BARCODE   ITEM
< 1   Item Barcode   Item Name >
< 2   Item Barcode   Item Name >
;
;

326
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<tr>
<th>Student Name</th>
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<th>Disk Number</th>
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</table>

Items Borrowed: ..........................................................

Staff Borrowers Name (Block Letters): ..........................................

Course/Dept.: .................... Date/Time: .........................

Staff Signature: ......................................................

Lab Attendant Signature: ..............................................
Transcript P: ALABS Information Interview

<table>
<thead>
<tr>
<th>Lines</th>
<th>Topics (Phases)</th>
<th>System Features (Table 3.2)</th>
<th>Texts</th>
</tr>
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<tbody>
<tr>
<td>1-2</td>
<td>Acceptance of the tape recorder</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>3-10</td>
<td>Possibility of hardware Loans to Tutors</td>
<td>2.1.4 Tutor Loans</td>
<td>A2: Text M</td>
</tr>
<tr>
<td>11-27</td>
<td>Function of the Tutor Information Sheet</td>
<td>3.4 Add Tutor</td>
<td>A2: Text L</td>
</tr>
<tr>
<td>28-40</td>
<td>Student Interruption</td>
<td>N/A</td>
<td>N/A</td>
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<tr>
<td>41-60</td>
<td>Late Class Loans</td>
<td>2.1.5 Class Loans</td>
<td></td>
</tr>
<tr>
<td>61-70</td>
<td>'Lateness' for Class and Tutor Loans</td>
<td>2.1.4 Tutor Loans</td>
<td></td>
</tr>
<tr>
<td>71-119</td>
<td>Offenses and Examples</td>
<td>3.1.1 Make an Offence</td>
<td></td>
</tr>
<tr>
<td>120-128</td>
<td>Operation of the Offence Subsystem</td>
<td>3.1.2 Delete an Offense</td>
<td></td>
</tr>
<tr>
<td>129-131</td>
<td>Leave taking</td>
<td>N/A</td>
<td>N/A</td>
</tr>
</tbody>
</table>

Date: Monday 20th December 1999; Interview Duration: 10m:24s

R = Analyst/Author; C: Operations Supervisor; S = Student

R Don't worry about it, no it won't be used against you, just forget about it.

C [indicates acceptance of the tape recorder]

R Ok, I've actually got two sets of questions, the first one... um... involves Tutors, Tutors were involved in Class Loans

C yes, that's correct

R but they also had, they also had the possibility of taking out Software themselves-the Tutor Loan function as well as a Class Loan function

C and books!

R / yeh, any any software, manual, probably not hardware but I don't.. but you know there's nothing in the system I don't think that prevents that... just it probably never happened... or it may have happened, it may have happened in Alex Zelinsky's time when there were Apples around that required interface cards and things like that

C yeh, no, | 1

R but, yeh

C no, no 2

R yeh I can't recall it either, but what I was trying to find out was... [long] um when Academic Staff were enrolled on a system not tutors but Academic Staff

C yeh

R / there was a Yearly Staff Loan Form that looked a little bit like this one, well it looked exactly like this one actually [laughs]

C [hands over Yearly Staff Loan Form, see Appendix A2: Text J]

R that's it

C that's right

R / yeh, yeh

C / yeh, yeh

R / which looks almost identical to the student loan, and almost identical to a lot of the other regulations but, um, [long] so Academic Staff would sign one of these

C um, um [indicates agreement]

R there was also a Tutor Information Sheet

C / um, um [indicates agreement]

R / which looked like that [hands it over] and it had some contact details on it

C / um, um [looking at the Tutor Information Sheet, indicates agreement]

R / I presume that's it they were running late

C / late

R / or something
/ yep, yep
/ and we had to get in contact with them... and I found the routine in ALABS that
put that on and had a look at the data base that's attached to it... but what I wanted
to find out was [long]

S sorry,
C yes
S is there actually any labs where I can run a Pascal program
C arr, you'll have to go down to the ITS labs /
S oh
C / were closed for maintenance
S and where is that
C in building 17, down next to the library
S arr
C there's some computer labs there
S arr
C building 17
S xxx [student thanks C and leaves]
R um, yeah, OK there's some Tutor Information put onto the system but what I can't
find is [long] an Overdue Letter, oh there's an Overdue Tutor
[shuffles through texts]
C wasn't it the same as the normal Overdue letter
R yeh, probably
C its just...
R / to Staff you mean
C / yeh
R yeh, ah, lets have a look [flips through texts] yeh it is its identical... except that
there is a different loan duration mentioned, one week for the Tutor and one, two
weeks for the Staff
C / the Staff
R ok, so what's my problem?... [long] ah that's my problem... say for example there
was a late Class Loan for example there was a missing disk
C / oh that happened!
R that happened heaps, what happened [short] then... did they... cause... did the
system generate one of these [Overdue Tutor]
C / oh no not for Class Loans!
R how...
C no
R ... did that work
C it stayed on the system
R / yeh, until the next week or something
C / yeh, it was there up until it actually got removed so if lets say you were the Tutor
and you returned 19 disks instead of twenty
R yeh, twenty
C / right, then the next time you come in to borrow more disks for another class it
comes up that you've got one outstanding
R / so there's definitely a separation between what I borrowed as a Tutor for my own
purposes, and what I
C / and what you need for a class
R / borrowed for a class
C / cause it may not have been you who forgot to
R / yes its a problem with the audit trail... there was actually four different service
encounters that could have affected that
C / that's right
R / well three actually
C / yeh but it [short] it just popped up on the screen as a reminder to us [Labstaff]
[long] that from the previous time you borrowed a Class there was one or two
[disks] that were outstanding,

R /right
C / that hadn't been returned

R Ok, that's, that's, cool that makes sense, arh, um, [short] ok well that's that. well
that's that thing solved, the next one is um, [long] er um what is it [long] yes the
disciplining and stuff.. yeh..yeh for me these are a little bit difficult to do anything
with because um I got the Offense menu stuff but that tells me what parts of the
system were being executed but it doesn't tell me the other stuff that I'm more
interested in like what, what kinds of offenses were there and what kinds of
problems did you encounter with them cause generally as I, as I remember it,
Offenses were generated when a Student failed to return an item?

C /that's was the main one
R /yeh
C / that was the main one., there was also Offenses for um... were you able to print
out any of the old data?
R uhh, I haven't tried it with the Offense databases
C / cause you got that
R / I suspect that there just going to be
C / cause we had to put a reason in here
R / yeh
C / so there must be ..if Louie's got the backup somewhere with the old data
R / data
C / you should be able to print that out and have a look at it
R / yeh, that would be very interesting
C / yeh like, yeh eating in the labs, the main one was not returning
R / items
C / items on time
R / and Labpasses I guess
C / and Labpasses
R / they were...
C manuals, software, Labpasses they were the main things..
R / yeh
C / but then it went from behavioral problems in the labs
R yeh
C um
R /brandishing shotguns for example
C [laughs]
R / no, just being loud and offensive
R / yeh
C / that sort of thing, um there was one that I recall where the student stole some
paper
R / really
C / continuous paper
R / yeh, yeh [short] yeah out of the printers
C / um, out of the printers. I saw him walking down when it was the car park,
remember out there?, I caught him out there, um [long] yeah there was [long]
R xxx
C bags! that right because at that stage there was a policy of no bags
R / no bags in the labs, that's right
C / and that was a behaviour thing, you told em don't do it, don't do it, then the third
time well sorry but...
R yeah, so once an Offense was created for whatever reason, then subsequent
loans were blocked till
C / yes they couldn't um
R / be in Unsupervised times
C / they couldn't go in and use the labs really during Unsupervised Times
and so that also could occur incur another, another Offense if we capture them in the labs.

and [pause] that required somebody talking to them, I can remember talking to a couple of students actually, reading the riot act to them and then having an offense cancelled.

but I generally didn’t deal with them, but ok well that about it actually, that’s what I thought was going on with Offenses actually.

did this actually automatically put students on the data, on the Offense database if there loan was overdue, I can’t remember that.

I don't recall actually.

I can’t remember that bit either, I don’t think it was I don’t think it did that actually.

/ I think this was a.

/ it was a manual, we had to manually.

/ you had to actually get this database up in order to erase a record.

yeah, yeah I think so too.

but it would ah it would tell you when.

oh, yeah, yeah it made... if flashed up and, yeah I remember that.

in anyway, thanks that’s all I needed.

oh that was..

/ easy wasn’t it.
Appendix 3: 
Graphical Notations

In order to describe the staging of texts associated with workpractices, a simple directed graph notation is used. *Genre digraphs* are used provide a similar purpose as that of Genre Structure Potentials (Hasan). However the notation is simpler because not special case features need to be provided. For example, no distinction is made between obligatory and optional elements since this distinction does not appear to be useful in this semio-informatic. Hasans GSP notation supports a ranging construct that is not required here. The advantage of the notation described here is that it is computable in principle (see discussion in Chapter 5, §5.3.1). The basic form of a genre digraph consists of a sequence of genre elements between the start and end of sequence symbol. This sequence is referred to as the base line sequence and consists of the most frequently occurring pattern of genre elements. Less frequently occurring sequences are arranged top and bottom of the base line. When required a genre digraph can be augmented by qualitative elements when the analyst is confident of their existence and has ablated them from a transcript with an appropriate stakeholder.

As noted in Chapter 2 and elsewhere, entire qualitative sequences are required to show the staging of workpractices for which texts could not be located or which were the products of elicitation. The notation for these is identical to that for genre digraphs with the exception that the qualitative elements (nodes) are drawn with dashed outlines, and the label of the element is suffixed with a ‘*q*’ to indicate that it has been derived qualitatively.
No notation has been developed by Hasan to show the similarities and differences between generic and qualitative sequences, although Clarke (1996) has suggested and applied symbols which were designed for use in studies which utilise Hasan's GSP notation (see Clarke 1996). Since even small information systems involve many texts, involve multiple contexts of situation and multiple material settings, and may involve longitudinal studies of genre change, semio-informatic studies require a notation for the direct comparison of activity sequences and qualitative activity sequences.

**Figure A3-1: Diagramming notation for Qualitative Activity Sequences**

<table>
<thead>
<tr>
<th>Sequence</th>
<th>Genre</th>
<th>Qualitative</th>
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<tr>
<td>Start of Sequence</td>
<td>△</td>
<td>△</td>
</tr>
<tr>
<td>End of Sequence</td>
<td>▽</td>
<td>▽</td>
</tr>
<tr>
<td>Element</td>
<td>G</td>
<td>Gq</td>
</tr>
</tbody>
</table>

Unlike genres which are produced by analysing texts and which map out the *variety* of element sequences, a qualitative sequences is generated post-ex facto and is based on unstructured interviews, participant observations and in the case of information systems, the code itself. At best, qualitative activity sequences represent the most common sequence, the
prototypical canonical configuration of elements— the qualitative equivalent of a genre base sequence. Qualitative sequences represent a kind of ‘organisational memory’.

To reveal the ways in which social subjects are constructed, reconstructed and positioned by workpractice genres, and to provide a more regional view of information systems than that provided by the local view of the workpractice genre and qualitative sequences described above, Assemblages Diagrams were created. The notational conventions for these are provided in Figure A3-2. The relationship between these and sequence diagram is provided in Figure A3-3.

Figure A3-2: Diagramming notation for Assemblage Diagrams

A social subject (participant, actor) called Student engaged in one or more genres associated with the use of an information system.

A spoken-language genre called Student Append, a service encounter. The emphasised outline indicates that spoken-language is used.

A written language genre called the Conditions of Use Form, a regulatory genre. The normal outline indicates that written language is used.

A social subject, the Operations Supervisor, implicated in the use of a genre in this case the Faculty Usage Report. This relationship between social subjects and the genres they enact is represented by an unemphasised line.

A genre association between genres is indicated by an emphasised line. Here the macro-genre of Notice + Agenda is associated with the Operations Supervisor Job Duty statement.

A box with a dashed outline indicates an association between two genres also applies by to another. Here Student Loan is associated with the Conditions of Use form, and so by extension, but not by direct reference is Student Append.
**Figure A3.3:** Relationship between various deliverables (Genre Sequences, Digraphs and Assemblages) during Genre Analysis (after Clarke 1998). The sequence of genre elements from a specific Student Loan text associated with the ALABS Version 2 is shown in (a). The Student Loan Genre derived by merging the Genre Sequences of many Student Loan texts is shown in (b). The genre elements from the above sequence are shown in grey. The Genre Assemblage for Student-Labstaff features of the ALABS system is shown in (c). Genres are shown as ovals. Genres comprising spoken texts are shown with thick outlines, while those comprising written texts are shown with thin outlines. The Student Loan Genre is shown in grey.
Bibliography


Andersen, P. B. (1992) *Personal Communication*


Athanasiadis, L. (1999) *Personal Communication*


Bally, C.; Sechehaye, A. and A. Riedlinger eds/ (1916/1972) *F. de Saussure Course in General Linguistics* (Cours de linguistique générale) Translated and annotated by Roy Harris UK: Duckworth


Clarke, R. J. (1990) “Social, Economic and Historical Conditions in the Development of Computer Centre” Christian Albrechts University, Kiel Germany, 10 December


Clarke, R. J. (1992a) “Voloshinov and the Social Sign” Danish Centre for Semiotic Studies, Solstrup Castle, Denmark, September


Clarke, R. J. (1994) "The Design of WinCHAT" Australian Association for Social Research Conference AASR'94, University of Tasmania, Launceston

Clarke, R. J. (1995a) "Genre in Systemic Functional Linguistics and the Analysis of Information Systems in Organisations" First International Conference on Organisational Semiotics February 10th-15th, University of Twente, The Netherlands


Clarke, R. J. (1997c) “Systemics into Information Systems” Social Literacy Research Group Seminar Series Faculty of Education, University of Wollongong, Thursday 23rd October 1997, 12:30-1:30pm, 67.343

Clarke, R. J. (1997d) “Eliciting Current and Proposed Systems Workpractices: A Pilot Study using Genre” Final Report International Business Research Institute, Commerce Faculty


Clarke, R. J. and A. Mehler (1999) “Theorising Print Media in Contexts A Systemic Semiotic Contribution to Computational Semiotics” *7th International Congress of the IASS-AIS: International Association fra Semiotic Studies/ Association Internationale de Sémiotique- Sign Processes in Complex Systems Dresden, University of Technology, Dresden, Germany, October 6-11, 1999*


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de Souza, C. S. (1998) *Personal Communication*


Eigen, M. (1993) "Viral Quasispecies" *Scientific American* 269 (1) 32-39


Feez, S. (1997) *Personal Communication*


Fuhrman, O. E. and K. Oeler (1986) “Discourse analysis and reflexivity” *Social Studies of Science* 16 (2) 293-307


343


Gudwin (1999) “From Semiotics to Computational Semiotics” in Machines and History (Machinen und Geschichte) Abstracts: 9th International Congress of the German Society for Semiotic Studies (DGS), Technical University, Dresden, Germany, October 3-6, 1999, p.77


Halliday, M. A. K. (1978) Language as Social Semiotic: The social interpretation of language and meaning Great Britain: Edward Arnold


347

Liu, K. (1993) *Semiotics Applied to Information Systems Development* University of Twente, Enschede, The Netherlands


Martin, J. R. (1985) *Factual Writing: exploring and challenging social reality* ECS806 Sociocultural aspects of language and education Victoria, Australia: Deakin University

Martin, J. R. (1991) "Intrinsic Functionality: implications for contextual theory" *Social Semiotics* 1 (1) 99-162


McGrath, A. (1998) *Personal Communication*


Nyquist, H. (1924) "Certain Factors Affecting Telegraph Speed" *Bell System Technical J.* April 324 (6)


349


Pap, L. (1991) *Semiotics: An Integrative Survey* Toronto Semiotic Circle, Victoria College in the University of Toronto Monograph Series of the TSC, Number 7


Poyatos, F. (1972) “The communication system of the speaker-actor” *Linguistics* 83: 64-84

Poyatos, F. (1976) *Man beyond Words* Oswego, N.Y.: State University College


351


Williams, R. (1988) Keywords: A Vocabulary of Culture and Society Great Britain: Flamingo

