



Paradigmatic and Syntagmatic Views of Developer Workpractices

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Agenda

Paradigmatic & Syntagmatic Views of Developer Workpractices

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Introduction

Introduction

- communication approaches in IS/T are appealing because they hold the potential to relate the practice of work to the enactment of organisation
- some effort has been expended on *relating communication concepts to standard development practices*; Madsen (1996) on object-oriented development; Andersen (1993) on programming
- some recent work used to understand what is at stake during development when viewed from the perspective of a communication theory eg./ *developing theorisations of business process, process orientation (CCBP)*

Introduction

Two Omissions in IS/T Communications Approaches

1. any recent work related to the mapping of workpractices to some form of machine-executable representations
 2. absence of any work describing the communication-based accounts of developer workpractices that are needed to accomplish this mapping
- this paper concerns the second of these problems:
 - accounting for developer workpractices and
 - directed at the sufficiency of communication-based methods in IS developer activities

Introduction

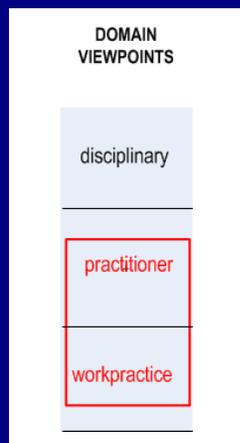
IS/T Artefacts and Development Workpractices

- both artefacts and development workpractices are considered as *semiotic systems* (after Saussure 1972)
- *opens up an entirely new line of investigation into the systems development process itself*
 - all previous communication studies into development investigate the *syntagmatic dimension of systems*- how communicative resources and components are chained together in order to form the realisation of a system feature
 - *obligates us to simultaneously consider systems development from the complementary paradigmatic perspective*- the available options from which a developer may choose at any point throughout the development process

Communication Approaches: Discipline and Practice

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Communication Approaches Domain Viewpoints (Clarke 2005, 94)



- we can think of discipline in terms of three different *domain viewpoints* to which communication approaches can be applied
 - at the *workpractices viewpoint* we can consider how communication theory can be used to understand business process and service enactment and evolution
 - at the *practitioner viewpoint* we see how our interventions as service scientists, managers, analysts, and designers can be constituted as sets of communication about communication
 - at the *disciplinary viewpoint* how our world view is discursively constructed for example as 'organisational problems' for which we have 'technical solutions'

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Communication Approaches

Linguistic Approaches in IS (Lyytinen 1985)

- first published review on the use and applicability of linguistic approaches- attempted to locate and evaluate them in the literature
- how might we build upon this work given almost three decades of work:
 1. elaborate the classification of communication approaches
 2. reclassify communication approaches according to the formal versus functional divide
 3. distinguish between comprehensive theories versus communication theories
 4. extend communication theories and methods into domains beyond traditional concerns

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Communication Approaches

1. Elaborate Classification

- *include the work of communities that have incorporated communication theory explicitly*; including relevant work in OrgSem, LAP, ALOIS and Actability/Pragmatics
- *include orthodox development practices that rely on an unacknowledged and often untheorised communicative foundation*
 - the role that communication plays in these techniques transparent or invisible
 - a more exhaustive critique will require the inclusion of sub-standard orthodox techniques- these will need to be unpacked using communication theory

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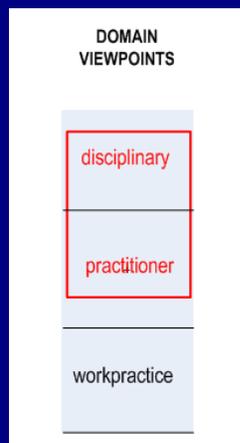
Communication Approaches

2. Reclassify Communication Approaches: Rule | Resource

- use the formal versus functional divide to reclassify IS communication approaches as this has organised 20th C linguistics
- *language as rule*: rationalism, empiricism and logic, oriented towards obligation and inclination, language in decontextualised settings, universality and learnability
- *language as a resource*: ethnography, oriented towards probability and usability, emphasize authentic language use in specific contexts

Communication Approaches

3. Distinguish between comprehensive theories | resources



- communication approaches differ in the extent to which they can account for generalised organisational discourse
- distinction is important because *theories of communication are likely to be account for higher order practitioner and disciplinary domain viewpoints* (Clarke 2005, 94) while approaches based on one or few communication resources will be unlikely to account for them

Communication Approaches

4. Extend Communication Approaches into New Domains

- as communication approaches in IS/T are unusual, it is not unreasonable to expect that *new classes or problem will be identified and become addressable*
- examples:
 - analysing the diachronic dimensions of IS/T artefacts in organisations (Clarke 2000)
 - using communication approaches to remove the opaqueness that often surrounds developer workpractices (Clarke 2006)
- a new approach here- application of a semiotic model of communication to understand *developer workpractices from a paradigmatic perspective*

Semiotic Systems: Paradigms and Syntagms

Semiotic Systems, Paradigms & Syntagms

Models of the Sign: Triadic and Dyadic

- two major branches of semiotic theory- distinguishable by their models of the sign
 - Swiss linguist *Ferdinand de Saussure*
 - North American philosopher *Charles Sanders Peirce*
- *Saussure's dyadic sign*- content or meaning (*signified*) and its expression or realisation (*signifier*)
- *Peirce's triadic sign* consists of an expression the *sign vehicle*, a thought or *sense*, and the thing signified or *referent* (Nöth 1990 nomenclature)
- these sign models are incompatible with each other theoretically and methodologically- *coherent semiotic analyses of social entities like organisations will be next to impossible if triadic signs are used*
- *signs are social institutions, the signified and the signifier are not individual but collective*

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Semiotic Systems, Paradigms & Syntagms

Model Employ a Dyadic Semiotics

- while Saussure's sign is social it requires theoretical extensions to create a social semiotics- I use *Systemic Functional Linguistics*- a full-blown semiotic model of language- it has been *extended into non-language domains*- so it is applicable to interactive multimodal systems
- however *language still the most important and prevalent modality*, both for
 - *workpractices* associated in the presence and absence of information systems in organisations
 - but also *change management* and *systems development activities*

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Semiotic Systems, Paradigms & Syntagms

Signs and Semiotic Systems

- *relationship between the content or meaning of a sign and its expression* is arbitrary in the sense that it is *conventional*- so what is the meaning of a 'sign'
- signs acquire their meaning in relation to the *semiotic system* to which they belong
 - semiotic systems are *organised as a set of choices*
 - each choice in the semiotic system *acquires its meanings against a background of other signs that could have been chosen*
 - eg/ rose semiotic system: **red** (signifier)- *passion* (signified) not **yellow** *friendship*, not **white** (*happiness*), not **pink** (*gratitude*) ...
 - the 'meaning' of a sign comes from what it is not in the semiotic system to which it belongs- *meanings exist as differences*

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Semiotic Systems, Paradigms & Syntagms

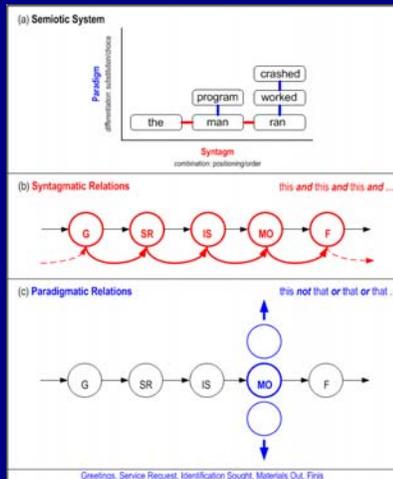
Syntagms and Paradigms

- signs co-existing in semiotic systems *enter into two types of relations with other signs*- syntagmatic relations and paradigmatic relations
- a *syntagm* is an orderly set of interacting signifiers which form a meaningful whole
 - governed by some explicit and implicit rules and conventions (see later for workpractices)
 - involves *ordering, combinations and their possibilities*
 - generally, one member of a paradigm is followed by others to form a chain
- a *paradigm* is a set of associated signifiers or signifieds that are all members of some defining category but which are different to each other
 - involves *selection and is based on contrasts or differences*
 - generally, one member of a paradigm is structurally replaceable with another- choosing one excludes the others

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Semiotic Systems, Paradigms & Syntagms

Syntagmatic and Paradigmatic Relations



- if we are interested in *developing structures representing workpractices or their executable representations* we might have a structure which consists of elements like Greetings, Service Request and so on ...
- *each element needs to be arranged syntagmatically* (b), at any location in this evolving structure we may have *chosen to specify an appropriate element from the relevant paradigm* (c)

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Semiotic Systems, Paradigms & Syntagms

Semiotic Systems, Meaning and Development Activities

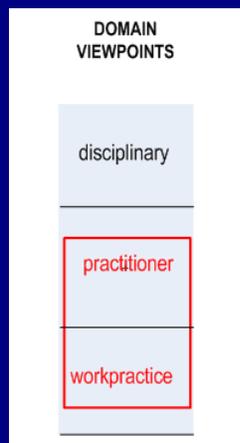
- detailed qualitative and ethnographic studies aside, *a developer has at best an incomplete and partial understanding of user semiotic systems ...*
- ... one that may use *similar or identical signifiers but arranged into semantic systems that associate these to different signifieds*
- helps to explain the *large proportion of systems development projects that are considered failures* even projects with a high degree of user participation

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Syntagmatic View of Workpractices

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Syntagmatic View of Workpractices



- most communication approaches *focus exclusively on the syntagmatic view to workpractice analysis*
- in SFL, genre has proved to be useful when investigating patterns in organisational activity
 - by creating *descriptions of workpractices as business processes and services* (Clarke and Nilsson 2008)
 - describing contextual *changes to specific workpractices* in response to changes within the structure and operations of the organisation, and wholesale *longitudinal changes to sets of IS/T related business processes* (Clarke 1996)

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Syntagmatic View of Workpractices

Workpractices and Genre

- *genre elements* are assigned to stretches of language in a transcript from a paradigm of elements
 - the elements form a *paradigm* usually derived from a linguistic analysis of similar workpractice texts over a period of time
 - a *syntagmatic representation* of the transcript elements can be formed for a text using its appropriate paradigm of genre elements- the resulting structure is called a *genre sequence*
- over time a large number of genre sequences, some identical, most similar, will provide examples of almost all the ways in which this kind of work can be conducted
- to characterise this kind of work, individual genre sequences are merged to form a single *genre digraph*

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Syntagmatic View of Workpractices

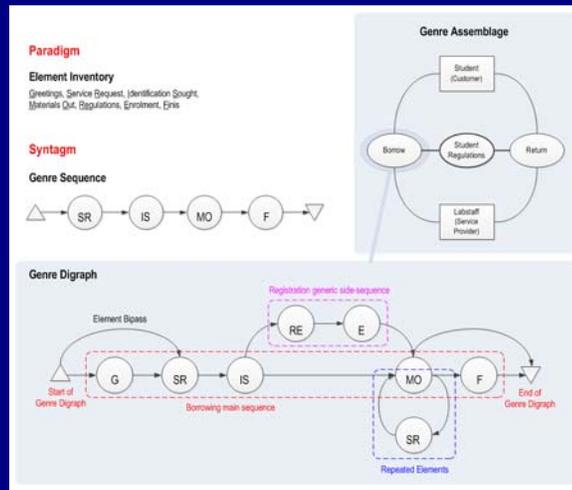
Genre to model Business Process and Service Structures

- *genre* is the global rhetorical structure of a communication
 - an set of genre elements with known functions called an *genre element inventory*
 - each *genre element* consists of one or more exchange structures that are linked together into an complex sequence that can be modelled as *directed cyclical graphs*
 - as we have seen these can be *derived bottom-up for novel/unknown genres*
- but, societies accumulate useful (reusable) *canonical genres* across a variety of contexts
 - *some elements can be re-labelled to functionally match the current text circumstances* or *expanded into more 'delicate' genre element sub-sequences- canonical genres are applied top-down*
 - examples include factual/narrative recounts, reports, exposition, explanations etc... some studies have made more 'delicate' sub-classifications (secondary education)

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Syntagmatic View of Workpractices

Paradigm & Syntagms | Genre Digraphs & Assemblages



- a *workpractice* is represented by one or more *genres* (see *genre digraph*)-individual genres are not enough to fully describe even the most trivial IS
- IS consist of multiple *workpractices* and must be represented using multiple *genres*
- the semantic relationships between numbers of genre digraphs are shown using a *Genre Assemblage diagram*

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Syntagmatic View of Workpractices

Workpractices and Genre: Analysis and Design

- genre is emphasised in relation to business process change because:
 - it not only represents the *large-scale rhetorical organisation of completed acts of communication* but it
 - also sits at the *interface between the culture of the business or the way it conducts a particular class of work*
- just as an *existing workpractice* can be described generically, a *new workpractice* may be designed by creating, modifying or using existing functions and assembling them into a new sequence
- both *an analysis of an existing workpractice or the design of a new workpractice emphasises syntagmatic relations between signs*

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Syntagmatic View of Workpractices

Relevant Language Resources



Transcription
• Clause Boundary Analysis

Coding
• Standard
• Linguistic methods

Genres	A pattern of communication and action made up of elements which constitute one or more exchange structures- these elements may be phatic as well as functional. They may also be realised non-verbally in some situations
Exchange Structures	More extended interactions that involve sequences of speech functions that constitute larger interaction patterns (we may expect to see these reused in other contexts eg. Question + Answer or Offer + Acceptance)
Moves	Language is time-ordered and so we use social tactics to determine who should speak next- these are referred to as moves and are points of possible turn-transfer
Speech Function	Once the role taken in a service is decided, this will determine the kind of speech functions that we expect and also are expected to provide during the enactment of the service
Speech Role	The role to be adopted in a service determines what we can and can't say in particular service situations

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Syntagmatic View of Workpractices

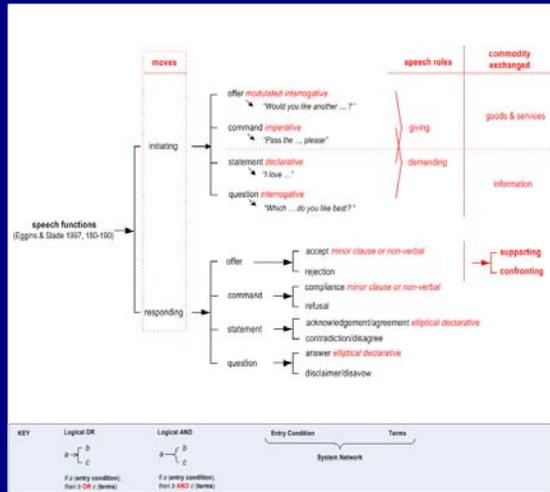
Speech Function System (Egins & Slade 1997, 190)

- in order to understand the *semantics of an interaction* we must *understand how language is being used to construct an interaction*
 - must know knowing what *commodity* an interactant is interested in (goods and service; information) and also what *speech role* they are adopting during the interaction (giving/demanding)
 - the interactants will need to establish a relationship that enables them to sequence and build their interaction and that is accomplished by *moves*
 - commercial transactions are thoroughly conventional and so the speech roles, commodities and moves are well known to interactants

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Syntagmatic View of Workpractices

Speech Function System (Eggs & Slade 1997, 190)



- diagram shows *speech function (semiotic) system* using a SFL notation called a *systems network*
- each *speech function has an associated grammatical realisation*- reliably identifiable
- more extended interactions involve sequences of speech functions that constitute larger interaction patterns called *exchange structures*
- one or more exchange structures can construct functional and persistent stretches of language-*genre elements* ...

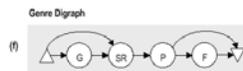
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Syntagmatic View of Workpractices

Linguistic Analysis of Magazine Purchase Workpractice

(b) @Begin
@Participants: NEW Newsagency Employee, CUS Customer
@Age of NEW: 22
@Sex of NEW: female
@Sex of CUS: male

(a)	(c)	(d)	(e)
1 *CUS hi, how are you today %fact CUS brings a magazine over to the counter	initiating question <i>interrogative</i>	E1	G
2 *NEW im good thanks how are you %fact NEW and CUS are at the counter	responding answer <i>elliptical declarative</i> ; initiating question <i>interrogative</i>	E2	
3 *CUS good[at] umm [] %scom CUS is holding a magazine fetched from the rack	responding answer <i>elliptical declarative, paralinguistic</i> <i>non verbal</i> (as command)	E3	SR
4 *NEW just the magazine	follow up question <i>interrogative</i>	E4	
5 *CUS yea just this one thanks	responding answer <i>declarative</i>	E5	E6
6 *NEW yup [] seven ninety five [] did you want a bag for that one	discourse marker; statement <i>declarative</i> ; offer <i>modulated interrogative</i>		
7 *CUS umm no im alright thanks	responding offer rejection <i>minor clause</i>		
8 *NEW ok	discourse marker		
9 *CUS there you go %fact CUS hand over payment	initiating statement <i>declarative</i>	E7	P
10 *NEW thank you [] five cents change	responding statement acknowledgement <i>minor clause</i> ; initiating statement	E8	
11 *CUS thanks for that	responding statement acknowledgement <i>minor clause</i>		
12 *NEW no worries	phatic <i>minor clause</i>		
13 *CUS all right	phatic <i>minor clause</i>		
14 *NEW bye	phatic <i>minor clause</i>		F
15 *CUS see you	phatic <i>minor clause</i>		



- Genre Elements**
- G = Greeting
 - SR = Service Request
 - P = Purchase
 - F = Fins
- Exchange Structure**
- E1 = question + answer
 - E2 = question + answer
 - E3 = command (non-verbal) + compliance (non-verbal)
 - E4 = question + answer
 - E5 = statement + agreement (non-verbal)
 - E6 = offer + rejection
 - E7 = statement + agreement
 - E8 = statement + agreement

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Syntagmatic View of Workpractices

Cohesion in Workpractice Structures

- we can model workpractices using insights provided by this particular kind of communication approach- this can be done both structurally and semantically
- modelling these structure relies on determining the *internal consistency and completeness* of the proposed workpractice structure
- appropriating SFL resources to this task, we refer to this as service structure *cohesion* and propose that this can be modelled by the links between adjacent elements in the service structure

Syntagmatic View of Workpractices

Cohesive Ties and the Redesign of Workpractices

- the links between elements can be thought of as *cohesive ties*
 - a well formed workpractice possesses a high level of cohesion within and throughout its genre structure
 - low levels of cohesion imply that the structure is either serving multiple functions, eg. enrolling as well as borrowing, or when the structure is not well suited to its goals and requires some redesign
- *redesigning the workpractice will involve making changes to its element inventory, its structure, or both*
 - these changes involve the *addition or subtraction of elements*
 - overall aim of modelling activities is to *introduce the smallest number of changes to the structures and their element inventories* in order to achieve local cohesion at a desired point in the structure thereby resulting in a more cohesive structure globally

Syntagmatic View of Workpractices

Workpractice Redesign: Functional Duplication

- there are several different types of conditions that lead to low workpractice structure cohesion
- the simplest of these is called *functional duplication* when two different elements exist within an element inventory serving identical purposes or functions
 - can be solved by *deleting one or more of the offending elements from the element inventory*- need to redefining the remaining element to account for any special conditions handled by the removed elements
 - removing duplicating elements tends to *increase cohesion in the workpractice structure*

Syntagmatic View of Workpractices

Workpractice Redesign: Functional Inefficacy & Lacunae

- another condition leading to low structural cohesion is *functional inefficacy*
 - where an element may not provide a distinct and unique benefit to the workpractice structure
 - likely to be a result of an ill-considered choice of an initial structure- then the functional inefficacy probably developed as a result of modifications to the structure over time
 - low service structure cohesion at a particular point in the structure may signal the need for a new element- a *functional lacunae*
- functional duplication, inefficacy and lacunae *can be viewed as syntagmatic issues from the perspective of the workpractice and paradigmatic issues from the perspective of the element inventory*

Syntagmatic View of Workpractices

Structural Aspects of Workpractices using Cohesion

Cohesion

Internal consistency and completeness



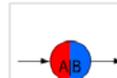
High Cohesion
A necessarily precedes B



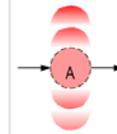
Low Cohesion

- either a point in a workpractice structure where more than one activity or task is adjacent to each other
- or A need not precede B

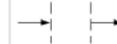
cohesive tie



Functional Duplication
two different elements exist within an element inventory serving identical purposes/ functions



Functional Inefficacy
element does not provide a distinct or unique benefit to the service structure



Functional Lacunae
A missing or omitted element needed to create cohesion between A and B

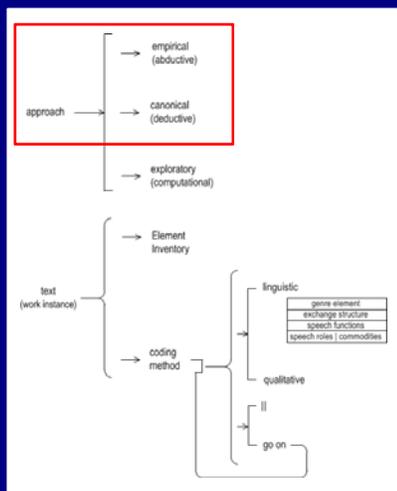
Practitioner Workpractices using SFL: Paradigmatic Options for Development

Practitioner Workpractices using SFL Paradigmatic Options for Development

- systems development can be explored paradigmatically
 - can view it as a range of options that can be deployed and that literally form the designer's toolkit
 - when deployed during development unfold syntagmatically in a workplace
- we apply this perspective to SFL
 - can represent both the *practitioner and workpractice viewpoints paradigmatically*
 - use a *provisional systems network to represent the options available to practitioners for utilising genre in several ways*
 - *currently involves two sub-networks*- one involving the approach to the study and the showing how text instances are coded ...

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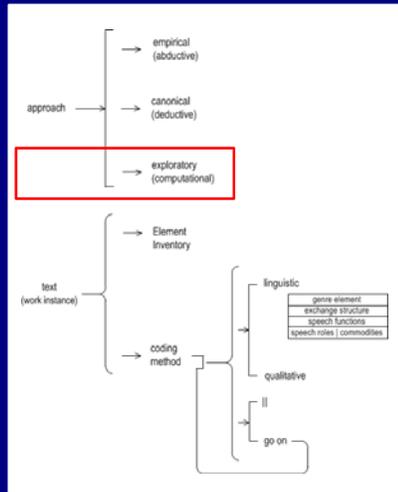
Practitioner Workpractices using SFL Approaches ...



- *empirical approach (abductive)*
 - using texts locate functional stretches of language that signal *genre elements*- the elements are assembled into genre sequence that accounts for the staging in the text
 - over time as more texts are analysed the *element inventory* will stabilise- no new elements required
- *canonical approach (deductive)*
 - starts with a previously identified generic structure- a *canonical genre*- as a point of departure for analysis or design
 - as a consequence the *element inventory* is also predetermined- try to account for the functional stretches in the work texts using canonical elements
- *possible that a workpractice text reveals an unanticipated genre element*
 - add element to the inventory
 - re-analyse the corpus for its existence and adjust sequences if necessary

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Practitioner Workpractices using SFL Approaches

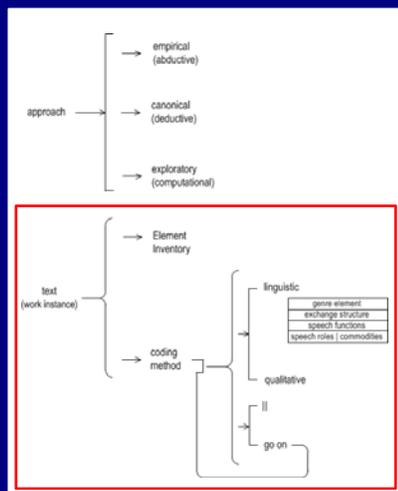


exploratory (computational)

- for a pre-given genre sequence or digraph, it is trivial to create a provisional element inventory, in most cases an element inventory or canonical element inventory is available for a genre
- regardless of how it is acquired, the element inventory can be used to compute all the permutations of elements- a *genre sequence combinatorial space*
- not all sequences will be useful*, eg. money handed out before a product is secured, a farewell occurs before a greeting ...
- a group of expert users can be used to *prune the space yielding a small set of useful sequences* that could form the basis of new workpractices- sometimes these sequences are novel
- unlike the empirical or canonical approaches that are based on texts and are syntagmatic, the *exploratory approach is inventory-driven making it a purely paradigmatic approach*
- a new contribution to genre analysis

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Practitioner Workpractices using SFL Dealing with Work Instances



- coding of texts (irrespective of whether the empirical or canonical approach is used) requires an element inventory and a coding method
- the coding method comprises two major options either qualitative and linguistic
 - the rectangle under the linguistics option is a *realisation structure* (Matthiesen 1995) showing the different language resources required arranged compositionally
 - the network shows that irrespective of whether the text is analysed qualitatively or linguistically- *coding is recursively conducted ('go on') until the text is fully coded ('||')*
 - this little network shows that we can mix the coding (qualitative or linguistic) within the same text- an unanticipated result of a paradigmatic view of developer workpractices*

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Practitioner Workpractices using SFL Workpractice Semantics

- so far we have considered *structural aspects* of the internal consistency and completeness of a service using cohesion, now we consider *semantic aspects* of service structure
 - determining if the workpractice structure 'fit for purpose' or aligned requires an understanding of the *relationship between a proposed workpractice and its contexts, both immediate and more broadly organisational*
 - we can directly see the relevance of SFLs dual theorisation of context as both Situational and Cultural
 - *any completed act of communication can be analysed to determine both its Situational Coherence and Cultural Coherence*- we can apply these ideas directly to consider service structure fitness and alignment

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Practitioner Workpractices using SFL Workpractice Semantics: Situational & Cultural Coherence

- each proposed workpractice structure can be evaluated according to its relevance to the immediate situation in which it is used (*situational coherence*) and also how relevant it is to other related sequences in which it may be used (*cultural or organisational coherence*)
- two types of coherence can be used to distinguish between single workpractice structures and more complex systems
 - *individual workpractices must be arranged to promote situational coherence* as well as their *necessarily smaller contribution to the overall coherence of the system*
 - *complex systems must be arranged in such a way as to promote coherence at the scale of entire unit, department or organisation*

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Practitioner Workpractices using SFL

Workpractice Semantics: Functional Redundancy

- a special case of functional duplication is referred to as *functional redundancy*- one or more elements in a structure are functionally similar to elements in related structures → *a lack of coherence within the overall system*
 - does not concern the relationship between elements in a workpractice structure itself but rather those *elements in related workpractices*
 - *if it functional redundancy exists within a relevant assemblage*- say a registration side-sequence and its elements duplicated in another service structure- might indicate low coherence due to at least two uncoordinated design activities
 - *can be due to persistent systems*- ones that suffered numerous bouts of reengineering (Clarke 2000); *can also be useful for systems and so it may be intentionally preserved!*

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Practitioner Workpractices using SFL

Situational and Cultural Coherence

Coherence: Situational and Cultural

'fitness-for-purpose' and alignment to existing service structures



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Practitioner Workpractices using SFL Workpractice Semantics and Modelling

- modelling activities and procedures that support them should provide the smallest service structure with the highest level of cohesion (internal consistency and completeness) as well as possessing high levels of situational and organisational-cultural coherence (fitness-for-purpose and alignment to existing service structures)
- covered the basis for representing service structure and described service structures cohesion and coherence- now *detail a specific test that can be applied to determining functional inefficacy, duplication and redundancy during service design activities*

Discussion and Further Research

Discussion and Further Research

Systems Development: Communication Perspective

- theoretically a *semiotic communication approach to systems development activities* involves:
 - the *reorganisation and reclassification of communication resources* from those employed *when users engage with workpractices ...*
 - ... to those that are *needed in order to support the development of machine executable representations*
 - changes to systems and their constituent workpractices will be evident in the shifts in patterns of communication associated with stakeholders and the changing nature of the communication resources that comprise them

Discussion and Further Research

Workpractices to Systems

- considering workpractices as semiotic systems
 - provides us with a broad vocabulary with which to talk about workpractice analysis and development → systems development (*syntagms, paradigms, semiotic systems*)
 - provides a deep vocabulary to talk about specific practices on discrete workpractices (*functional duplication, inefficacy and lacunae*)
- applying SFL to explore semiotic systems
 - gives us an appropriate unit with which to theorise, ie *genre*, and provides a theorisation for extensions needed when applying it to ISIT- *genre assemblages and associations*
 - bistratal theory of context (after Malinowski 1923/1946) enables us to extend *cohesion (low and high), situational and cultural coherence* to workpractices- and *functional redundancy* across workpractices

Discussion and Further Research

SFL Systems Development: Syntagmatic Perspective ...

- systems development activities are considered as a semiotic system, *viewed simultaneously from a syntagmatic and paradigmatic perspective*
- *syntagmatic perspective*
 - sequencing of *individual discrete workpractices*:
 - *element inventory* that describe the constituent functions for texts of that kind
 - merge together individual workpractices to form a single composite *genre digraph* (directed graph) that accounts for the rhetorical structures of all evident texts of that kind- the digraph describes the *workpractice* (process or service)
 - formalising *associations* between them in one or more genre assemblages- the genre assemblage and its associates between workpractices describes a system feature (part of a subsystem or an entire subsystem)

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Discussion and Further Research

SFL Systems Development: Syntagmatic Perspective

- we also can extend a *syntagmatic perspective on communication to concepts of cohesion and coherence* (applied metaphorically to genre)
 - can provide developers with rules or conventions for *determining if all parts of a workpractice structure (genre) are cohesive*
 - whether a particular syntagmatic arrangement of elements exhibits a *fitness for purpose (situational coherence)* and
 - whether it is in *alignment with existing workpractices (cultural/organisational coherence)*
- these methods are necessary because syntagmatic view of an evolving genre digraph requires *relevant rules or conventions that apply to arranging elements into relevant syntagms*

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Discussion and Further Research

SFL Systems Development: Paradigmatic Perspective

- biggest surprises came from looking at SFL genre-based development paradigmatically
 1. derive an *entirely new and purely paradigmatic computation approach*
 - *all possible syntagms are created from a given element inventory*
 - expert user group could *prune the possibilities by removing nonsensical sequences* leaving a few candidates that might be subsequently prototyped
 2. the possibility of *mixed linguistics and qualitative determination of workpractices*
 - previous studies were small enough that workpractices could be quarantined into one or the other category
 - but enterprise wide studies, large numbers of analysts, or systems that have undergone numerous modifications may end up having workpractices that could be mixtures of these kinds of elements

Discussion and Further Research

Envoi

- we started the paper by identifying two omissions:
 1. *mapping workpractices to machine execution*, and
 2. the *lack of convincing communication accounts of how to accomplish this mapping*
- interestingly, *for SFL* at least, *these questions are linked*
- how are the genre elements' language resources in workpractices being reorganised and displaced during development?
 - we need to not only look at the level of genre, but also at the constitutive language resources that make up these genre elements within completed acts of communication
 - syntagmatic and paradigmatic views of developer workpractices will help!

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