

The Discursive Organisation of Action and Language in Workpractice Descriptions

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Abstract

From a Systemic Semiotic perspective, instances of organisational communication (texts) and their general patterns (text types or genres) are treated as *distinct* from workplace action and their general patterns (action types). Administrative and Manufacturing systems demonstrate how genres and action types are discursively organised into workpractices. Different kinds of action can be identified in systems.

Keywords: Systemic Semiotics, action, language, text, genre, discursive organisation

1 Orientation

Genre theory is arguably becoming one of the most rapidly developing *social process approaches* (Quintas 1993) employed in the Information Systems discipline. Genre theory of various kinds and from a variety of sources is being applied in many ways in IS including, for example, providing conceptual tools for ‘investigating the social assumptions underpinning social analyses of computerization’ (Kling 1994), examining the various media associated with user interfaces (Clarke 2001b), in the description of hypersystems (Shepard and Watters 1999), in developing appropriate system documentation, in repurposing content from one form to another, or applied directly to systems analysis, design, and evolution, amongst others (Clarke 1995a). From these possible threads, this paper concentrates on the application of genres as a means of conducting systems analysis, and the relationships between them and action.

In part its appeal is due to the fact that genre theory embodies the concept of patterns- a powerful organising metaphor within the IS discipline- in this case recurrent patterns of communication within organisational settings (Yates and Orlikowski 1992). Identifiable by their communicative purposes and forms, genres can be considered ‘cultural property’ associated with and continually re-enacted within some (organisational) community (Yates et al 1999). Schutze and Boland Jr. (1997) view genres as soft or hard depending on the extent and explicitness of their features- although it is difficult to determine if this is due to the fact that genre as a category is inherently ‘fuzzy’ or just whether the constituent features are simply ambiguous. In contrast, Karjalainen and Salminen (2000) claim that genres become more ‘defined’ as communities become increasingly familiar with them, or by making more explicit rules for their structure and use. Bazerman (1994) and Yates et al (1997) describe the fact that sets of genres also form wider communicative processes and refer to these as genre systems. This concept opens up the possibility of social process descriptions of entire information systems. Several methods and methodologies have also been developed as a result of the utility of this concept including, requirements analysis methods (Karjalainen et al 2000), a document management methodology

called RASKE (Salminen 2000, Salminen et al 1997, Tiitinen et al 2000), and a systems development methodology called SFX based on Systemic Semiotics (Clarke 2000).

Systemic Semiotics is a semiotic approach for modelling systems in organisations formed by combining Systemic Functional Linguistics (SFL) with a selection of compatible Social Semiotic theories (principally Bakhtin in Todorov 1984, Foucault 1972, and Althusser 1971). The justification for this specific combination has been described elsewhere (see Clarke 2002b). Within this approach, workpractices- including those associated with systems use- are contextually defined as consisting of one or more text types and zero or more action types. In contrast to Language Action Perspectives based approaches, Systemic Semiotics considers instances of organisational communication (texts) and their general patterns (text types or genres) as ontologically *distinct* from instances of workplace action and their general patterns (action types).

The Systemic Semiotic model of genre is based on extensions of SFL. There are a number of significant advantages to adopting this form of genre analysis, including the fact that the theory is based on a very flexible and modular functional grammar, which is simultaneously semiotic and contextual. This last characteristic permits contextual descriptions of information systems to be related to their specific situational and organisational contexts (Clarke 1995b, 1996, 2000, 2002b). The Systemic Semiotic model of genre has a number of aspects reminiscent of features in non-semiotic models of genre. For example, the recurrent patterns of communication identified by Yates and Orlikowski (1992) are considered as structures consisting of genre elements which are functionally defined and which may be identified using qualitative analysis or by analysing speech functions in texts. The soft-hard continuum identified by Schutze and Boland Jr. (1997) is actually a product of the fact that genres are quasi-species (Clarke 1996), where the actual structure of a text may mark it as being a member of more than one genre. This attribute is essential in order to account for the development of new genre structures from existing ones. In the ALABS system, parts of which will be featured as a case study later in this paper, the emergence of new system features could be explained as the altering of existing genre structures by its end-user developers (Clarke 2000). While genres become more ‘entrenched’, that is more evident or popular within a community; the social semiotic theory employed in Systemic Semiotics allows us to understand those conditions under which a genre may be renegotiated. In other words the popularity of a genre is no guarantee of its continuous enactment. In fact at any point in a genre structure, communicating agents can ‘bail out’ and can potentially renegotiate it. It appears that all ‘manual workarounds’ have at their heart a renegotiated genre structure (Clarke 2002a). The theory used here enables us to improve upon the observation that genres form larger communicative patterns or ‘genre systems’ (Bazerman 1994; Yates et al 1997). Systemic Semiotics refers to these higher order structures as genre assemblages and provides a number of mechanisms based on the social semiotic theory of intertextuality to account for how genres bind together to form these large-scale features (Clarke 2002b). Various studies have shown that these assemblages construct a kind of ‘ecology’, enabling related but none-the-less distinct workpractices to coexist. This explains in part why systems can persist as recognisable complexes for significant periods of time. Systems consisting of multiple related genres are bound together by intertextual relations and exercise a kind of group inertia in workplaces (Clarke 2000).

However, while texts in work contexts are well accounted for within Systemic Semiotics, a compatible theory of action has not yet been developed. For the most part, the systems studied

have been for various historical reasons small administrative systems. Until recently, Systemic Semiotics had not been applied to analysing manufacturing systems in which elaborate sequences of action are more likely to occur. The approach is described in the following five sections. Various attributes of action are described in section 2 and the methodological consequences of treating action and language as distinct entities are explored in section 3. Several appropriate mechanisms for linking actions and texts to workpractices are proposed and critiqued in section 4. Section 5 applies this approach by to selected workpractices in ALABS (Automated Library and Borrowing System), an operational level system designed to loan and return software, hardware, and informational items to students and staff in a tertiary education computing facility (Clarke 2000). Conclusions and Further Research are described in section 6.

2 Attributes of Action

Workpractices have previously been defined as consisting of one or more text types and zero or more action types. Before detailing the methodological considerations raised by treating texts and actions as distinct (in the next section), we need to outline how Systemic Semiotics describes action, and provide justifications for treating instances of organisational communication (texts) and their general patterns (text types or genres) as *distinct* from workplace action and their general patterns (action types).

2.1 Action Types, Constituents, and Semiotic Functions

Like texts, *action types* occur in one or more named physical spaces called *material settings* (Clarke 2000). 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 actions that initiate, execute or invoke a system feature are generally shown as labels in a genre assemblage diagram; see Figure 2. Table 1 lists the genres associated with this assemblage, while Table 2 describes the related atomic actions. If an atomic action involves the relocation of an object or text from one material setting to another, then the action is represented on a genre assemblage diagram by a dashed circle linked to the text they may be responsible for triggering. An example of this type of atomic action is shown in Figure 3 where a Class Form is relocated from one material setting (the Service Desk) to another (the Teaching Laboratory). Atomic actions may be arranged or linked to other atomic actions to form sequences or recurrent patterns in which case they constitute an *action type*- an aggregate structure at a higher level of granularity. Action types are represented by directed graphs that utilise similar diagramming conventions to the genres used in Systemic Semiotics and described elsewhere (Clarke 2002b). 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.

The approach developed here also recognises that action serves a communicative and semiotic function in two specific ways. From first principles, action is defined in and by the semiotics of space (proxemics) and time (chronemics). Proxemics and chronemics are branches of applied semiotics originally proposed by Hall (1963, 1976); see Nöth (1990, 410-416) for an extended discussion. Where action is involved in the physical movement of materials, texts, or social agents (referred to as social subjects- explained in more detail below) the action is described as a *proxemic action*, whereas if the action involves an event, time or a trigger for communication, the

action is described as a *chronemic action*. ALABS is replete with both types of action, although as will be described later the occurrence is skewed towards atomic action and favours chronemic actions over proxemic ones.

2.2 Sequential Implicativeness

Ethnomethodologists were the first to identify a basic property of language called *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. Obviously, there is linear sequencing in complex stretches of action as well and so it could be justifiably claimed that complex action also possesses a kind of sequential implicativeness (see for example Drew and Heritage 1992, 37-42). 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.

However, the manner in which sequential implicativeness manifests itself in language and action is of an entirely different order. A fundamental relationship called *metafunctional organisation* (discussed in greater detail in section 4) exists between language and the contexts in which it occurs. While action also occurs within a context that constrains how its sequential implicativeness is realised, metafunctional organisation is a property of language entirely absent in complex sequences of action. It determines the ways in which a stretch of language provides a context from which subsequent stretches of language can be reproduced. Metafunctional organisation therefore indirectly constrains and determines the manner in which sequential implicativeness manifests itself in specific texts.

2.3 Text-forming Properties- Texture

Any stretch of writing or speech including those associated with workpractices possesses a complement of text-forming resources in order for it to be defined as a completed act of communication (that is a text). In SFL, text-forming resources are collectively referred to as *texture* (Martin 1992, 181; Halliday and Hasan 1976, 23-26, 324). There are a large number of text-forming resources recognised in Systemic Functional Linguistics. They are organised into three major groups: *intra-sentential* (Martin 1992, 381) or *structural text-forming resources* (Halliday 1995) which involve systems of Theme and Information in texts; *Inter-sentential resources* or *Cohesion*; and *Coherence* in texts which describes how texts relate to their contexts. Parenthetically, *sequential implicativeness* is evident in the text-forming resources that form linear structures throughout a text, examples of which include *reference chains* associated with the Reference systems in language (Eggins 1994, 99), and *lexical strings* associated with Lexical Cohesion (Eggins 1994, 104) amongst others. By definition action cannot possess any text-forming resources.

3 Methodological Considerations: Identifying Action and Language

Establishing distinctions between action and language at a theoretical level necessitates that these distinctions be evident at the methodological level. Systemic Semiotics identifies three analysis strategies that can be used when analysts attempt to understand workpractices in workplaces (Clarke 2000). These strategies describe referred to as text-situations, non-text situations, and empty corpus situations; see Figure 1.

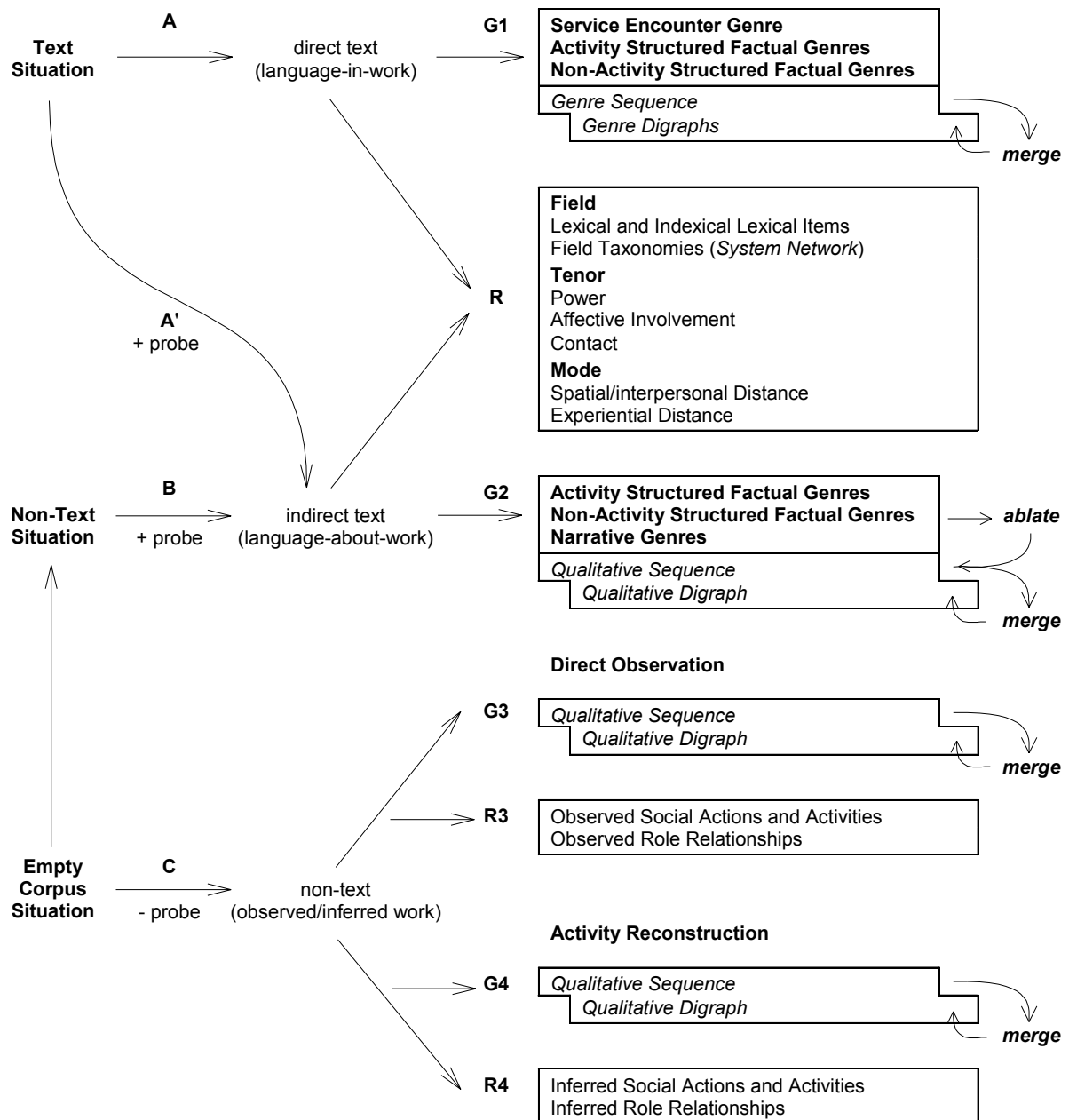
A *text situation* refers to the fact that workpractice texts can be evident in workplaces without any intervention on the part of the analysts (labeled A in Figure 1). These so-called *direct texts* are associated with ‘language-in-work’. A direct text can be analysed in order to recover information about its immediate situation context referred to as *register* in SFL (labeled R in Figure 1). Register features consist of *field*- the social actions and activities that are taking place, *tenor*- the role relationships evident in the text, and *mode*- the role language is playing in the interaction. Beneath each respective register feature are the names of specific methods (in normal type face) and any associated diagramming technique (shown in italics). Information about specific features and methods can be found in Clarke (2000), Martin (1992) and Eggins (1994). A direct text can also be analysed in order to recover information about its (organisational or national) cultural context referred to as *genre* in SFL (labeled G1 in Figure 1). Direct texts will have a generic structure that conforms to either the Service Encounter genre that was of primary importance to the ALABS system, or else it will belong to one of two sub-families of Factual canonical genres (those that are organised around an activity and those that are not). The reader is directed to Martin (1992) for further information about these families. The diagrammatic product of analysing a text generically is a *genre sequence*. These sequences are merged to form a genre digraph in order to characterise a workpractice generically (see Clarke 2002b).

A *non-text situation* refers to work situations where an analyst does not have direct access to a text (labeled B in Figure 1). This does not mean that the work situation does not use or involve language; on the contrary these situations commonly involve users engaged in reading or writing. In order for any analysis to be undertaken in this situation, the analyst must elicit a text by means of a probe (question). This text is called an *indirect text* and corresponds to ‘language-about-work’. Ideally the probe question is designed to provide a text of the appropriate generic structure, one in which the staging of the work can be retrieved. While non-text situations preclude the existence of service encounters, an analyst may recover the generic staging of a workpractice by eliciting from the user a response structured as either a Factual or a Narrative (story) genre, see label G2 in Figure 1. Recovering relevant generic staging about the workpractice of interest will require the removal of extraneous genre elements associated with the response- this is referred to *ablation*. In recognition of the fact that the generic staging of the workpractice was recovered from an indirect text through ablation rather than having been recovered intact from a direct text, the staging uses diagramming conventions that signal the fact that the genre elements are qualitatively rather than linguistically identified. (As users do not often talk in narratives when directly engaged in workpractices, this possibility was not included in the previous discussion on direct texts). The recovered text can be subject to the same kind of Register analysis as before, although further elicitation may be needed to refine field, tenor and mode relations applying to the work situation embedded in language-about-work. Note also that text situations can be transformed into non-text situations through the action of elicitation-analysis situations involving language-in-work can also yield language-about-work, see label A’. These analysis situations deal with texts. Actions involve their own analysis strategy.

The analysis of action forms an *empty corpus situation*, labeled C in Figure 1. The term ‘empty corpus’ derives from the fact that the analysis situation does not produce any text and so the activities must be either observed or otherwise inferred or reconstructed. In some circumstances it is possible to construe an Empty Corpus Situation as a Non-Text Situation, in which case strategy B takes effect. But if we wish to understand action and cannot acquire a text by any means, for

example the work can only be observed (for safety reasons the action cannot be interrupted), there are no people to ask (the action is automated), or the work practice can only be inferred by other means (the workpractice staging is reconstructed from archives or programs), then a *non-text* is said to occur and there are only a limited range of options available for examining the observed or inferred work. Action can be analysed by *direct observation*. With reference to Figure 1, the code R3 refers to the category of Register or the Context of Situation in SFL, whereby specific features of a text signal significant aspects of the social occasion. However, since a text does not exist, social actions and activities and role relationships must be observed. The G3 code refers to the category of Genre or Cultural Context in SFL whereby specific features in a text signal the functional and to an extent the canonical staging of the text. Without a text the staging of the action is specified using an action type in the form of a qualitatively determined sequence of atomic actions. If the action being considered is complex then successive sequences may be merged into a more comprehensive directed graph (qualitative digraph), analogous to representing the staging of text genre. If direct observation of action is not possible then activities must be inferred by another means. This is referred to as *activity reconstruction*. Actions and activities may be inferred (R4) from secondary sources such as workplace evidence or on occasions by examining system code. As with direct observation, qualitative sequences may be identified and action types produced by merging them into qualitative digraphs if the reconstructed activities are of sufficient complexity (G4).

Figure 1: Analysis Strategies for text, non-text, and empty corpus situations (after Clarke 2000)



4 Co-occurrence Mechanisms- Action with Language

Having established the case for considering action and language as distinct categories theoretically and methodologically, 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? Two possible mechanisms are available within systemic semiotics that could account for the binding together of action and language in the form workpractices. The first

mechanism is a proposed extension by the author to metafunctional organisation, which was developed by Feez (1997) to describe how sets of related texts co-occur. We consider whether this mechanism- based on Systemic Functional Linguistics- might be a way of linking complex action and texts together in work contexts. The second mechanism is called discursive organisation, and is based on social semiotic theory.

4.1 Extensions to the Metafunctional Hypothesis

The *metafunctional hypothesis* proposes that all ‘natural’ languages- that is to say ‘social’ languages- are organised by three simultaneous and interacting metafunctions. Language is theorised as being organised by three simultaneous and interacting metafunctions that are found in all ‘natural’- that is to say ‘social’- languages. Language can be used to represent social actions and is a way of acting upon the social world and through it the material world (*ideational metafunction*). Importantly language also represents and constructs social groups (*interpersonal metafunction*) as well as connecting within a text and between texts, and their contexts (*textual metafunction*). As originally proposed by Feez (1997), 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. The relationship between language metafunctions and context, referred to as the *metafunctional hookup*, is possible because SFL is a contextual model of language.

One possible mechanism for explaining the co-occurrence of action with language is to extend Feez’s (1997) concept to potentially explain the co-occurrence of specific actions and texts. Unfortunately the metafunctional hypothesis does not apply to action. While a specific action or sequence could be described metaphorically as having a non-text analogue of the ideational or interpersonal ‘metafunction’, it is certainly the case that action does not possess a textual metafunctional. While being an interesting descriptive proposal, this approach does not suggest any mechanisms that can explain the actual metafunctional distinctions between related texts in organisational contexts. The risk of extending this proposal to action in workpractices is that it privileges the category of text over that of action. It is more likely that action and text are locked into a mutual co-dependency.

4.2 Discursive Organisation

The mechanism used here for explaining the form and frequency of specific actions, as well as a mechanism for explaining the co-occurrence of specific actions with specific texts in institutional and organisational settings, is the social semiotic concept of *discourse*. This is not to be confused with linguistic theories of discourse as extended stretches of language or as a folk-linguistic synonym for casual conversation. The concept of discourse is based on the work of Foucault (1972), a concise definition of which is provided by Kress (1985, 6-7) who states:

“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”

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 theory for texts. Often the ‘systematically-organised sets of statements’ are explicitly provided in the form of regulatory texts (contracts for example) or conventions (safety procedures), ‘unwritten laws’ or constraints. In the case of action in administrative systems, these actions are either necessary in order to instigate or trigger a particular kind of communication, or needed as a logical requirement for completing particular kinds of communication.

Another advantage of discursive organisation is that action and language are placed on the same footing, in the sense that both *mutually construe* and influence each other with respect to workpractices. This mutual construal is formalised by *associations*, a form of *intertextual references* that show which actions and/or genres are associated or discursively organised together. The success or failure of either affects the other and has consequences on those who may be individually or socially involved in its outcomes. Employing the Social Semiotic 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. ‘Subjectivity’ refers simultaneously to the condition of individuality and self-awareness, which is continually formed and reformed under changing social, economic, and historical circumstances. The theory of social subjectivity claims that participants in communication are socially and discursively formed. Each will bring to organisations and to particular workpractices different sets of institutional and linguistic experiences (Clarke 2001b, 594). The individualism that social subjectivity replaces is inherent in descriptions of action in architectural studies; see for example 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).

5 Case Study: ALABS Workpractice Actions

The analysis of ‘systems of genres’ (Bazerman 1994, Yeates et al 1997) in Systemic Semiotics proceeds from the development of Genre Assemblage diagrams. These are the consequence of having analysed many texts, which characterise particular routine and recurrent patterns of communication in the form of individual genres. We will examine two genre assemblages associated with Tutors in the ALABS system. One of a number of genre assemblages identified as a consequence of studying the ALABS system (Clarke 2000) is shown in Figure 2. Tutors were considered to be special a kind academic staff member and were allowed to borrow software items and use them in the Laboratories. They would borrow items and return them by entering into service encounters- spoken language genres, which are used for the loan or sale of goods or services. The rules and conditions that govern the loan and returning was specified in a Tutor Form, which allowed tutors to be registered on the system for a year. The association that linked loaning and return involved the direct intertextual referencing of each of these genres in the Tutor Form- itself a regulatory written genre. If the Tutor was late in returning items then an Overdue Tutor letter was generated automatically by the system and sent out the next day. The association links this occurrence to that of returning and by implication the association that links returning to the Tutor Form. A list of the genres involved is provided in Table 1.

Figure 2: ALABS Genre Assemblage showing the genres associated with the Tutor Loans/Return workpractices where tutors borrow and return software for there own use. These loan regulations are specified as contractual conditions in the Yearly Tutor Loans Form, which has the same generic structure as a contract.

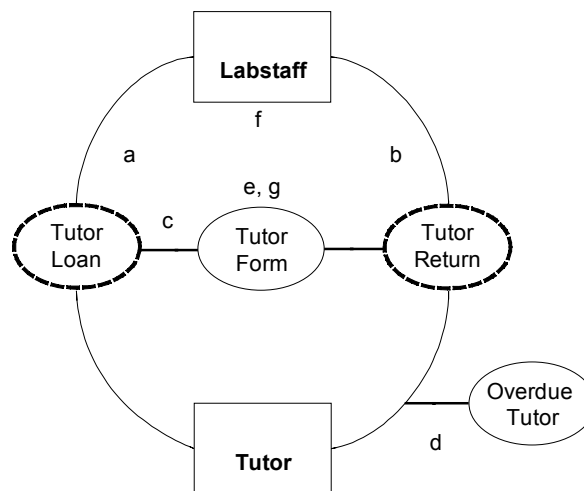


Table 1: Genres identified as part of Genre Assemblage in Figure 2.

Abbreviation	Full Name	Text Type	Versions
Tutor Form	Yearly Tutor Loans Form	written; regulatory	1, 4
Overdue Tutor	Overdue Tutor Loan Letter	written; regulatory	1, 4
Tutor Loan	Tutor Loan	spoken; service encounter	1, 4
Tutor Return	Tutor Return	spoken; service encounter	1, 4

Table 2: System related chronemic atomic actions associated with various workpractice texts and system technology (shaded) of relevance to the Genre Assemblage in Figure 2.

Code	Description
a	Loan: Tutor Loan
b	Return: Tutor
c	Current Tutor Loans
d	Items on Loan: Overdue Tutor Loans
e	Add Tutor
f	Print All Tutors on Database
g	Print Tutor Borrowing Forms
h	Dump Tutor Data Base
i	Backup Databases: Tutors

ALABS was an administrative operational system and had many assemblages. The genres and the associations between them are represented on Genre Assemblage diagrams like the one in Figure 2. The conventions for reading this type of diagram are simple. The ovals with thick lines represent spoken language conforming to the structure and function of a service encounter. The dashed ovals indicate that Tutor Loan and Return were qualitatively determined not linguistically analysed. This is the typical situation when systems features have been decommissioned, as these ones had been when the study was conducted. Ovals with thin black lines refer to specific written genres. The rectangles represent social subjects or participants in this workpractice- Labstaff who loan and Tutors who borrow and return. The thin lines which join then show which genres they are directly involved in realising. The thick black lines refer to associations that indicate discursive organisation of language and action.

The second genre assemblage is the Class Loans>Returns Assemblage shown in Figure 3. This Genre Assemblage represents the Class Loans/Return workpractices in ALABS. This assemblage involves Tutors who were responsible for sets of software released into their care by the Microcomputer Laboratories staff. Multiple sets of software were borrowed by Tutors to use in their tutorial classes. Having borrowed class sets of software (using a Class Loan genre), Tutors were responsible for loaning these disks to students who would then use them during their tutorials. Ultimately the tutors needed to return these disks (using a Class Return genre) to the Labstaff when they finished teaching. In order to keep track of which student had what disk, Tutors were obliged to take a blank pre-printed Class Form when the Class Loan was made and then return this form along with the disks. In the class students would write their name corresponding to the number of the disk that they were using (Lab Loan). At the end of the tutorial each student indicated that they had returned their disk by again signing the Class Form (Lab Return). Note that the completion of the Class Form during this complex nested service encounter (Clarke 1996) is the responsibility of Tutor, as indicated by the occurrence of the Tutor Form that specifies the rules applicable to Tutors.

5.1 Evident Atomic Actions

The Tutor Loans/Return workpractices like all other workpractices in ALABS were replete with both chronemic and proxemic atomic actions. The invocation of particular system features by Labstaff from ALABS menus constituted time or event based atomic actions. *Chronemic atomic actions* are indicated by letters in Figure 2 and described in Table 2. 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 normally labelled on Assemblage diagrams. However, the Class Loans>Returns Assemblage associated with Version 2 of ALABS shows the relocation of the Tutor and the Class Loan Form from one material setting, the Service Desk, to another material setting, a Teaching Laboratory, between dashed lines in Figure 3.

5.2 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. This system feature existed because machines, which could not be repaired at the Laboratories, 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 into 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.

5.3 Predecessor-Successor Relationships: Material and Consequential

A proxemic atomic action in the Class Loans>Returns Assemblage diagram (ALABS Version 2) is labelled reloc Cf and links the material settings of the Service Desk and the Teaching Laboratory, see Figure 3. Recognising the existence of this action and the importance of predecessor-successor relationships, provided a means to determine the analytical completeness of a workpractice description. For the purposes of this paper, 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 3. 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.

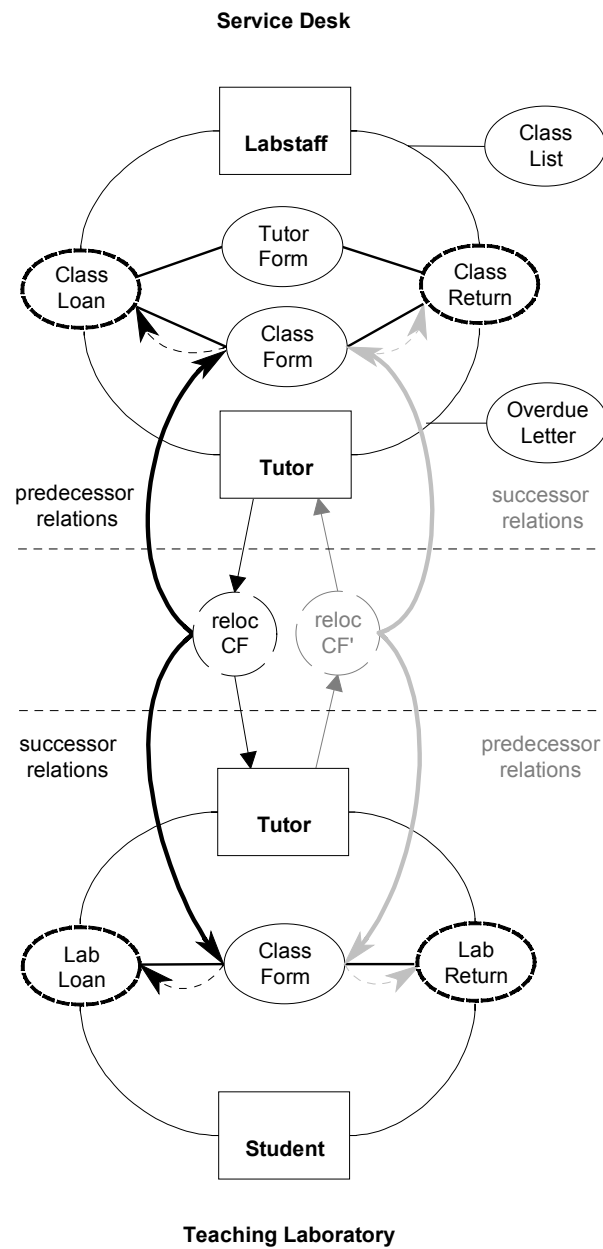
This proxemic action is also indirectly implicated in subsequent texts. Within the Service Desk material setting, a Class Form is produced as a consequence of conducting Class Loans between Labstaff and Tutors. In a sense, reloc CF also enters into a different kind of predecessor relation with Class 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 3.

5.4 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

Figure 3: 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.



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 3.

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 is universally applicable.

6 Conclusions and Further Research

Previous studies of information systems utilising Systemic Semiotics have been limited to administrative information systems or various kinds of hypersystems. This paper described a Systemic Semiotic approach that accounts for the discursive organisation of workpractice actions and texts while preserving both categories as distinct yet interrelated. The advantage of a Systemic Semiotic model is that diachronic changes to workpractice action and language can be described using the same discursive co-occurrence mechanism in which workpractice action and language mutually construe each other. The discursive organisation of workpractice actions was exemplified using *atomic actions* that were responsible for triggering patterns of communication (workpractice genres) in operational systems. Action associated with ALABS took the form of either chronemic or proxemics atomic actions. Chronemic atomic actions trigger systems features used during the enactment of a workpractice text or those involved in the maintenance of the ALABS system itself. Proxemic atomic actions involve the relocation of texts and social subjects from one material setting to another. The former are generally explicitly labelled on Assemblage diagrams, while the latter are frequently omitted.

While action does not play a major role in ALABS workpractices, there are several theoretical, methodological and substantive issues that are raised by actions associated with ALABS that are addressed here. Methodologically, atomic actions are important in determining the relative completeness of a workpractice description. This is due to the fact that ALABS workpractice actions were associated through discursive organisation with workpractice texts 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 that 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.

While operational systems constitute the vast majority of information systems in organisations, they do not involve elaborate sequences of workpractice action. The prevalence of atomic actions

and the absence of action sequences appear to be a characteristic of administrative information systems. In principle, the same discursive co-occurrence mechanism can be applied to *action digraphs* associated with complex and recurring actions that can be found in manufacturing systems. Recent research conducted on a warehouse manufacturing information system (Clarke 1999), 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 3. This distinction will be the subject of further research.

Table 3: Texts and Action as distinguishing characteristics of Administrative versus Manufacturing Information Systems (after Clarke 1999).

	Administrative IS	Manufacturing IS
6.1.1.1.1.1 6.1.1.1.1.2 Action	<p>Simple atomic actions (chronemic or proxemic) consisting of single elements</p> <p>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.</p> <p>Apart from needing to be completed in a given time frame, administrative actions are typically not pre-specified.</p>	<p>Complex action sequences consisting of many elements arranged into distinct types of action.</p> <p>Action sequences are related to the workpractice primarily through discursive organisation involving multiple texts. Action sequences become a dominant component of workpractices.</p> <p>Action may be strictly pre-specified by explicit regulations, best practice standards, codes of conduct, or legislation.</p>
Texts	<p>Workpractices primarily consist of texts with relatively simple action</p> <p>Direct text situations generally prevail so there is little need for active elicitation</p>	<p>Workpractices primarily consist of action, texts tend to be written rather than spoken</p> <p>Indirect texts and Empty Corpus Situations prevail and so analysts must observe and actively elicit</p>

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