

Chapter 1 Introduction

1.0 Research Background: Prelude

The research presented in this thesis started as a part of an Australia Research Council (ARC) Discovery Project: *Image/Text Relations in Narrative and Information Texts for Children in Print and Electronic Media* (2005-2008). The purpose of the ARC project was to develop an account of the ways in which words and images interact to construct the meanings of narrative and information texts in print and electronic media, and to formulate from this account an accessible metalanguage necessary for the development of multiliteracies in primary education (for major outcome of the project see, Martin, 2008; Painter, 2008, Forthcoming; Unsworth & Cléirigh, 2009; Zhao, 2008, 2010b).

My preliminary task in the project was to provide an account for intersemiotic relations in information texts in electronic media. At the initial stage of the project, it was readily assumed that multimedia texts are essentially 'registeral' variations of traditional print texts. The description of intermodal grammar and cohesion in hypermedia texts was hence conceived as an extension of that in print texts. To 'improve' existing intersemiotic models became the primary ambition of my research at the time.

Although blessed with an extravagant theory such as SFL, my task was far from straightforward. From the very beginning, I was troubled by one seemingly trivial exercise—the determination of the basic analytical unit. Trained as a discourse analyst in systemic functional linguistics (hereinafter, SFL), my first instinct was to break the texts down into clauses. Images and other semiotic resources were subsequently treated as extended units, expanding the meaning potential of language. A preliminary systemic model was then built based on the descriptions of relations between these 'extra' units and linguistic units. The major modelling method was to increase the complexity of existing models through the introduction of new systems, the expansion of systemic choices and the increase of levels of delicacy, etc. Due to the

high-dimensional nature of the hypertexts, there was a significant increase in complexity in theoretical modelling. However, the sophistication of the model did not seem to increase its 'descriptive power' (Halliday, 2002 [1966], p. 120).

While developing the technique for text analysis, I was introduced to Bernstein's sociological theory of pedagogy. Bernstein's insight into the nature of pedagogical discourse provided rich resources for contextualizing the text analysis. However, the introduction of Bernstein's model unexpectedly highlighted some unsolved problems in the analysis. One of my key concerns was that the clause-centred, constituency-based analysis failed to shed any further light on the nature of digital pedagogical discourse. That is to say, hypertexts appeared to represent nothing more than a 'registeral' variation of print texts; and the digital learning process merely a complicated version of traditional classroom discourse. My research seemed to have lost its direction.

It was at the height of this crisis that I started to reconsider my approach to the project. Instead of further increasing the complexity in my analysis and theoretical modelling, I decided to take a big step back and ask some basic questions: e.g. What is a Multimedia Interactive (i.e. the data used in this research)? How can we as linguists analyse it? The decision I made reflected my new thinking about the relationship between data and theory. I grew increasingly aware that our explorations in multimodal discourse had in fact offered us a precious chance to re-examine and renew our understanding of human semiotic processes. As biologists Goldenfield and Woese eloquently state, "the most fundamental patterns of scientific discovery are the revolution in thought that accompanies a new body of data" (2007, p. 369). The decision resulted in a major shift in my approach to the multimodal research. Instead of probing whether and how existing SFL tools could be adapted to analyse new data, in my case hypertext, I sought to build a type of model that would capture the new (if any) sets of semiotic relations present in hypertext. In this thesis, I will detail the theoretical rationales behind my approach, chronicle its development, illustrate its applications and discuss its implications for SFL theory and future research in multimodality.

While the nature of my research has changed dramatically during the years, my inspiration nevertheless remains the same: to observe language use in its context, to comprehend the ways in which texts construe knowledge and shape society, to search for practical tools for teaching language and literacy in schools, and ultimately to address the unequal distribution of knowledge in this digital age of ours.

1.1 Research Objectives and Scope

The purpose of this thesis is to engage with the continuing dialogue on language, knowledge and pedagogy between the systemic functional linguistic theory (SFL) of the Hallidayian tradition and Bernstein's sociological theory of pedagogy. It explores the dynamic nature of the semiotic relations in contemporary multimodal discourse. Based on the linguistic descriptions, it endeavours to provide an insight into the (re)shaping of knowledge structures in the age of digital multimedia learning.

More specifically, the thesis examines online curriculum materials, known as Multimedia Interactives (MIs), designed for primary social science subjects in Australian and New Zealand contexts. It sets out to:

- 1) construct an account for the relations between verbal text and modalities other than language (MOLs); and to formulate from the account a metalanguage readily adaptable to educational contexts;
- 2) based on the linguistic description, to provide an understanding of the ways in which primary social science knowledge is recontextualised in emerging electronic multimodal discourses.

The thesis is intended as a journey of exploration. It encompasses in sequence four steps of investigation, each of which is critical in achieving the abovementioned two goals of this research:

- 1) the interpretation of the linguistic/semiotic nature of the data—Multimedia

Interactives (MIs),

- 2) the development of a time-based model for coding and analysing the data;
- 3) the description of the relations between language and other semiotic resources with a focus on Ideational patterns (Field);
- 4) the modeling of the multimodal recontextualisation of primary social science knowledge.

1.2 Research Rationale

This research aims to engage with the latest development as well as address the existing gaps of knowledge in three related research areas.

- 1) **Systemic functional multimodal theory (SF-MDA)**: to propose a complementary model for intersemiotic relations, in particular in hypertext environments;
- 2) **Multiliteracies pedagogy**: to contribute to the development of a readily adaptable metalanguage for multiliteracies practices;
- 3) **Multimedia learning**: to offer a text-based perspective on the use of multimedia materials to assist learning.

The detailed rationale behind the research are elaborated as the following:

1.2.1 Multimodal Discourse Analysis: A SFL perspective

The primary area of research to be addressed in this thesis is that of multimodal discourse analysis (MDA). Since the mid 1990s, MDA has established itself as one of

the key research areas within the general theory of systemic functional linguistics (SFL). The evolution of the systemic functional multimodal research (SF-MDA) in the past 15 years involves roughly three stages, *initiation*, *development* and *expansion*. The initiation stage began in the early 1990s, marked by the publication of two groundbreaking studies: *The language of displayed art* (O'Toole, 1994) and *Reading images: the grammar of visual design* (Kress & Van Leeuwen, 2006[1996]). Inspired by Halliday's systemic functional description of language, Kress & Van Leeuwen (2006[1996]) developed a detailed account of the 'functional grammar' of the visual semiotics. Their work focused on the paradigmatic structure of visual semiosis, providing a powerful alternative to the syntagmatic-centred descriptions in French structuralism tradition, such as the work by (Barthes, 1968, 1970, 1977). Likewise, O'Toole (1994) explored various aspects of SFL theory with a focus the concept of rank and metafunction (following Halliday, 1994). In his book, O'Toole offered detailed metafunctional descriptions of visual semiotics in displayed art, e.g. renaissance painting, sculpture and architecture. His work extended MDA beyond the boundary of the page to 3D space.

Despite critiques (e.g. Forceville, 1996), the impact of the two MDA classics and their contributions to future generations of researchers are undeniable. One of their major contributions has been the broadening of the research scope for discourse analysts and SFL researchers alike. In the decade followed the publication of the two books, an extensive body of research has been produced, exploring the rich territory of human semiotic resources, for instance, action (Martinec, 2000, 2001); colour (Kress & Van Leeuwen, 2002; Painter, 2008); gestures (Jaworski & Crispin, 2009; Martinec, 2004; Zappavigna, 2010a); laughter (Knight, 2010); mathematical symbols (O'Halloran, 1999, 2005); music & sounds (Caldwell, 2010; McDonald, 2005; Van Leeuwen, 1999b, 2009); press photography (Caple, 2009, 2010; Economou, 2009), space (Ravelli, 2006; Stenglin, 2004, 2009); topography (Thibault, 2007; Van Leeuwen, 2006), etc.

Another profound change the two pioneering works brought is the ways in which SFL theory is perceived and applied. One common research theme underlining both books has been the exploration of the adaptability of SFL categories in the description of modalities other than language (MOLs). Through this exploration, SFL theory has

been able to engage with a wider research audience (e.g. Bateman, 2008a; Norris, 2004; Scollon & LeVine, 2004; Tseng & Bateman, 2009) as well as the designers of multimodal artefacts (e.g. Martinec & Van Leeuwen, 2009; Ravelli, 2006; Van Leeuwen, 2008). On the other hand, the problems raised in SF-MDA research have pushed SFL linguists to renew understandings of language and inevitably encouraged us to seek new methods of studying and modelling the complexity of human semiosis (Baldry & Thibault, 2010; Bateman, 2008a; Caldwell & Zappavigna, 2010; O'Halloran, 2004a; O'Halloran & Baldry, forthcoming; Zappavigna, Dwyer, & Martin, 2010; Zhao, 2010b). With hindsight, this is one of the most significant theoretical consequences the early SF-MDA works have brought. The research presented in this thesis can be seen both as a direct product and a further exploration of these consequences.

Around the turn of the millennium, SFL-MDA research entered a new stage in development. Whereas there were on-going efforts in developing systemic description of MOLs, the building of an integrated model for intersemiotic relations became the main theoretical challenge. One of the first works to emerge was Royce's (1998, 2002) study of intersemiotic complementarity in the *Economist* magazine, in which he examined the "synergic" relations between image and language on page-based multimodal texts. Royce continued the early theoretical pursuit of SF-MDA research in exploring the potentiality of SFL theory in multimodal description with a shift of focus from the grammatical-oriented tools to the discourse-oriented ones (Halliday & Hasan, 1976).

Royce's (1998, 2002) attempt at offering an "integrated" framework for intersemiotic relations have been echoed in a number of studies, for example, Martinec & Salway (2005), Matthiessen (2007), O'Halloran (1999, 2005, 2008), and Unsworth & Cléirigh (2009). The similarities and differences between the major models will be reviewed in detail in Chapter 2 (see Chapter 2, Section 2.2.3.2). Although producing promising analytical results to various extents, these models tend to thrive on local applications. That is to say, each model is typically register-biased and the translatability between the models is relative low (cf. Martinec & Salway, 2005; Unsworth & Cléirigh, 2009). Another common characteristic of these models is the overall high level of complexity in the modelling (e.g. the amount of new systems and the levels of delicacy, etc.),

which created potential obstacles to adapting these descriptions in educational contexts. This thesis thus attempts to address these concerns through the exploration of a complementary approach to modelling intersemiosis.

The past five years have witnessed the transition of SF-MDA from the development to the expansion stage. This stage is characterised by the explosion of the interest in MDA research across the board (Baldry & Thibault, 2010; Bateman, 2008a; Bednarek & Martin, 2010; Jewitt, 2009; Kress, 2010; Martinec & Van Leeuwen, 2009; Mehler, Sharoff, & Santini, 2010; O'Halloran & Baldry, forthcoming; Royce & Bowcher, 2007; Unsworth, 2008b, c; Ventola & Moya Guijjaro, 2009). The diversification of research directions and methodologies has made a simple characterisation of SF-MDA research a precarious task. Nevertheless, there are some common challenges facing multimodal researchers.

Once such challenge is the development of empirically based quantitative research methodologies for MDA. Most MDA studies have been carried out manually and are consequently limited to a small selection of data. Not only is such method labour intensive, the research findings or frameworks proposed, as discussed earlier, tend to be “idiosyncratic” (Bateman, 2008a, p. 278). To allow MDA analysts to work with a more representative sample of multimodal texts, certain level of automatic analysis needs to be achieved. Many MDA researchers have found inspirations in cutting-edge corpus research. Although SFL has a established history of dialoguing with corpus linguistic tradition (Bednarek, 2010; Halliday & Webster, 2005; Thompson & Hunston, 2006), the building of annotated multimodal corpus, involves many new complications— for example, how to address the physical and technological constraints (e.g. printed or digital) of the various types of multimodal texts; how to incorporate tiers of annotation for different semiotic modes. The challenges have been taken up by the pioneers in the area, and a few successful models have been built, most notably, the Genre and Multimodality (GeM) Model (Bateman, 2008a; Bateman & Delin, 2001; Bateman, Delin, & Allen, 2000; Bateman, Delin, & Henschel, 2002, 2007) and Multimodal Corpus Authoring (MCA) system (Baldry & Thibault, 2006, 2010; O'Halloran & Baldry, forthcoming).

Another huge challenge is to move from the static to the dynamic. The term ‘dynamic’ is often used in two different yet related senses in SF-MDA: ‘dynamic’ data and dynamic modelling. ‘Dynamic’ data, in contrast to ‘static’ texts such as printed newspaper, refers to time-based data, which typically (not exclusively) uses screen as medium—for example, film. Although the earliest work on ‘dynamic’ data can be dated back to van Leeuwen’s (Van Leeuwen, 1985, 1991, 1996) work on rhythmic structure and conjunctive relations in film and television, it is not until recent years that researchers have started exploring extensively with texts outside print media. The most productive area of research is that of screen-based medium, namely film and television. The focus of this research ranges from the description of the interactions between language with visuals (Hunston, 2008; Iedema, 2001b; O’Halloran, 2004b) and sounds (Pun, 2005) to discourse and generic features of the genre, for example, phasal structures (Baldry, 2004; Thibault, 2000) and cohesive relations (Tseng, 2008, 2009). Many studies of ‘dynamic’ texts (e.g. Baldry & Thibault, 2006; O’Halloran, 2008; Tseng, 2009) share the same theoretical ambition of the multimodal corpus studies, that is to develop a coherent transcription and annotation system that allows fine-grained multimodal descriptions.

The term dynamic is also associated with linguistic modelling. Since 1980s, dynamic modelling has been one of the key pursuits of SFL. The first waves of interest in dynamic modelling (see Chapter 3, Section 3.1.3) were brought on by the research on conversational data (Berry, 1981; Martin, 1985; Ventola, 1987) and text generation (e.g. Bateman, 1989; Matthiessen & Bateman, 1991; Zeng, 1996). The modelling methods and solutions proposed in these studies were ahead of their time. Unfortunately, the majority of the projects were unable to continue due to various external and internal reasons (cf. Bateman, 2008b). The last few years have witnessed the renewal of interest in the area thanks to the rapid expansion of MDA theory. More and more researchers have started to recognise the limitations of the traditional SFL modelling methodologies in coping with the high dimensional (i.e. of multiple variables) nature of the multimodal artefacts. As a result, there has been an increasing call for new attempts at dynamic modelling (Martin, 2010). The issue is currently being tackled from two different directions, one from the computational side and the other linguistic. On the one hand, researchers have been seeking

alternative computational based modelling technique such as visualisation (Caldwell & Zappavigna, 2010; Zappavigna, et al., 2010). On the other hand, there have been increasing critical introspections on SFL and SF-MDA theory, in particular our understanding of human semiosis as meaning-making process (Zhao, 2010b), for ultimately dynamic modelling calls for a linguistic theory that has dynamism built *into* its metalanguage.

The research presented in the current thesis endeavours to take up some of these challenges. It draws on the studies of both static and 'dynamic' multimodal texts and extends these efforts to the description of texts in hypermedia environment, a hybrid of screen and page (Gere, 2006). More importantly, it endeavours to break down the arbitrary division between static and 'dynamic' texts in the linguistic modelling through the search for a complementary approach that both addresses the 'dynamic' and high-dimensional nature of hypertexts, and has dynamism built into its descriptive model.

1.2.2 Multiliteracies: The challenge of the new century

This thesis is also a response to the on-going call for the development of a "metalanguage for multiliteracies". The term 'multiliteracies' was first used by a research collective known as New London Group, referring to a new approach to literacy that addresses

- 1) ...multiplicity and integration of significant modes of meaning-making, where the textual is also related to the visual, the audio, the spatial, the behavioral, and so on. This is particularly important in the mass media, multimedia, and in an electronic hypermedia; and
- 2) ...the realities of increasing local diversity and global connectedness. Dealing with linguistic differences and cultural differences has now become central to the pragmatics of our working, civic, and private lives. (New London Group, 1996, p. 34)

In the past decade, the New London Group's initiative has generated a large amount of interests among researchers and educators (Cope & Kalantzis, 2000; Every, 2002; Fairclough, 2000; Healy, 2008; Kalantzis, Cope, & Fehring, 2002; Unsworth, 2001, 2008a, c). Although the two dimensions of the projects are in no way two separate phenomena, the current thesis and the discussion in this section will focus largely on the first.

The world which students of the 21st century inhabit is increasingly digital and multimodal. In order to prepare students to be effective learners in this environment, many scholars argue that the traditional focus on the mastery of computer and information skills is not adequate and are often focused on at the expense of critical analytical skills (Bigum, 2002; Lankshear, Green, & Snyder, 2000). Various concepts have subsequently been proposed, such as 'multimedia literacy' (Buckingham, 2004; Lemke, 2006; The New Media Consortium, 2005), 'digital literacy' (Lankshear & Knobel, 2008), 'hypertext literacy' (Bolter, 1998), advocating a new type of literacy that allows students to engage critically with new media texts. This new literacy, many researchers assert, does not involve one single skill rather a set of skills, e.g. navigating, collecting, analysing & (re)producing to name just a few. As a result the word literacy is increasingly used in plural form— literacies. The New London Group's concept of multiliteracies is more or less comparable to other types of new literacy. However, it places emphasis on the social semiotic aspect of the new media texts. That is, it is interested in the ways in which various social semiotic artefacts (not only language) interact with each other to create meaning in various social-cultural contexts. As Cope and Kalantzis explain,

The pedagogy of multiliteracies,... focuses on modes of representation much broader than language alone. These differ according to culture and context, and have specific cognitive, cultural and social effects. In some cultural contexts – in an Aboriginal community or in a multimedia environment, for instance – the visual mode of representation may be much more powerful and closely related to language than 'mere literacy' would ever be able to allow. (Cope & Kalantzis, 2000, p. 5)

Ongoing research on multiliteracies involves three main orientations: the study of 1) the multimodal texts; 2) literacy practices in and outside the classroom; and 3) the

pedagogical frameworks. The research on multimodal texts focuses on the description of various semiotic modes and the ways in which they interact, including predominantly works within the general theory of systemic functional semiotics and SF-MDA outlined in the previous section. The existing description covers a range of registers in both print (Martin, 2008; Painter, 2008, Forthcoming; Unsworth & Cléirigh, 2009) and/or digital media format (Unsworth, 2004 ; Zammit & Callow, 1999; Zhao, 2008). This description also extends to the multimodal texts that produced by children themselves (Kress, Jewitt, Ogborn, & Tsatsarelis, 2001; Van Leeuwen, 1999a). A second type of research is interested in the educational practices in the multiliteracies classroom. Ethnographic methods, such as videotaping, interviews and questionnaires are typically used to examine a broad range of literacy practices including shared reading (Mills, 2006), independent reading/browsing (Walsh, Asha, & Spranger, 2007; Zammit, 2007), and producing multimodal texts (Callow, 2006), etc. The research in this area provides invaluable first-hand knowledge on the demands placed on students in a multiliteracies classroom (Lemke, 2000a), and to which extent the complicated interactions between language, visuals and other semiotic artefact are being talked about and understood by the students and the teachers (Kress, 2003; Kress, et al., 2005). A third type of work approaches multiliteracies from a more abstract level. The central concern of such work (Cope & Kalantzis, 2000; Luke, 2003; Macken-Horarik, 2009; Unsworth, 2008a) is the development of an integrated pedagogical framework for multiliteracies, which addresses a broad range of issues such as the design of the curriculum, its implementation in the classroom, and the social-cultural and political implications of the new practice.

Despite of the diversification of the research directions, it is widely acknowledged that one key issue in multiliteracies is to develop a metalanguage that can “identify and explain differences between texts, and relate these to the contexts of culture and situation in which they seem to work” and “describes meaning in various realms. These include the textual and the visual, as well as the multimodal relations between the different meaning-making processes that are now so critical in media texts and the texts of electronic multimedia” (New London Group, 1996, p. 77). This vision seems to align naturally with main research agenda of SF-MDA. However, it maybe

some time before an educational accessible metalanguage is made available to teachers and students. Macken-Horarik argues that a worthy metalanguage should

... be able to deal with both the particular and the general in language use. In fact, it should enable us to move between the specifics of an instance (where innovation occurs) and the language system (where codification occurs) and to do so in principled ways. (Macken-Horarik, 2009, p. 41)

Current research trend in SF-MDA does not seem to encourage such development. One obvious drawback is the relative immaturity of the SF-MDA theory itself. As discussed earlier, there are many urgent theoretical issues yet to be addressed. Moreover, the extravagance of the systemic functional descriptions often require an extra layer of reinterpretation to make it accessible for people with little or no background in the theory. Most importantly, the overwhelming research effort in SF-MDA at the moment has been put into the description various semiotic and intersemiotic systems.

This thesis endeavours to address these educational concerns through the development of a complementary intersemiotic approach. At the textual level, the model focuses primarily on logogenesis, the unfolding of the instance, while drawing on the rich functional descriptions of various semiotic systems. It seeks to reduce the complexity in description by adding one extra dimension: time. At the contextual level, the model incorporates Bernstein's theory of education, treating multimedia and hypermedia texts as essentially new types of pedagogic discourse. In this way, the theoretical account will be readily available to students and educators as a metalanguage.

1.2.3 Text based approach to Multimedia learning: A third voice

The third purpose of the thesis is to participate in the on-going investigation of the impact of modern technology on learning from a text-based perspective. The history of 20th century education has been blessed with the advantages in multimedia

technologies, radio, television, and more recently computer/web-based devices. Many educators and researchers ardently predicted that the introduction of cutting-edge technologies into classrooms would eventually revolutionise the education system (Cuban, 1986). Approaching the end of the century, however, the anticipated revolution had not taken place. Even the most acclaimed technological innovation of the century—the computer—has failed to deliver more efficient learning than traditional teacher-centred instruction (Congition and Technology Group at Vanderbilt, 1996). In the last decade of the 20th century, the missing revolution has forced the researchers to reconsider the role and the function of multimedia technologies and the nature of multimedia learning. Consequently, learner-centred (e.g. Clark, 1994; Jonassen, Campbell, & Davidson, 1994) and text-centred studies (e.g. Unsworth, 2001) emerged to challenge the traditional technology-centred approach to multimedia learning.

The learner-based approach to multimedia learning is closely associated with the general epistemological movement of cognitive science in the second half of the century. The central concern of this approach is to understand “the relation between design features and the human information processing system” (Mayer, 2005, p. 5). The research within this tradition takes a constructive view on knowledge and relies predominantly on quantitative and empirical methodologies (Mayer, 2005, 2009). The major contribution of the approach is the discovery of principles for instructional design that would potentially enhance multimedia learning. One such is example is the modality principle (Low & Sweller, 2005) which states that information presented in mixed modes is usually more effective than the same information presented in a single mode. Another good example is the interactivity principle (Betrancourt, 2005; Mayer & Chandler, 2001), which suggests that information presented in animation will be effective if the user has control over the pace of the animation. Lying at the heart of these principles is the belief that “In the process of trying to build connections between words and pictures, learners are able to create a deeper understanding than from words of pictures alone” (Mayer, 2005, p. 5).

The text-centred approach includes the majority of the research outlined in the previous section (Section 1.2.3). If the focus of the learner-centred approach is the

multiplication of learning capacity, the central concern of the text-centred approach is the multiplication (Lemke, 1998) of meaning. Whether studying multimedia texts or the use of these texts, a text-centred study typically focuses on unpacking the ways in which various semiotic resources are combined to convey meanings and produce knowledge. In a sense, the learner-based approach (multimedia learning) provides principles for designing multimedia instructional materials (Clark & Mayer, 2008), while the text-centered approach (multimodal learning) offers guidelines for the effective use of these materials in or outside the classroom. In Unsworth's words, it helps to "facilitate explicit discussions" and "interpretive possibilities constructed by the multimodal texts" (2008a, p. 70). The two approaches in this sense are deeply complementary. It is only through the combination of the two perspectives will we have a better understanding of the impact of multimedia technology on learning.

The research presented in this thesis aims to provide a social semiotic perspective on Multimedia Interactives, which essentially are a type of multimedia instructional material. If the question proposed by a learner-centred study would be how effectively a learner could gain knowledge of history through using MIs, the question answered in this thesis is what types of literacy demands have been placed on a student to engage successfully with these multimodal texts.

1.3 Research Data: Multimedia Interactives (MIs)

1.3.1 Multimedia Interactives: What

The data used in this research consists of online curriculum materials designed by the Le@rning Federation (TIF)¹. Established in 2001, TIF is an Australian government (Ministerial Council on Education, Employment, Training and Youth Affairs) initiative. One main function of the organisation is to develop online materials for schools in Australia and New Zealand in six priority curriculum areas (cf. Freebody, 2005):

- 1) Innovation, enterprise and creativity (Year 1-10)

¹ <http://www.thelearningfederation.edu.au>

- 2) Languages other than English
- 3) Literacy for students at risk of not achieving national literacy benchmarks (Year 5-9)
- 4) Mathematics and numeracy (Year 1-10)
- 5) Science (year 1-6 and 9-10)
- 6) Studies of Australia (years 1-10)

The curriculum materials designed by TIF include two major types: 1) digital resources, e.g. video, images and sound clips; 2) learning objects — essentially computer-based interactive learning activities, which involve a variety of media, audio, animation and graphs. Learning objects (LOs), which provide the main sources of data for this research, will be referred to as Multimedia Interactives (MIs) throughout the thesis. Detailed characterisations and categorisations of the MIs used in the research will be provided in Chapter 2. Here, I will offer an overview of the MIs.

Plate 1.1 Mission-oriented MIs: *Gold Rush!*

a. The street of Ballarat



b. In the tool shop



Plate 1.1 (continued) Mission-oriented MIs: *Gold Rush!*

c. In the Goldfields! Dig Over!



A typical MI requires a learner to accomplish a certain task through a series of hypertext navigation and interactive activities. The task could either be mission-oriented (i.e. the learner is asked to carry out certain type of virtual task, e.g. mining for gold) or product-oriented (i.e. the learner is expected to produce a multimedia text, e.g. a newsreel or a virtual exhibition). *Gold Rush!* (Plate 1.1), for example, is an example of a mission-oriented MI, the task for the learner is to use limited financial resources to select and buy food, shelter and other requirements related to gold mining to complete a successful dig in 1865 in outback Australia.

The game starts at a fictitious street of the town of Ballarat in 1865 (see Plate 1.1a). The learner is given instructions regarding the basic tasks and the procedure of the game, which involve: 1) buying a permit in the permit office, 2) choosing the type of mine to dig by clicking on the anchor 'view map', 3) purchasing suitable tools in the tool shop, 4) obtaining sufficient amount of food and utilities in the supply store, and 5) going digging in the goldfields. Once the learner decides on the sequence in which he/she will accomplish the five required tasks, he/she will then click on an anchor (e.g. the shop with the sign Tools) that is linked to a micro-site (e.g. the tool shop in Plate 1.1b) where each task (e.g. purchasing mining tools) is carried out. In the tool shop, for instance, the player needs to read the descriptions of the different types of mining tools and then decide on the suitable tools to purchase. Upon the successful completion of the digging task, the learner will be awarded with 'gold'. (Plate 1.1c).

The First Golden Age of Cricket (see Plate 1.2), on the other hand, represents a typical product-oriented MI. The learner is expected to navigate through a virtual locker room (Plate 1.2a) and explore the history of cricketing in Australia during the period from 1900 to 1940. The historical information, presented in various media formats, e.g. news cuttings, photographic images, film clips, etc, is hidden in each locker (Plate 1.2b). During the navigation, the learner needs to 'collect' (through screen selection) relevant multimedia artefacts, and use them to produce a documentary newsreel about Australia's first golden age of cricket in a virtual edit room (Plate 1.2c). In contrast to mission-oriented a MI, a product-oriented MI does not impose a navigation sequence. That is, the order in which the learner examines the four lockers will not have *direct* impact on the outcome of the task.

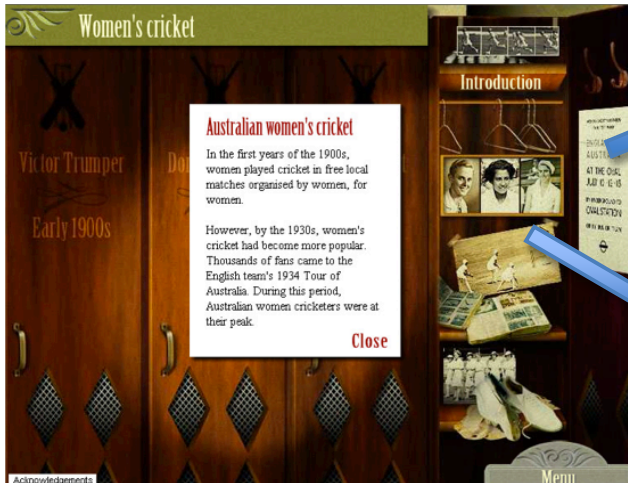
Plate 1.2 Product-oriented MIs: *New Homes*

a. *in the locker room*



Plate 1.2 (continued) Product-oriented MIs: *New Homes*

b. inside the locker: *Women's cricket*



The original test poster for match between Australian & English Women's Cricket Teams from 1937.



[Interview with Neil MacLarty.](#)
[Contains audio clip.](#)


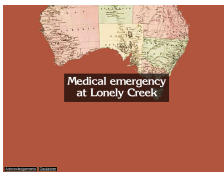
c. in the edit room



1.3.2 Data selection criteria



Access to most TIF curriculum materials requires institution licensing, and this research therefore has chosen the MIs available on public domain through the National Museum of Australian (NMA) website. The NMA website places the items under the section Kids: Learn & Play². These MIs usually use objects from the museum's collection. Of the 12 MIs currently (as of December 2010) listed on the website, five were chosen as the data for this research. Table 1.1 offers an overview of these MIs.

Table 1.1 A summary of MIs used in the research

Name	Age	Type	Overview
<p><i>Mystery object: Torres Strait Islands (MOTSI)</i></p>  <p>http://www.nma.gov.au/kidz/learn_and_play/torres/</p>	7-12	Product	<p>In this interactive, you are shown a wonderful Torres Strait Island object, made by Torres Strait Island artist, Ken Thaiday, for the Museum's collection.</p> <p>First take a good look at the object and guess what it could be. Then learn a little more about the Torres Strait Islands and their trading history to find clues about where exactly this type of object could have come from.</p> <p>You will then examine a timeline that gives past practices and influences that might have influenced Ken in making the object.</p> <p>You can now find out how big it is and examine individual parts of the object to see what they are made of and what they represent. You may then want to change your mind about what you think the object is using information you have learned.</p> <p>Finally, you look at three different types of activities it could have been used for and make your final decision regarding the object's identity.</p>
<p><i>Emergency at Lonely Creek (EALC)</i></p>  <p>http://www.nma.gov.au/kidz/learn_and_play/emergency_at_lonely_creek/</p>	10-12	Mission	<p>take yourself back in time to 1890 when people from all over the world worked in the copper mines of the Queensland outback. Camel, horse and cart and trains were the main forms of transport and long distance communication was by telegram or letter.</p> <p>Your task is to find a doctor to treat a man injured after falling off his camel near Lonely Creek. The camel driver needs urgent medical attention and he is a long way from the nearest doctor. Find out how the doctor can be contacted by exploring the communication and transportation options available, then contact him and send details in the fastest route across the outback to Lonely Creek. Will the doctor make it in time?</p> <p>After you have found help for the camel driver, jump forward in time to 1935 when new inventions have brought great improvements to communication and transportation. The cattle industry is now booming but being a stockman can be a dangerous job.</p> <p>This time your task is to get help for a stockman who has fallen from his horse near Lonely Creek. Work out the fastest way to bring a doctor to the stockman using new inventions such as the two-way radio and the aeroplane.</p>

² http://www.nma.gov.au/kidz/learn_and_play/

Table 1.1 (continued) A summary of MIs used in the research

Name	Age	Type	Overview
<p><i>New homes (NH)</i></p>  <p>http://www.nma.gov.au/kidz/learn_and_play/new_homes/</p>	8-12	Product	<p>Explore the lives of two European women who lived through World War II before immigrating to Australia to start a new life. Learn about their stories by examining a collection of archive photographs, their personal memorabilia and audio commentary describing their backgrounds and circumstances surrounding their leaving; their skills; how these skills were used or rejected on arrival; and the challenges the women faced in settling in Australia.</p> <p>After investigating the women's stories, build a museum exhibition about the experience of migration using artefacts and photographs from each woman's story.</p> <p>Title your exhibition with one of the themes of 'Leaving home', 'Separation from friends and family', 'Skills and work', or your write your own theme, then write captions for each object to describe how it relates to your chosen theme.</p> <p>Objects from the Museum's collection used in the interactive include the dentist equipment Lilija Brakamis brought from Latvia but was not qualified to use in Australia and a dress and other craftwork made by Petronella Wensing after her arrival in Australia from The Netherlands.</p>
<p><i>The first golden age of cricket (FGAC)</i></p>  <p>http://www.nma.gov.au/kidz/learn_and_play/the_first_golden_age_of_cricket/</p>	10-12	Product	<p>Find out about the history of cricket in Australia by tracking the roots of cricket back to colonisation and how the British Empire influenced where cricket is played.</p> <p>Explore the lockers in a sports change room to find out about people that first helped Australia become a great cricketing nation. Examine sporting equipment, photographs, text and archival footage about a diverse range of Australian cricketers from the period 1900-40. These include women and Aboriginal cricketers, as well as famous players such as Don Bradman and Victor Trumper.</p> <p>After examining the lockers, make a documentary newsreel about Australia's first golden age of cricket in a virtual edit room. Use text, pictures, audio clips and film clips found in the lockers to describe how Australia became a great cricketing nation.</p> <p>Objects from the Museum's collection used in the interactive include Victor Trumper's bat, a cricket ball used by Eddie Gilbert and Mollie Flaherty's scrapbooks and cricket shoes.</p>
<p><i>Gold Rush! (GR)</i></p>  <p>http://www.nma.gov.au/kidz/learn_and_play/gold_rush/</p>	8-12	Mission	<p>Take yourself back to the Ballarat goldfields of 1865 and mine for gold. Your mission is to use limited financial resources to select and buy food, shelter and other requirements related to gold mining at the time to complete a successful dig.</p> <p>You may choose to dig by either alluvial or shaft mining, and must buy a miner's permit, equipment and supplies appropriate for your chosen mining method. Prices are given in pounds and shillings and a currency converter allows you to convert amounts to current dollar values.</p> <p>As you start your dig on the goldfields, you receive feedback advising whether or not your purchases have been appropriate. By completing this interactive, you will recognise the challenges that miners faced finding gold, and the importance of the Gold Rush era in shaping Australia's population during the mid to late 1800s.</p> <p>Objects from the Museum's collection used in this interactive include a gold washing cradle, a miner's licence, scales and a digger's brooch.</p>

The criteria for selecting these data include:

- 1) the relevance and the diversity of the theme: only topics explicitly prescribed in Australian primary social science (HSIE and SOSE) syllabus are chosen. Each topic, e.g. immigration, only occurs once in the data;
- 2) the age of the intended audience: the MIs designed for children under age 7 are excluded;
- 3) the diversity of the design: the texts with identical interactive structure and similar task only occur once.

These criteria were based on a detailed survey of *The New South Wales Human Society and Its Environment (HSIE) K-6 syllabus* (NSW Board of Study, 2006) and *Queensland Study of Society and Environment (SOSE) 1-7 syllabus* (Queensland Studies Authority, 2006), and the Le@rning Federation's annual research reports (Freebody, 2005, 2006) as well as a pilot study on *Gold Rush!*. Multiple factors were taken into account in forming the selection criteria, the main factors being the focus and the scope of the ARC discovery project this research originates from.

1.3.3 Multimedia Interactives: Why

There are three main reasons why MIs from the Le@rning Federations are particularly interesting and worthwhile objects for research.

Firstly, the design of MIs incorporates the key features of the contemporary semiotic landscape. A typical MI utilizes a rich array of semiotic resources, e.g. written and spoken language, images and animated images, and sound effects etc. These multimodal units are often connected with each other through hyperlinks. The study of the MIs, therefore, will assist in our understanding of the nature of hypermodality (Lemke, 2002b) and provide an insight into the hybrid and complex nature of the evolving hypermedia discourse (Bateman, 2008a; Bateman, et al., 2007; Djonov, 2005, 2007, 2008; Knox, 2009a, b, 2010; Mehler, et al., 2010)

The MIs are also chosen because of their subject-specific contents. Most MIs address one or more topics in a particular learning area (e.g. study of Australia) at a certain stage of learning (e.g. year 3-5) prescribed in the school syllabus across Australia (e.g. NSW Board of Study, 2006). They usually contain the typical types of multimodal texts a student will encounter in that subject area. For instance, the MIs for primary social science subjects frequently use maps, newspaper cuttings, and historical photos and film clips, etc. Research in Information and Communication Technology (ICT) has indicated that purpose-built online content is productive in promoting school learning (BECTA, 2005), and there is “substantial evidence of impact of specific use, for example using simulations and modeling in Science and Mathematics” (Cox, et al 2003 quoted in BECTA 2005, p.19). For this reason, researching the MIs of a particular subject area will offer at least two advantages. First, it will allow us to identify the multiliteracies skills essential to the successful learning in the subject area. The subject area addressed in this study—primary social science—is particularly worth investigating for it has so far attracted little attention in multiliteracies research in contrast to science (Guo, 2004 ; Jones, 2006, 2007; Kress, et al., 2001; Lemke, 1998, 2000a, 2002a; O’Halloran, 2005; Thibault, 2001; Unsworth, 2004; Unsworth & Cléirigh, 2009) and language (English) subjects (Jewitt, 2002; Kress, et al., 2005; Macken-Horarik, 2009; Unsworth, 2006a, 2008c; Unsworth, Tomas, Simpson, & Asha, 2005). Moreover, the analysis of these subject-specific MIs will illuminate the ways in which a particular type of knowledge is *recontextualised* (Bernstein, 2000) in emerging digital multimodal discourse. In a sense, this will provide a timely update on and valuable comparison to the research on language-based school literacies (Christie & Derewianka, 2008; Coffin, 2006; Humphrey, 1996; Korner, McInnes, Rose, & De Silva Joyce, 2007; Macken-Horarik, 1996; Martin & Christie, 1997; Martin & Veel, 1998; Rose, 1997; Rothery, 1994; Unsworth, 1999a) and traditional classroom discourse (Christie, 2002; Rose, 1999, 2005) conducted by the Sydney School since the 1980s.

A further reason for choosing the MIs is that there is research evidence indicating an increasing trend towards integrating these materials in classroom learning in Australian schools. Since 2005, TIF has commissioned a series of studies (Freebody, 2005, 2006; Freebody, Muspratt, & McRae, 2007; Freebody, Reimann, & Tiu, 2008)

evaluating the implementation of MIs in Australian schools. Adopting both quantitative (e.g. questionnaires) and qualitative methods (e.g. site observations), these studies examined the use of these digital materials from various perspectives, e.g. students and parents, teachers and administrators. The findings in all four studies suggest positive responses to the use of these materials from teachers and students. It is also shown that SOSE and HSIE have higher reported rates of use in later studies than those reported in earlier ones (Freebody, et al., 2008). In other words, these digital multimodal texts have become an integrated part of school learning in Australia. However, the research on digital texts for children has largely been focused on commercial materials (Djonov, 2007, 2008; Gee, 2003, 2007; Legerwood, 1999; Unsworth, 2006a). The study of curriculum materials thus will offer an interesting counterpoint, enabling us to have a more comprehensive understanding of the ways in which digital discourses (re)shape the learning and social development of our children.

To sum up, the study of MIs has both theoretical and practical implications. On the one hand, the research into MIs will contribute to some much-debated theoretical issues in SFL theory, multimodal discourse analysis as well as the sociological theory of education in Bernsteinian tradition. On the other hand, it will provide an important path to our comprehension of the nature of electronic multimodal texts as well as digital learning. In this sense, it will assist in developing a pedagogy of multiliteracies (Unsworth, 2006b). It also has the potential to promote the integration and effective use of ICT materials in curriculum practice.

1.4 The organisation of the thesis

Chapter 1 (Introduction)

Chapter 2: Multimedia Interactives (MIs): Three perspectives

Chapter 2 examines Multimedia Interactives from three different perspectives: as hypermedia, as hypertext and as social process. Major literature in related areas is reviewed wherever relevant. The chapter maps out the two research focuses for the

thesis—the construal and the recontextualisation of primary social science knowledge in MIs. Moreover, the chapter establishes the key notion that MIs can be analysed as ‘multisemiotic’ ‘pedagogic’ discourse, and presents the theoretical rationales for the complementary approach to multimodal interactions outlined in Chapter 3.

Chapter 3: Intersemiotic relations as logogenetic patterns: towards a time-based SF-MDA model

Chapter 3 introduces, describes and exemplifies the time-based model developed for analysing intersemiotic relations in hypermedia environment. The discussion in the chapter starts with the SFL categories that are adopted in the logogenetic model. The three key notions in the model are then introduced, including time as the main modelling axis, logogenetic unit (the time-based semiotic unit) and logogenetic patterns (the time-based semiotic patterns). The chapter illustrates three basic types of logogenetic patterns: sequencing; coupling; and clustering. The chapter concludes with applying the time-based model in analysing MIs, focusing on the identification of the basic analytical unit, known as Critical Path.

Chapter 4 Major types of verbiage-image ideational couplings In Multimedia Interactives: Construing notions of community

Chapter 4 addresses the first research topic of the thesis — the construal of primary social science. The chapter first explains the basic mechanisms behind the forming of verbiage-image couplings in hypertext. It then introduces and exemplifies five major types of couplings found in the five MIs. The ways in which these couplings form local clustering with elementary verbal genres is also illustrated in detail. The chapter wraps up with discussion of the ways in which notions of community (people and places) are construed in MIs.

Chapter 5: Classification and framing: The recontextualisation of primary social science in Multimedia Interactives

Chapter 5 investigates the second research topic of the thesis — the recontextualisation of primary social science knowledge in MIs. The discussion in this chapter focuses on Bernstein’s notion of classification and framing. It illustrates the

ways in which the boundaries between various pedagogic categories are set up in MIs as well as the ways in which the control over the two embedded registers— instructional and regulative—of the pedagogic discourse is achieved. The main argument of the chapter is that while MIs are, in general, weakly classified, the strength of framing varies from one MI to another.

Chapter 6: Conclusion

Chapter 6 first reviews the major theoretical arguments and research findings presented in this thesis. It then summarises the major contributions of the research to the field of SFL, MDA and multiliteracies. Finally, the chapter concludes the thesis by discussing the limitations of the research and implications for future work.

Chapter 2 Multimedia Interactives (MIs): Three perspectives

2.0 Overview

In this chapter, I outline the first step in this research—the interpretation of the nature of Multimedia Interactives (MIs) as semiotic artefacts. More specifically, I seek to formulate some basic hypothesis of the nature of MIs, which in turn will assist in mapping out the focuses of this study and providing guidelines for selecting or developing an adequate descriptive model.

To achieve this goal, I examine the data through three different perspectives: 1) the angle from above, focusing on the nature of MIs as social discourses and processes; 2) the angle from around, looking at the types of semiotic configurations in hypertext; and 3) the angle from below, focusing on the characteristics of digital hypermedia. As I demonstrate throughout the chapter, these three perspectives are not alternative but complementary to each other. Our understanding of MIs from one perspective will inevitably impact on our interpretation of its nature from another. I argue that while the central task of multimodal discourse research such as that reported in this thesis is to capture various semiotic patterns, the other two perspectives (i.e. from above and below) are indispensable, in particular in handling new types of data such as MIs. Taking different perspectives often helps us to form better hypothesis of the nature of data by minimising (though not eliminating) our theoretical bias before the actual analysis starts.

Chapter 2 is organised into four sections. Sections 2.1-2.3 discuss in sequence the three different perspectives, the view from above (MIs as social process), from around (MIs as hypertext) and from below (MIs and digital media). Relevant theory and research, in particular those in the tradition of systemic functional multimodal discourse analysis (hereinafter SF-MDA) are discussed at various points. Section 2.4 summarises the discussions in previous sections and outlines the type of descriptive model required to address the research questions raised in the discussions. The task of building such a model will be subsequently taken up in the following Chapter 3.

2.1 Pedagogic discourse: View from above

The first perspective on MIs provides the starting point for this research. In this perspective, I explore the nature of MIs as social discourses and processes. My discussion in this section centres on two notions: genre (cf. Martin & Rose, 2008) and pedagogic discourse (cf. Bernstein, 2000). The main purpose of my discussion is to place MIs in its broader social context. In doing so, I seek to form some basic research questions for this research.

2.1.1 Educational genres and Multimedia Interactive (MIs)

2.1.1.1 Genre: An overview

Since the early 1980s, there has been extensive research on texts and discourses in educational settings from a systemic functional linguistics (SFL) perspective. The most notable work in this respect is that of the Sydney School of educational linguistics (cf. Martin, 2000a for extensive list of reference see Chapter 1, Section 1.3.3). One key notion underling the work of the Sydney School is that of genre. Genre is characterised as “staged, goal-oriented social processes” (Martin & Rose, 2008, p. 6), a definition that highlights “the way in which most genres take more than a single phase to unfold” (staged); “the sense of frustration or incompleteness that is felt when phases don’t unfold as expected or planned” (goal-oriented); and “the fact that genres are addressed”, that is, “formulated with readers and listeners in mind” (social) (Martin, 1997, p. 13).

Martin (1994) further proposes the concept of macrogenre as a way of looking at large-scale texts that formed through the combination of various elementary genres. The idea was further explored in a series of studies of such texts, including administration planning procedures (Iedema, 2003), classroom discourse (Christie, 2002), medical discourse (Jordens, 2002), science and geography textbooks (Martin, 1994, 2002b), and counselling discourse (Muntigl, 2004). Of particular interest to this study is Christie’s work on classroom discourse, which will be explored further in the following section (Section 2.1.2).

In Genre Theory (GT), there are two basic types of recurrent patterns to be considered: 1) local patterns or schematic structures, the configurations of various units of meaning in a text and the positioning of units in text structure; 2) global patterns or genre, the overall meaning configurations of text which signify their relations with other texts at this level of abstraction. In essence, the former captures the relation between each stage within a genre, while the latter deals with the relation of a genre with another.

Figure 2.1 History genres: Typological and topological perspectives

a. A typological perspective on history genres (Martin & Rose, 2008, p. 132)

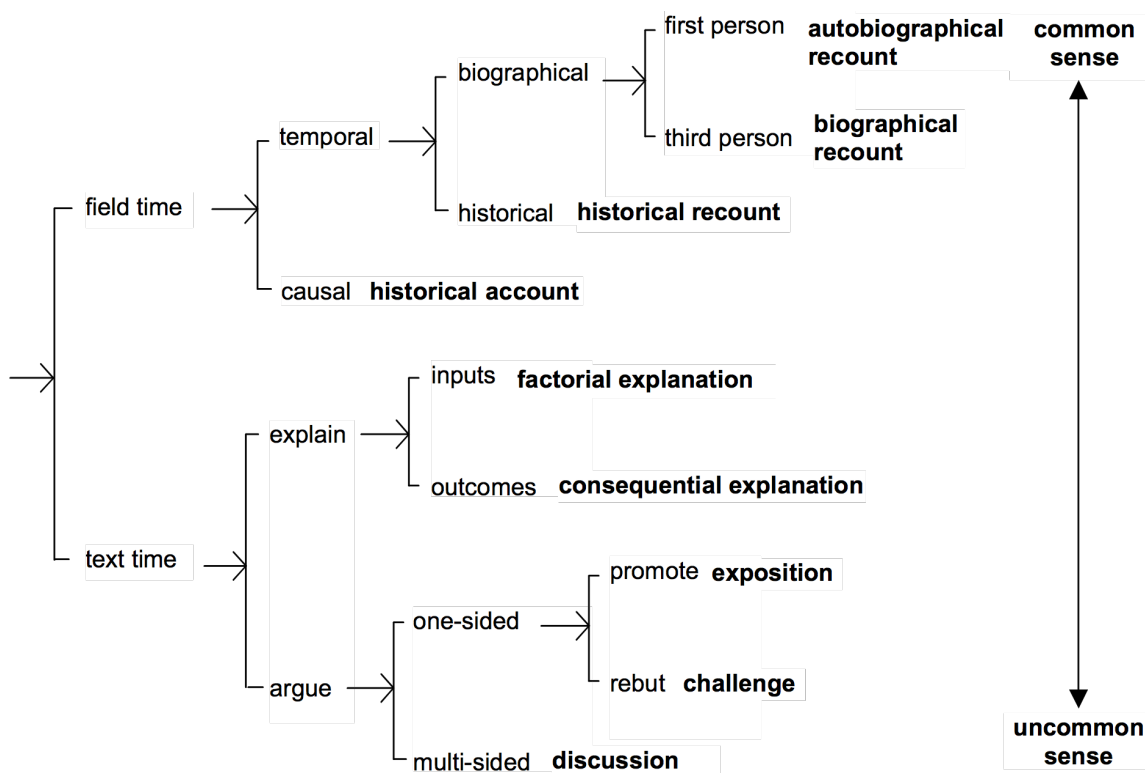
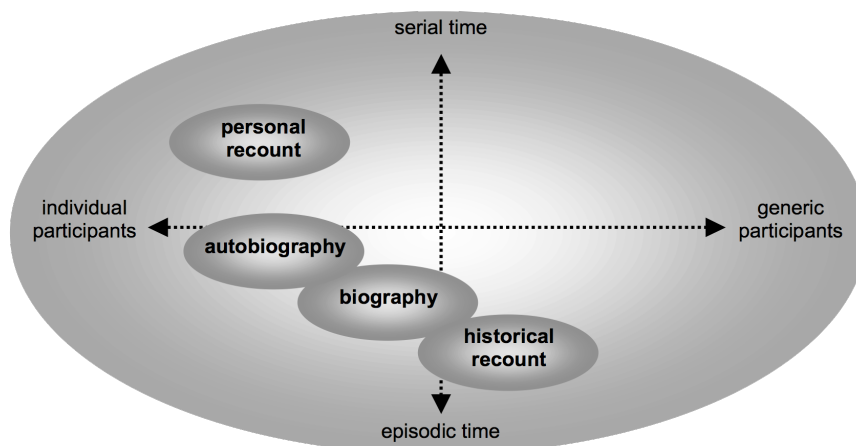


Figure 2.1 (continued) History genres: Typological and topological perspectives

b. A topological perspective on history genres (Martin & Rose, 2008, p.134)



Genre relations are modelled through two basic types of agnation, typological and topological (Martin & Matthiessen, 1991). The typological approach sets up categorical distinctions as oppositions between genres, and has its formalisation in system networks. The topological approach, on the other hand, maps degrees of similarity rather than imposing absolute boundaries of differences. It presents the relation between genres as a continuum. Figure 2.1 exemplifies the differences between a typological perspective (2.1a) and a topological perspective on history genres (2.1b).

In this section, I observe MIs through these key concepts of Genre Theory. I am not attempting a detailed generic profile (i.e. the description of linguistic patterns) for MIs, since the task is impossible at this stage of the research. Rather, I am interested in providing a broad generic characterisation of MIs as a potential new type of educational discourse, including 1) types of elementary genres utilised in the MIs and 2) the overall schematic structure of MIs. My method here is to compare MIs with existing descriptions of educational genres. My aim is to establish similarities between MIs and traditional educational discourse, and subsequently concentrate research energy on mapping out the features that distinguish MIs from them. In other words, I will take the similarity as a point of departure for a different kind of analysis to be developed in this thesis.

2.1.1.2 Elementary verbal genres in MIs

My discussion in this section focuses on the types of elementary verbal genres utilised in the MIs. More specifically, I am interested in two questions: 1) if any verbal genres can be identified in MIs and how recognisable these genres are (i.e. if they can be read without the images); and 2) what the most typical verbal genres are. In answering these questions, I aim to identify the types of social processes and fields MIs are related to.

In MIs, there are two basic types of verbal text blocks (in visual text box or in audio clips). I shall at this stage call them ‘linking text’ and ‘content text’. The function of linking text, such as the ones in Text 2.1, is to guide the learner through the navigation task of a MI. The content text (Text 2.2), on the other hand, offers information related to the subject area MIs cover—primary social science. I explore in turn the types of genres that constitute these two types of texts. A full list of instances of elementary genres in the five MIs is provided in Appendix I.

Text 2.1 Linking text in MIs

a. Gold Rush!

Miner’s tips

- To mine for gold you need to:
- Buy a permit in the permit office.
- Buy enough supplies in the supply store to last you up to one month.
- Select the map and choose the type of mine where you will work.
- When you have chosen your mine, go to the tool shop and buy the tools you need to mine for gold.
- After you have everything you need, select To goldfields and get to work!

b. Mystery Object: Torres Strait Island

Are you getting any closer to solving the mystery? You thought the object was Totem.
Do you want to change your mind?

Text 2.2 Content text in MIs

a. New Homes

World War II lasted for 6 years from 1939 to 1945. Millions of people in Europe lost their lives and many more saw their homes and way of life destroyed. Haunted by the memories of war, many preferred to start a new life far away from Europe. Australians have been horrified by the images of the war in Europe and wanted to help the refugees. The Australian government also wanted to increase the population and boost

the economy. In 1947, it passed the Displaced Person's Act, which allowed selected Europeans to come to Australia. Over the next five years, an estimated 170,000 people came from Europe to start a new life in Australia. Find out the stories of two of the women who made the trip.

b. Gold Rush!

Shaft Mining

Shaft mining takes place under the surface of the Earth. The shaft or hole was usually about 1 m wide and up to 10 m deep. A windlass was used to lower a man down the shaft and to lift the dirt that he dug out. The dirt would then be washed in a cradle in order to find gold.

Linking text: Procedure genres

The genre of linking text (Text 2.1) is readily recognisable and is that of Procedure, a genre concerned with a specialised sequence of activities in relation to certain objects and locations. In essence, this type of genre functions as a pedagogic 'how to' text. The procedure genres in MIs fall roughly into two types. The first type (see Text 2.3) is *agnate to* what Martin and Rose (2008) describe as everyday procedure, a type of (oral) procedure accompanying an activity in which the learners are instructed to perform a task.

Text 2.3 'Everyday Procedure' in MIs

a. Mystery Object: Torres Strait Island

1. Are you getting any closer to solving the mystery? [*Interrogative: Demand*]
2. You thought the object was Totem. [*Declarative: Statement*]
3. Do you want to change your mind? [*Interrogative: Demand*]

b. Medical Emergency at Lonely Creek

1. Good! [*Expletive*]
2. You've found Minister McDougal,
3. who can give Sayed medical aid. [*Declarative: Statement*]
4. Now go back to the post office to see if the telegram has been sent. [*Command: Imperative*]

These 'everyday procedures' are scattered throughout the navigation process of a MI. They often incorporate a range of Mood structures and Speech Functions in guiding and directing the navigation sequences. For example, *Now go back to the post office to see if the telegram has been sent* (Command: Imperative). *Do you want to change your*

mind? (Demand: Interrogative). It also accesses and evaluates the performance of the learner from time to time (e.g. *Good! You've found Minister McDougal, who can give Sayed aid*). Through these 'oral-like' procedures, MIs establishes a pedagogic relation with the learner that is direct, personal, here and now (cf. Gamble, 2004 quoted in Martin & Rose, 2008, p. 182).

The second type of procedure specifies the activity sequence in mission-oriented MIs and explains the production procedure and generic features of a multimodal text in product-oriented MIs (see Text 2.4 and Text 2.5).

Text 2.4 Procedure in mission-oriented MIs: *Gold Rush!*

Miner's tips

1. To mine for *gold*
2. you need to
3. Buy a *permit* in the **permit office**.
4. Buy enough *supplies* in the **supply store**
5. TO last you up to one month.
6. Select **the map**
7. AND choose the *type of mine* [[*where you will work*]].
8. WHEN you have chosen *your mine*,
9. go to the **tool shop**
10. AND buy the *tools* [[*you need to mine for gold*]].
11. AFTER you have *everything* [[*you need*]],
12. select To **goldfields**
13. AND get to work!

In mission-oriented MIs such as *Gold Rush!* (Text 2.4), this type of procedure specifies three aspects of the mission: the types of activities, the sequence and the fields of these activities. The types of activities are realized in verbal groups e.g. buy, mine, select, choose, go (underlined in the text), while the sequences are realized in conjunctive relations, e.g. AND, WHEN, AFTER (SMALL CAPITAL in the text). The fields of activities typically include two basic elements: types of location such as **permit office**, **tool shop** (**bold** in the text), and types of object such as *permits*, *tools* (*italics* in the text).

Text. 2.5 Procedure in product-oriented MIs: *New Homes*

Curator's tips

1. You need to create *four exhibits*, one for **each room in the museum**.

2. *Each exhibit will be on different theme,*
3. related to the experience of immigrants.
4. To start,
5. select one of the themes in the **Work space**: for example, *leaving home*.
6. Decide
7. which *items* in your **Storage area** best fit *that theme*
8. AND move *them* into your **Work space**.
9. You can change the order
10. by moving images into **the spaces between them**.
11. You can delete images
12. by moving them from **the Work space**.
13. Select Possible meanings for ideas about [[which theme an item might belong with]].
14. Type a description for each item
15. by selecting it in **the Work space**
16. AND THEN choosing Write description.
17. Try to explain to visitors [[why this item is related to the theme]].
18. Write an introduction for your exhibition
19. by selecting the label at the front of the Work space.
20. Use this to explain [[how the theme relates to immigrants' experiences]].
21. You can create your own theme
22. by selecting Room 4 title in **the Preview area**
23. AND THEN type in *your own theme*.
24. Select Go to **exhibition**
25. to see our work displayed **in the museum**

Likewise, a procedure in product-oriented MIs such as *New Homes* (Text 2.5) deploys similar linguistic recourses to construe three main aspects of the production of a multimedia texts: 1) the type of text, e.g. *four exhibits*; and its key 'generic' components, e.g. *different theme, an introduction for your exhibition, a description for each item* (*italics* in the text); 2) the types of activities involved in creating the text, e.g. select, move, explain, type, write (underlined in the text) and the sequence of the activities, e.g. AND THEN (SMALL CAPITAL in the text); and 3) the virtual location in which these activities take place, , e.g. **each room in the museum, Storage area, the spaces between them, Room 4** (**bold** in the text).

One particularly interesting aspect of procedure in MIs is its ability to incorporate two different types of activities: 'real' activities (various procedures in a task) and hypermedia interactive ones (which hyperlinks to activate). In *Gold Rush!* (Text 2.4), for instance, 'real activities' are the ones like go to the tool shop, buy a permit in the permit office; while the hypermedia interactive activities include select to goldfields, select the map. Similarly, the locations the activities take place is also a mix of 'real' place (e.g. *in the permit office*) and anchors (e.g. *select to goldfields*). Sometimes the

distinction is less clear, for instance, in *WHEN you have chosen your mine*, choose can be both a real action as in make a choice and a hypermedia action as in click on the button that represent the mine. It seems that MIs have the ability to incorporate different fields of activities into a coherent sequence and blur the boundaries between them. This thus raises first set of questions, which are worth further exploration:

- What are the types of fields of activities (navigation activities) in MIs?
- And how do these different fields interact with each other?

Content text: Report, Explanation and history genres

In content text blocks, there are two types of elementary genres that can be easily identified: Report (describing and classifying things) and Explanation (explaining how processes happen). Report texts in MIs typically describe and classify objects that are of particular cultural or historical significance in Australian (or Austro-Asian) contexts. For instance, Text 2.6a provides a description of ceremonial dances in Torres Strait Island. Explanation texts in MIs, on the other hand, deal largely with various activities that are of particular significance in Australia's social-cultural history. Text 2.6b is an example of a Sequential Explanation, explaining the process of shaft mining during the period of the gold rush.

Text 2.6 Explanation and Report in MIs

a. Descriptive Report: Mystery Object: Torres Strait Islands

Ceremonies and dancing
Ceremonies and dances have many functions on the Torres Strait Islands.

- Each clan has ceremonial dances with their own style of singing and dancing.
- Different dances with elaborate costumes are used to celebrate a wedding, mark an event or mourn death at a funeral.
- Ceremonial dances often include totem objects, to encourage a positive relationship with the supernatural.
- Knowledge is passed down through dance, singing, storytelling and art.

Young Saibal Island dancer

Ceremonies and dancing

Ceremonies and dances have many functions on the Torres Strait Islands. Each clan has **ceremonial dances with their own style of singing and dancing**. Different dances with elaborate costumes are used to celebrate a wedding, mark and event or mourn death at a funeral. **Ceremonial dances** often include totem objects, to encourage a positive relationship with the supernatural. Knowledge is passed on through dance, singing, storytelling and art.

Text 2.6 (continued) Explanation and Report in MIs

b. Sequential Explanation: Gold Rush!



Shaft Mining

Shaft mining takes place under the surface of the Earth. **The shaft or hole** was usually about 1 m wide and up to 10 m deep. **A windlass** was used to lower **a man** down **the shaft** and to lift the dirt that **he** dug out. **The dirt** would then be washed in **a cradle** in order to find gold.

The third group of genres found in MIs is essentially field specific, i.e. history genres. The three main types of history genre used in MIs are Biographical Recount (the history of an individual), Historical Recount (the history of groups) and occasionally Historical Account (the eternal causal sequence of history). In *New Homes* (Text 2.7), for instance, we are introduced to the cause of mass European immigration to Australian after the Second World War (Historical Account in Text 2.7a), as well as the personal history (Biographical Recount in 2.7b) of Petronella Wensing.

Text 2.7 History genres in MIs: *New Homes*

a. Historical Account

World War II lasted for **6 years from 1939 to 1945**. Millions of people in Europe lost their lives and many more saw their homes and way of life destroyed. Haunted by the memories of war, many preferred to start a new life far away from Europe. Australians have been horrified by the images of the war in Europe and wanted to help the refugees. The Australian government also wanted to increase the population and boost the economy. **In 1947**, it passed the Displaced Person's Act, which allowed selected Europeans to come to Australia. **Over the next five years**, an estimated 170,000 people came from Europe to start a new life in Australia. Find out the stories of two of the women who made the trip.

b. Biographical Recount

Petronella Wensing was born **in 1924** in Tachwingen, a town in the Netherlands or Holland. Petronella was just **16 years old** and studying to be a teacher when her town was bombed during World War II. Her country was occupied by the Germans. Petronella's family was fettered by the war as her brothers and sisters were sent to work in a German labour camp. **In 1948**, she met Michael. They were married and later had two sons. **After the war**, many people in Holland could not find work. Michael was

unemployed. The Dutch government and the Catholic migration office encouraged the Wensings to move to a country less affected by war. They decided to immigrate to Australia. The Australian government welcomed refugees from Europe. Petronella was sad to leave the Netherlands. But with two sons and a new baby on the way, she hoped for a better life in Australia. Petronella was very talented at sewing. She brought her sewing equipment with her and made dresses and other items. She made a bobbin lace map of her new home featuring Australian animals and birds. **After few years** in Australia, the family was separated, as Michael had to move to Canberra for work. Petronella stayed with her sons in a migrant hostel in Sydney. The family was eventually reunited in Canberra. In Canberra, she studied for **3 years** to qualify as a textile-design teacher and taught **for 16 years**. Petronella became a well-known artist and also worked with church and community organisations to help other migrants to build a new life in Australia.

Report, Explanation and various history genres in MIs are easily recognisable. In most cases, they can be read on their own as a coherent piece of text. However, in MIs, they are always accompanied by or accompanying an image (e.g. Text 2.6) or moving images such as animation or video clips. In some cases, the genre spans a few hyperlinked nodes.

Plate 2.1 Elementary verbal genres in hypermedia environment: *New Homes*



Homepage of Pentronella Wensing

Petronella Wensing was born **in 1924** in Tachwingen, a town in the Netherlands or Holland.



Stage 1: 1924: Birth

In the *New Homes* (Plate 2.1), for instance, Petronella Wensing's story starts with a homepage like link. At the bottom of the homepage, there is a timescale listing six periods in her life (1924, 1940, 1948, 1953, 1956, 1908s). While clicking on the photo above a specific time, we are directed to a new page, which contains one stage in the Biographical Recount of Petronella's life, e.g. 1924 (delivered through audio channel). We can also view a selection of photos from that particular period, e.g. the photos of her family and the town of Tachwingen.

There are two aspects of these genres—Report, Explanation and history genres—worth exploring. The first concerns the ways in which meaning multiplies (cf. Lemke, 1998) through placing these traditional genres in a new hypermedia environment. The research question can be asked thus is:

- How elementary verbal genres interact with images and other multimodal recourses to construe the field of knowledge (primary social science).

The second aspect worth exploring is the relation between these genres and the procedural genre in linking text. To be able to study this relation, I need to introduce the theoretical concept of pedagogic discourse, a task I shall take up in Section 2.1.2. In the following section, I will continue the exploration of the generic features of MIs, focusing on their macro-structure.

2.1.1.3 Macro schematic structure of MIs

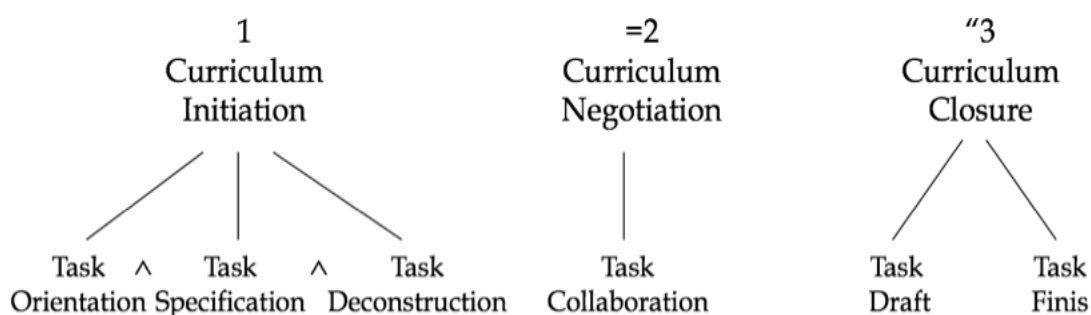
In this section, I focus on the macro-structure of MIs. The premise here is that in complex long-scale texts such as MIs, “the variation of language and a flexible combination of genres or stages represents variation at a lower level, realising a more stable pattern at macro-structure” (Piriyasilpa, 2009, p. 245). That is to say, although each MI may contain a different combination of elementary verbal genres and/or new multimedia genres at a lower level, we should in theory be able to observe certain stable global schematic structures since they have the same global purpose and realise the similar social process of digital learning.

The labelling of each generic stage is based mainly on the purpose of a stage in relation to the MI, and the typical combination of elementary verbal genres of the stage. I need to emphasise here again that I am not offering a detailed ‘analysis’ of the macrogenre of MIs. Instead, as in the previous section, I seek to identify the types of social processes and fields MIs are *agnate to*. To put it in another way, by recognising the types of traditional social processes MIs resemble (or possibly evolve from) in an

earlier stage of the research, I shall subsequently be able to focus my research on exploring the features that establish MIs as a new (if any) type of ‘digitalised’ social process. A comprehensive account of the macrostructure of MIs is presented in Appendix II.

The macrostructure of MIs, not surprisingly, bears resemblance to that of traditional classroom discourse as described by Christie (1989, 1997, 1999, 2002). To capture the structured activities in classrooms, Christie proposes the concept of curriculum macrogenre. One type of curriculum macrogenre Christie has described is that of the primary social science program in Australia. She recognises three stages in a curriculum macrogenre, sequentially: the Curriculum Initiation, the Curriculum Negotiation and the Curriculum closure (see Figure 2.2),

Figure 2.2 Macrogenre of upper primary social science program (cf. Christie, 2002)

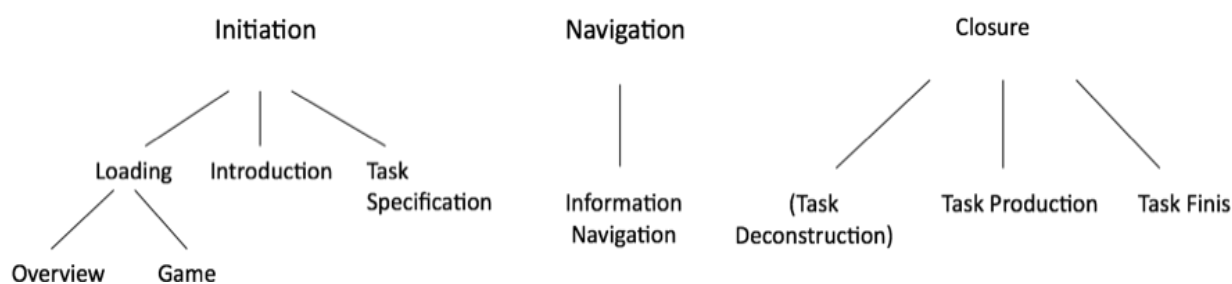


The Curriculum Initiation stage consists of a single genre, which is made up of three sub-stages: 1) Task Orientation—explaining direction of the task sequence in classroom; 2) Task Specification—defining of pedagogic task, which in traditional classroom settings typically involves a writing task; and 3) Task Deconstruction—analysing or deconstructing a target text type. The Curriculum Negotiation stage, which is seen as an elaboration (denoted in “=”) of the Task Orientation, usually involves several different genres operating recursively. At this stage, the teacher and the students work collaboratively, collecting and reading information as well as preparing notes for the (writing) task. The final stage—Curriculum Closure, is considered as standing in a projection relation (denoted in “ ”) to the Curriculum

Initiation, for the activities at this stage have been projected in the Task Specification. That is, they have been introduced in a more general way in Task Specification. Similar to the Negotiation stage, the Curriculum Closure constitutes several genres, operating recursively. Basic genres in this stage include Task Draft (the writing of a sample text) and Task Finis (the completion of the task).

The resemblance between the macrostructure of a product-oriented MI and that of a traditional curriculum as described by Christie is straightforward. Figure 2.3 presents the macro structure of product-oriented MIs, while Table 2.1 illustrates the stages within a MI text, using *New Homes* as an example.

Figure 2.3 The Macrostructure of product-oriented MIs



A product-oriented MI typically unfolds in three main stages, each paralleling a stage in curriculum macrogenre: Initiation, Navigation and Closure. The Initiation stage in MIs is composed of three sub-stages. The first stage Loading, is further divided into two elements: Overview and Game. The Overview, typically presented in a verbal text, introduces the general historical background of the MI. In *New Homes*, for example, the Overview describes the cause of the mass immigration of European citizens to Australia after World War II through a Historical Account (see also Text 2.7a). The Game stage includes a short keyboard game. The keyboard game in *New Homes* invites the learner to ‘move’ cars across a map of Europe. The game is often loosely related to the task in MIs. The inclusion of the game appears to be motivated by technological needs, as it usually takes a minute or so for MIs to load onto a local computer, depending on the bandwidth. These games have been gradually phased out during the years. The newer MIs, for instance *Medical Emergency at Lonely Creek* or *Mystery Object: Torres Strait Islands* no longer contain these games.

Table 2.1 The macrostructure of product-oriented MIs: *New Homes*









Stages		Screen Shots (examples)	Transcriptions of verbal Text	Typical elementary verbal genres
Initiation	Loading		<p>World War II (1939-45) forced millions of people in Europe to leave their homes as cities were bombed, towns destroyed, people sent to labour or concentration camps and the economy left in ruins.</p> <p>To encourage some of these people to make Australia their new home, the Australian Government passed the Displaced Persons Act, which allowed certain European immigrants to come to Australia from 1947.</p> <p>Drive the car over the countries' signs to see how many immigrants from that country came to Australia from 1947 to 1952.</p>	<p>Historical Account</p> <p>Procedure</p>
	Game			
	Introduction		<p>World War II lasted for 6 years from 1939 to 1945. Millions of people in Europe lost their lives and many more saw their homes and way of life destroyed. Haunted by the memories of war, many preferred to start a new life far away from Europe. Australians have been horrified by the images of the war in Europe and wanted to help the refugees. The Australian government also wanted to increase the population and boost the economy. In 1947, it passed the Displaced Person's Act, which allowed selected Europeans to come to Australia. Over the next five years, an estimated 170,000 people came from Europe to start a new life in Australia. Find out the stories of two of the women who made the trip.</p>	<p>Historical Account</p>
	Task Specification		<p>Explore the stories of these two immigrants to Australia. When you have finished you will create a museum exhibition about their experiences.</p> <p>Choose one of the photos to begin.</p>	<p>Procedure</p>
	Information Navigation		<p>(Audio) Petronella Wensing was born in 1924 in Tachwingen, a town in the Netherlands or Holland. Petronella was just 16 years old and studying to be a teacher when her town was bombed during World War II. Her country was occupied by the Germans. Petronella's family was fettered by the war as her brothers and sisters were sent to work in a German labour camp. In 1948, she met Michael. They were married and later had two sons. After the war, many people in Holland could not find work. Michael was unemployed. The Dutch government and the Catholic migration office encouraged the Wensings to move to a country less affected by war. They decided to immigrate to Australia. The Australian government welcomed refugees from Europe. Petronella was sad to leave the Netherlands. But with two sons and a new baby on the way, she hoped for a better life in Australia. Petronella was very talented at sewing. She brought her sewing equipment with her and made dresses and other items. She made a bobbin lace map of her new home featuring Australian animals and birds. After few years in Australia, the family was separated, as Michael had to move to Canberra for work. Petronella stayed with her sons in a migrant hostel in Sydney. The family was eventually reunited in Canberra. In Canberra, she studied for 3 years to qualify as a textile-design teacher and taught for 16 years. Petronella became a well-known artist and also worked with church and community organisations to help other migrants to build a new life in Australia.</p>	<p>Biographical recount</p>

Table 2.1 (continued) The macrostructure of product-oriented MIs: *New Homes*

Stages	Screen Shots (examples)	Transcriptions of verbal Text	Typical elementary verbal genres	
Closure	(Task Deconstruction)	 <p>Curator's tips You need to create four exhibits, one for each room in the museum. Each exhibit will be on different theme, related the experience of immigrants.</p> <ol style="list-style-type: none"> 1. To start, select one of the themes in the Work space: for example, leaving home. 2. Decide which items in your Storage area best fit that theme and move them into your Work space. You can change the order by moving images into the spaces between them. You can delete images by moving them from the Work space. 3. Select Possible meanings for ideas about which theme an item might belong with. 4. Type a description for each item by selecting it in the Work space and then choosing Write description. Try to explain to visitors why this item is related to the theme. 5. Write an introduction for your exhibition by selecting the label at the front of the Work space. Use this to explain how the themes relates to immigrants' experiences. 6. You can create your own theme by selecting Room 4 title in the Preview area and then type in your own theme. 7. Select Go to exhibition to see our work displayed in the museum. 	Procedure	
	Task Production			
	Task finis			

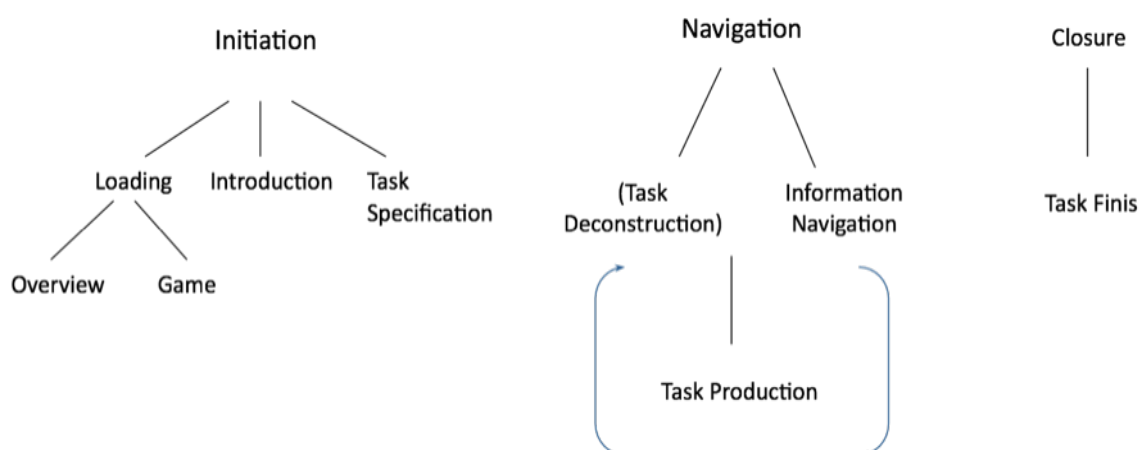
The second sub-stage in the Initiation is the Introduction. This stage, typically including a flash animation, elaborates on the historical information provided in the Overview. The final stage of the Initiation—Task specification introduces the task of a MI through a Procedure text. The task in product-oriented MIs often involves the production of multimodal texts of various kinds. In *New Homes*, for example, the learner is asked to explore the stories of two European immigrants and create a museum exhibition about them. The task sometime takes a more conventional form. In *Mystery Object: Torres Strait Island*, for instance, the learner is asked to answer a quiz after navigating through the MI.

The main stage in MIs is the Information Navigation, in which the learner browses through various hyperlinked multimedia artefacts and collects information for the

task. For example, in *New Homes*, the learner can click on the photos of Pentronella and listen to audio descriptions (the Biographical Recount) of her life. This stage typically includes one or all three basic types of verbal genre as described in Section 2.1.2—Report, Explanation and history genres.

In the Closure stage of MIs, there are typically three sub-stages. The Task Deconstruction ‘deconstructs’ or explains the key features of the multimodal text the learner is required to produce. The main verbal genre in this sub-stage is the Procedure. As in curriculum discourse, it is projected in the Task Specification (Initiation). In *New Homes*, for instance, the learner is instructed to “*Type a description for each item by selecting in the Work space and then choosing Write description. Try to explain to visitors why this item is related to the theme.*” It is interesting to note that the deconstruction of multimodal genre in MIs often includes the specification of both technology elements (“*select in the Work space*”) and semiotic elements (“*Try to explain to visitors why this item (i.e. an image) is related to the theme*”). The final two sub-stages in the Closures are the Task Production (the learner produces the multimodal text) and the Task Finis. The study of these two final stages requires the engagement of field methods such as ethnography, which is beyond the scope of this research.










Figure 2.4 The macrostructure of mission-oriented MIs



A mission-oriented MI, on the other hand, seems to be further removed from traditional classroom discourse for it takes on a form closer to computer games. In

Gold Rush!, for instance, the learner engages with a virtual game of gold mining. I shall, however, suggest that this dissimilarity is superficial, for the structure of activity sequences in mission-oriented MIs still bears resemblance to classroom discourse. The macrostructure of mission-oriented MIs is presented in Figure 2.4 and illustrated through the example of *Gold Rush!* in Table 2.2.

Table 2.2 The macrostructure of mission-oriented MIs: *Gold Rush!*

Stages		Screen Shots (samples)	Transcriptions of verbal Text	Typical elementary verbal genres
Initiation	Loading	Overview 	The year is 1865 and there's a gold rush on in Australia. You are about to journey to Victorian goldfields to join thousands of others trying to strike it rich. You will find yourself in Ballarat, where you can buy all you need for life on the goldfields. While 'Gold Rush!' is loading, try your luck at this!	Procedure
		Game 		Keyboard Game
	Introduction		Audio) Ling: Hi I'm Ling. My father has come to Australia from China to find gold. Thousands of people are still rushing here from lots of different countries. That's why it is called the Gold Rush.	Historical Recount
	Task Specification		(Audio) Ling: Are you ready to join the rushing dig for gold? Let's start.	Procedure
Navigation	(Task Deconstruction)		To mine for gold you need to : <ul style="list-style-type: none"> Buy a permit in the permit office. Buy enough supplies in the supply store to last you up to one month. Select the map and choose the type of mine where you will work. When you have chosen your mine, go to the tool shop and buy the tools you need to mine for gold. After you have everything you need, select To goldfields and get to work!	Procedure
	Information Navigation		To mine for gold you have to buy a permit. In China if you find gold, it goes straight to the rulers. In Australia, you can keep it as long as you have a permit. That's why so many people are coming here.	Report, Explanatory, Recount
	Task Production		Pay miner's permit Buy now? Yes No Currency converter	'everyday' Procedure
Closure	Task finis		(Image with sound effects of digging)	
			Dig over! Congratulations! You have found 31.5 ounces of gold. By adding luck you have found 27 more ounces of gold. In total, this is worth £ 97. That's a great result for all your hard work! Play again?	Procedure

As Figure 2.4 and Table 2.2 show, the Initiation stage in mission-oriented MIs is identical to that in product-oriented MIs. The differences between the two types of MIs consist predominantly in the Navigation stage and the Closure stage. In a product-oriented MI the task of producing a multimodal text (Task Production) is fulfilled in the final Closure stage, whereas in a mission-oriented MI, the Task Production (the virtual game) is embedded in the Navigation stage. That is to say, in the former, the learner collects the information *prior to* the task; while in the latter, the learner completes the task *while* collecting information.

For example, in *Gold Rush!* (see Plate 2.2), the learner needs to purchase mining tools in the tool shop. When the learner clicks on one of the tools (e.g. Cradle) in the shop, a window containing information on the tool pops up. After reading the information, the learner needs to make a decision on whether they will purchase the tool. The purchase decision is made based on the type of mine (they have chosen). If they are to purchase the tool, they can then click on the money sign (£ 2.8s) to proceed. In a way, a mission-oriented MI provides immediate feedback on a learner's understanding of a particular text (the description of the cradle), its relation to other texts (the description of mines in earlier stage of the game), and the game genre (how many steps it takes to finish the task). Since the Task Production is now embedded in the Navigation stage, the Task Deconstruction is relocated accordingly. The Closure stage in mission-oriented MIs, contains only the Task Finis stage, where evaluation is given on how well the learner has performed in the game.

Plate 2.2 *Gold Rush!*: Purchasing cradle



In her research of classroom discourse, Christie (cf. 2002) shows that though an underlying (macro)generic schema can be observed across classrooms, an individual curriculum may vary in the ways in which it combines elementary genres within each stage, in particular in the Negotiation and the Closure, depending largely on the interaction style of a particular classroom. For instance, in the Negotiation stage, some classrooms rely mainly on the collaborations between students, while others involve intensive negotiation between the teacher and the students. These differences can be observed in the ways in which different linguistic patterns are configured in classroom discourse. Christie's work is particularly instructive to this research, for it further shows that if we could establish a similarity in macrostructure between MIs, we would be able to focus on the local linguistic patterns, in case of MIs, multimodal patterns. So far in this section, I have established that there's a comparable underlying schematic structure across MIs, with variations between mission-oriented and product-oriented MIs. Now the comparability has been established, I can focus on the differences in local patterns (i.e. different types of semiotic relations). Two research questions can thus be asked:

- Do two types of MIs (mission-oriented & product-oriented) construe fields of activities (navigation activities) and knowledge differently, and if so
- How fields are construed in the two types of MIs and across different MIs?

2.1.2 Pedagogic discourse and Multimedia Interactives (MIs)

2.1.2.1 Pedagogic discourse: Regulative and instructional registers

In this section, I pick up the task forecasted in section 2.1.1.2, i.e. introducing the Bernsteinian concept of pedagogic discourse. As discussed earlier, this concept is useful in exploring the relation between Procedure genre and other verbal elementary genres in MIs. To be more precise, it offers a useful conceptual framework for interpreting the two fields as construed through these texts—the field of navigation activities and the field of primary social science.

Pedagogic discourse is one of the key concepts in Bernstein's theory of cultural production, reproduction and transmission (Bernstein, 1975, 1990, 2000). For Bernstein, recontextualising rules constitute pedagogic discourse, which allows the appropriation of one discourse (*regulative*) into another discourse (*instructional*). More specifically, pedagogic discourse is

... the rule which embeds a discourse of competence (skills of various kinds) into a discourse of social order in such a way that the latter always dominates the former. We shall call the discourse transmitting specialized competence and their relation to each other instructional discourse, and the discourse creating specialized order, relation and identity regulative discourse. (Bernstein, 1990, p. 183)

Bernstein emphasises the singular nature of pedagogic discourse. That is to say, it is not two discourses, but the principle that "leads to the embedding of one discourse to another, to create one text, to create one discourse" (2000, p. 32). Pedagogic discourse therefore is expressed in the following formula, which highlighted the fact that instructional discourse is always embedded in the dominating regulative (Bernstein, 1990).

$$\frac{\text{Instructional Discourse}}{\text{Regulative Discourse}} \quad \frac{\text{ID}}{\text{RD}}$$

In her work on curriculum discourse, Christie reconceptualised the notion from a systemic functional linguistic perspective. In her words,

...pedagogic discourse found in the curriculum genres of schooling functions in such way that it is realized primarily in first order or regulative register, to do with the overall pedagogic directions taken, their goals, pacing and sequencing; and a second order or instructional register to do with the 'content' and its specialized skills at issue. The first order or regulative register, (...) 'projects' a second order or instructional register. (Christie, 2002, p. 25)

In defining pedagogic discourse, Christie replaces Bernstein's choice of term discourse (as in regulative discourse) with register and embedding with projecting in order to locate the notion more comfortably in the conceptual framework of SFL.

Christie applies this notion of pedagogic discourse in her investigation of primary and lower secondary classroom, focusing on the linguistic realisations of the two types of registers in curriculum. More specifically, she analyses the ideational, interpersonal and textual grammatical configurations of the two registers at the various stages of the curriculum macrogenre.

One key argument to emerge from Christie's work is the "moral regulation" (2002, p. 163) function of the regulative register. Moral regulation involves two dimensions in terms of schooling: 1) the establishment of acceptable patterns of social and interpersonal behaviours; 2) the acquiring of the methods for learning particular to the field of knowledge (realised in instructional register), including handling information, reasoning, arguing and so on. Christie shows that the focus of regulative discourse shifts in most classrooms (those that do not consist of large numbers of disruptive and uncontrollable students) gradually from the former to the latter during the years of schooling. She also illustrates the ways in which the misalignment (i.e. the regulative fails to appropriate the instructional discourse) of two registers could potentially impact on learning in the classroom.

2.1.2.2 Regulative and instructional registers in MIs

Examined through a Bernsteinian point of view, MIs are essentially a specific type of pedagogic discourse, which allows the projection of an instructional register through a regulative one. As discussed in the previous Section 2.1.1, there are two different fields emerging from the analysis elementary verbal genres in MIs: the field of hypermedia navigation activities and that of primary social science. The former is primarily construed through Procedure genres, whereas the latter through Report, Explanation and history genres.

Now if we revisit the procedural texts, we can recognise their ‘regulative’ function. On the one hand, they provide the direction (e.g. *Now go back to the post office to see if the telegram has been sent*), pacing (e.g. *Are you getting any closer to solving the mystery?*) and activity sequencing (e.g. *After you have everything you need, select to gold fields and get to work!*). On the other hand, they also offer moral evaluations of the learner’s behaviour (e.g. *Good! You’ve found Minister McDougal who can give Sayed medical aid*). These procedural texts in MIs, therefore, can be seen as realising the regulative register. To put it in another way, the field of navigation activities belongs to the *regulative* register.

Text 2.3 ‘Everyday Procedure’ in MIs

Mystery Object: Torres Strait Island

1. Are you getting any closer to solving the mystery? [*Interrogative: Demand*]
2. You thought the object was Totem. [*Declarative: Statement*]
3. Do you want to change your mind? [*Interrogative: Demand*]

Medical Emergency at Lonely Creek

1. Good! [*Expletive*]
2. You’ve found Minister McDougal,
3. who can give Sayed medical aid. [*Declarative: Statement*]
4. Now go back to the post office to see if the telegram has been sent.

Text 2.4 Procedure in mission-oriented MIs: *Gold Rush!*

Miner’s tips

1. To mine for *gold*
2. you need to
3. Buy a *permit* in the **permit office**.
4. Buy enough *supplies* in the **supply store**
5. TO last you up to one month.
6. Select the map
7. AND choose the *type of mine* [[*where you will work*]].
8. WHEN you have chosen your mine,
9. go to the **tool shop**
10. AND buy the *tools* [[*you need to mine for gold*]].
11. AFTER you have everything [[*you need*]],
12. select To **goldfields**
13. AND get to work!

In contrast, the other common types of verbal elementary genres (Explanation, Report and history genres), deal with the construing of primary social science knowledge itself. As discussed in Section 2.1.1.2, these texts deal largely with events,

processes, objects and figures that constitute Australian social-cultural history. In this sense, they realise the field of primary social science and belong to *the instructional* register.

As a pedagogic discourse, MIs enable the projection of the instructional register through the regulative register. That is to say, the field of navigation activities projects that of primary social science. Simply put, primary social science knowledge is *recontextualised* in the digital discourse of MIs. If the genre perspective is concerned with how the two fields (navigation activities and primary social science) are construed in MIs, the Bernsteinian perspective opens up new research questions, that is,

- How the field of navigation activity projects the field of primary social science (multimodally) in MIs, and
- Are there any differences between two types of MIs (mission and product) and across MIs?

2.3.3 View from above: A short summary

In this section, I have examined the MIs through two theoretical frameworks, Genre Theory and Bernstein's theory of pedagogic discourse. More specifically, I have investigated the types of elementary verbal genres occurring in MIs and the macrostructures of MIs. I have demonstrated that there are two basic fields that can be identified in MIs—navigation activities and primary social science. Furthermore, I have introduced the concept of pedagogic discourse as a useful way to understand the relation between the two different fields, that is, the fields of navigation activities projects that of the primary social science.

By placing MIs in its broader social and educational context, I have mapped out the research direction for this new type of data. I have formulated several research questions during the process, including

- What are the types of fields of activities (navigation activities) in MIs and how do these different fields interact with each other?
- How do elementary verbal genres interact with images and other multimodal resources to construe the fields of knowledge (primary social science)?
- Do two types of MIs (mission-oriented & product-oriented) construe fields of activities (navigation activities) and knowledge differently? And if so, how fields are construed in different types of MIs?
- How does the field of navigation activity project the field of primary social science (multimodally) in MIs? Are there any differences between two types of MIs (mission and product) and across MIs?

Emerging from these questions are two main research directions:

- the multimodal construal of primary social science knowledge in MIs
- the recontextualisation of the field of primary social science knowledge in MIs

The pursuing of these research directions requires detailed analysis of local semiotic patterns. In the following section, I will explore the types of semiotic relations in MIs and the potential methods for capturing these patterns.

2.2 Hypermodality: View from around

The second perspective on MIs examines its nature as (hyper)text, exploring the meaning-making potential of and/or meaning making process in hypertext. More specifically, this perspective is concerned with two issues: 1) the types of semiotic or intersemiotic relations central to the understanding of MIs as pedagogic discourse

and 2) the type of descriptive framework adequate for capturing these semiotic relations in MIs. In this section, I address these two issues through the concept of hypermodality (Lemke, 2002b).

2.2.1 Hypermodality: An overview

Lemke (2002b) proposes the term hypermodality as a useful way to examine the nature of the hypermedia texts. Hypermodality, in his words, is “one way to name the new interactions of word-, image, and sound-based meaning in hypermedia”. “It is not simply that we juxtapose image, text and sound; we design multiple inter-connections among them, both potential and explicit” (Lemke, 2002b, p. 300). In essence, hypermodality is

... the conflation of **multimodality** and **hypertextuality**. Not only do we have linkages among text units of various scales, but we have linkages among text units, visual elements, and sound units. And these go beyond the default conventions of traditional multimodal genres (Lemke, 2002, p. 301, bold mine).

Lemke’s concept of hypermodality highlights the ‘content’ (i.e. meaning making) aspect of hypertext, at the same time acknowledging the impact of medium and technology. Its merit and relevance to the study of MIs can be summarised in two points. First, in recognising two basic types of semiotic relations—hypertextuality and multimodality, Lemke maps out two possible directions for analysing MIs: 1) the exploration of the semantics of hypertextuality or hypertext semantics, i.e. the semantic resources interconnecting hyperlinked text units on different scales, and 2) the description of the ways in which language, image, and other semiotic resources interact to make meaning. SF-MDA research on hypermedia texts (e.g. Djonov, 2005, 2007, 2008; Jones, 2006, 2007; Knox, 2009a, b, 2010; Kok, 2004; Zammit, 2007) so far has evolved more or less around the two themes identified by Lemke.

Furthermore, in exploring the idea of hypermodality, in particular hypertext semantics, Lemke demonstrates the potential of building a descriptive model based

on systemic functional linguistic theory. For instance, he points out the value of Genre Theory (following Martin 1992) and cohesion chains (Halliday & Hasan, 1976) in interpreting semantic interconnections between hyperlinks as well as their disadvantages in treating hierarchically organized information in hypertext. In short, he illustrates how and why particular SFL theoretical categories can be adapted in hypertext description.

In the remainder of this section, I examine MIs through the two types of relations identified by Lemke in sequence: hypertextuality and multimodality. I am particularly interested in two questions, the question of *what* and the question of *how*:

- 1) *What* types of semiotic relations are worth considering: i.e. whether the two types of relations, hypertextuality and multimodality are adequate and/or sufficient for understanding the nature of MIs semiotic artefacts and address the research questions proposed in the previous section.
- 2) *How* these semiotic relations can be accounted for: i.e. the ways in which the conceptualisation of hypertextuality and multimodality influences our choice in descriptive model and vice versa.

2.2.2 Hypertextuality and Multimedia Interactives (MIs)

2.2.2.1 Unit, scale and relation in hypertext semantics: A literature review

Lemke refers to hypertext semantics or hypertextuality as “the affordances of the hypertext medium for constructing meaning-relationships along traversals” (2002b, p. 306). Central to this definition are three key elements: 1) unit—the basic meaning-making or semantic unit, 2) scale—the number of units a traversal encompasses and the creation of texture (Halliday & Hasan, 1976) across the units that make a traversal an integrated text, and 3) relation—the types of relations linking two or more units along a traversal.

Lemke's (2002b, 2009, n.d.) own work on hypertext semantics uses *lexia* as the basic analytical unit. Lemke does not explicitly state the definition or the theoretical origin of the concept of *lexia*. Based on the use of the term in his work, however, it is reasonable to suggest that it originates from Barthes' notion of *lexia* as "units of reading" (1974, p.14) or text made up of segments of texts. A *lexia* in Lemke's work is equivalent to a webpage.

For Lemke, the main challenge for hypertext semantics is the scale of traversals, i.e. the numbers of units or *lexias* can be accounted for in the description of traversals. Lemke views this challenge as similar to the challenge of handling large-scale text semantics (e.g. Lemke, 1995, 2000b, 2003) in traditional text analysis. He proposes two SFL models—Genre Theory (following Martin, 1992) and cohesion (Halliday & Hasan, 1976) as the potential solutions for the issue. However, due to the "exploratory" (Lemke, 2002, p. 307) nature of his research, Lemke does not further explore the applicability of these models in hypertext description. Instead, he focuses his description on relations between two consecutive adjacent *lexias*.

Lemke proposes three types of relations between units along traversal: presentational (e.g. thematic formation, logical relations, rhetoric relations), orientational (e.g. exchange, evaluation) and organizational (e.g. structural relations, covariate chain elements). Within each type of relation, Lemke suggests the existing SFL systems on which the description can be built. For instance, in analysing NASA (U.S. National Aeronautics and Space Administration) homepage, he shows how modality (Halliday, 1994; Kress & Van Leeuwen, 2006 [1996]) can be used to construe the putative viewer's stance towards the information presented in different hyperlinks.

The challenges Lemke sets up for hypertext semantics have been taken up in several SF-MDA studies. The most comprehensive SFL-oriented work on hypertext semantics to date is Djonov's (2005, 2007, 2008) research on children's websites. Djonov takes the professional field of hypertext design as the starting point of her research, aiming to connect it with SFL theory. This technology-oriented perspective is reflected strongly in her work. For example, she builds her basic analytical unit—webpage—

around the notion of nodes (Rouet, Lenoven, Dillon, & Spiro, 1996), i.e. hyperlinked text chunks such as list of items, paragraphs, etc. Despite its origin in hypertext design, the unit of node/webpage in Djonov's work is comparable to Lemke's *lexia*. Drawing on Martin's (1992) descriptions of logico-semantic relations, Djonov develops an exhaustive systemic account of the types of relations between hyperlinked webpages.

The treatment of scale in Djonov's work, on the other hand, is reflected in her description of website hierarchy (hierarchy of periodicity) and hypertextual distance. The former deals with the hierarchical organisation of information on websites, while the latter accounts for the potentials of hyperlinks for revealing, obscuring or transcending the textual organisation of a website. Djonov's hypertextual analytical tools, in particular hypertextual distance (a notion inspired by Halliday & Hasan's work on distance between two phoric items in a cohesive tie, see Halliday & Hasan, 1976), could be potentially used for comparing texture (e.g. cohesion or generic scheme, etc) in traversals of different lengths, i.e. containing different numbers of basic units or *lexias*.

While most SF-MDA studies on hypertexts (Knox, 2009; Zhao, 2008) accept Lemke's assumption of the semantic nature of hyperlinks, some studies take a counterview. For instance, Kok (2004) argues that hypertext "is not a semiotic resource, but a platform the codeployment of different semiotic recourses" (p. 134). In his study of the Ministry of Education, Singapore homepage, Kok proposes a four-scale rank scheme¹ for dealing with units in hypertext, including (from lower to higher order) items (various semiotic elements), *lexia* (or webpage), cluster (a group of *lexias* created by hyperlinks) and web. For Kok, *lexia* is the basic meaning-processing unit in hypertext, and analysis deals mainly with the different metafunctional organisations at the level of *lexia*, and the intersemiotic relations between items in a *lexia*.

¹ Kok claims that these scales are different levels of abstraction, and are not necessarily related to each other by constituency (2004, p.133). On the other hand, he draws explicitly on Halliday's model of rank, which is essentially a constituency theory of compositional hierarchy. Furthermore, he treats the relation between the lower two ranks *lexia* and item as one of composition; a *lexia* is made up of items.

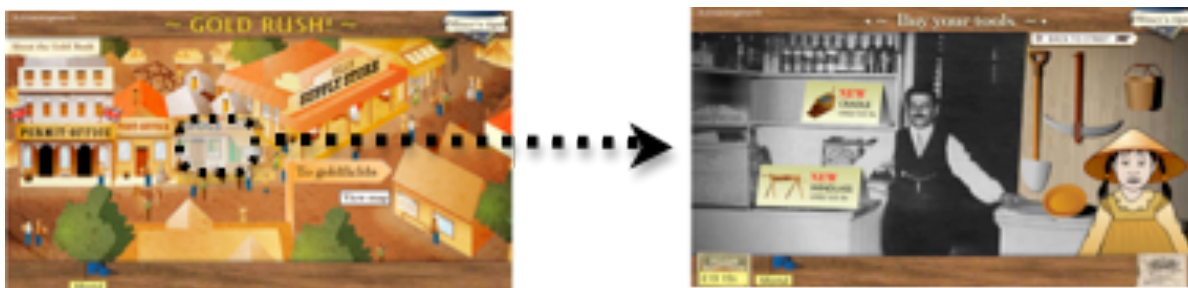
Kok's treatment of relations between two or more lexias, however, is somewhat ambiguous. On the one hand, his definition of cluster—"a number of connected lexias due to associations created via hyperlinks" (2004, p.135)—seems to suggest that lexias are linked arbitrarily through technology rather than through association of meaning, which fits with his rejection of the meaning-making nature of hypertext (cf. 2004, p.135-136). On the other hand, the rank-scale seems to entail a compositional relation between cluster and lexias (i.e. a cluster is made up of lexias just like clause is made up of groups and phrases), as well as semiotic relations between lexias, both syntagmatic (their position in a cluster) and paradigmatic (types of lexias).

The research reviewed so far has worked primarily with websites and their homepages. Despite their differences, the central concerns of these studies are nevertheless the same. One such concern regards the semantic status of hyperlinked units, that is, whether they are valid meaning units in analysis, and if so what linguistic units they are analogous to. A second concern is with the types of SFL descriptions, which can be adapted in modelling semantic relations in hypertext. In following section, I will explore the notion of hypertextuality in the context of MIs.

2.2.2.2 Multimedia Interactives (MIs): A case against hypertextuality?

I shall first make it clear that I concur with Lemke and Djonov in recognising the meaning potential of hyperlinks. That is, the association between two hyperlinked units can *potentially* be semantic relations in MIs. I have been able to observe several types of semantic relations between hyperlinked elements. A most straightforward example is from the tool shop in *Gold Rush!* (see Plate 2.3), specifically the relation between two hyperlinked nodes —'the image of the town' and 'the image of the shop' can potentially be treated as two items on a lexical chain and the relation between the two is that of composition (i.e. meronymy; see Martin, 1992).

Plate 2.3 *Gold Rush!*: The town of Ballard and the tool shop



My concern in this section, therefore, is not the validity of the concept of hypertextuality but its applicability in the context of this research. Simply put, my question here is whether existing approaches to hypertextuality are the most productive way of exploring traversals in MIs. There are two main motivations for my decision to pursue a different (but complementary) approach in this research.

First, MIs are essentially self-contained navigation spaces, unlike websites where it is possible for a user to traverse beyond the website via web external links (Djonov, 2005). That is to say, there's no possibility for the user to navigate beyond each individual MI.

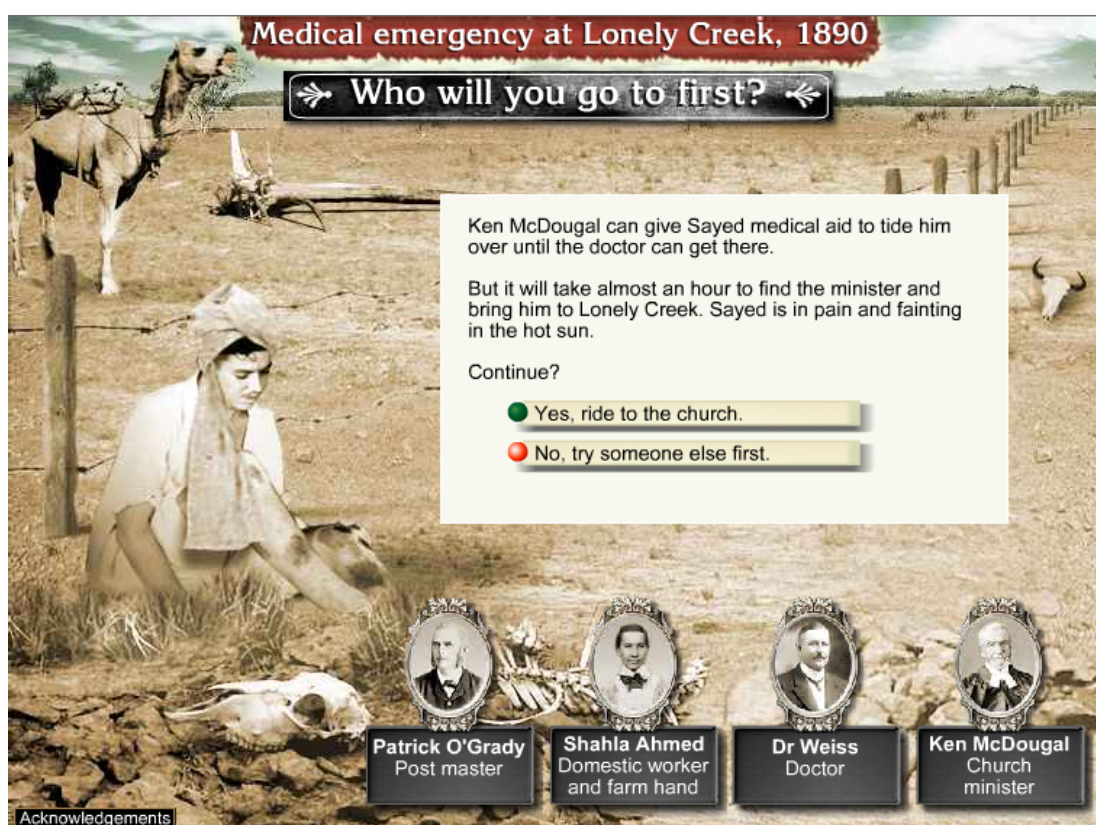
Plate 2.4 Three levels of hierarchy in *New Homes*



Additionally, there are limited possibilities for generating different traversals within a MI. MIs constrain a learner's navigation in two ways. 1) In product-oriented MIs, by

flattening the web-site hierarchy (Djonov, 2005). In *New Homes* (see Plate 2.4), for instance, there are only three levels in the hierarchy: menu, the personal page of each immigrant, and different periods in an immigrant's life history. 2) In mission-oriented MIs, by restricting the numbers of anchors on a page. In the example in Plate 2.5, the learner is only given two navigation options “*Yes, to ride to the church*”, and “*No, try someone else first*”. In this type of MI, an ‘ideal’ navigation path is usually dictated to the learner through a procedural text (see the discussion of procedure text in Section 2.1.1.2) in the Initiation Stage.

Plate 2.5 Medical Emergency at Lonely Creek: Where to go?



In short, unlike in websites, where different ‘textures’ are being created along different traversals, in the case of MIs, the process of navigation is essentially the process of discovering a ‘premeditated texture’.

The second reason for not pursuing hypertextuality in this research concerns the determination of basic analytical unit. The data Lemke and Djonov work with— websites and their homepages—fits with a page metaphor. The basic analytical unit

Lemke and Djonov use for hypertext description—webpage, therefore, can be treated at the same time as a technological unit (node) and a textual unit (lexia). To put it in another way, hyperlinks function both as semantic and technological links. Semantic units are thus mapped onto technological ones. In MIs, these mappings are less clear and consistent across various MIs, for MIs seem to work on a different type of metaphor—space. That is, our traversal in MIs is analogous to the movement in space rather than the turning of page, and I shall elaborate on this argument in Section 2.3.

In short, my exclusion of hyperterxtuality is an analytical decision rather than a theoretical choice. This is because the nature of MIs (the traversals allowed by them, and their 'space-like' nature) lends itself to a different kind of analysis of the semantic relations between hyperlinked items than that taken by Djonov (2005). Whereas Djonov, examining websites, essentially incorporates the relations between various semiotic recourses into the description of hypertextuality, I, examining MIs, account for the relations between hyperlinked items by treating them as multimodal relations. In other words, I have made a deliberate choice to focus my description on aspects that may help to address the two key research questions—the *multimodal* construal and recontextualisation of primary social science knowledge in MIs. In the following section, I shall explore the issue of multimodal relations or multimodality.

2.2.3 Multimodality and Multimedia Interactive (MIs)

2.2.3.1 Multimodality: Towards a working definition for intersemiosis

In the past few years, the definition of multimodality has become increasingly problematic for SF-MDA analysts. There have been many debates about the nature of semiotic mode (e.g. Bateman, 2008c; Martin, 2010) as well as ongoing attempts at clarifying the definition of 'mode', 'modality' and 'semiotic system' (e.g. Matthiessen, 2007; O'Halloran, 2005). The issues raised in these discussions are beyond the purpose and scope of this research. I follow in this thesis a narrow definition of multimodality as intersemiosis, concerning with the relations between different types of semiotic systems. In defining semiotic systems, I use Matthiessen's distinction between:

- 1) language
- 2) visual paralinguage, e.g. font, type face, layout
- 3) visual (pictorial) semiotic systems defining images of different kinds: drawings, paintings photographers, maps, graphs, charts, etc. (Matthiessen, 2007, p. 24-25)

In my description of MIs, I deal exclusively with 1) language and 3) visual pictorial systems or images.

In the remainder of this section, I will first provide an overview of major intersemiotic models proposed in SF-MDA. I will then discuss the common challenges facing the development of an integrated model for intersemiosis and the implications of these challenges for the description of MIs in this research.

2.2.3.2 Major intersemiotic models: A literature review

While the literature on hypertextuality is relatively limited, there has been a fruitful body of work examining the nature of intersemiotic interactions (e.g. Lemke, 2002b; Martinec & Salway 2005; Matthiessen, 2007; O'Halloran, 2005, 2008; Royce, 1998, 2007; Unsworth & Cléirigh, 2009). Table 2.3 provides an overview of the differences and similarities between major models. In the table, I provide a comparison between major models in regard to their treatments of three interrelated aspects: 1) stratification (see Chapter 3, Section, 3.1.1.1), 2) metafunction (see Chapter 3, Section 3.1.1.1), and 3) the availability of systematized descriptions (see Chapter 3, Section 3.1.2.1) and the informing SFL linguistic systems the descriptions draw on.

The core of an intersemiotic model consists of its view on *where* and *how* semiotic systems integrate. The question of *where* concerns stratification and metafunction, that is, in which stratum/strata and the metafunction(s) the intersemiotic integration occurs. The question of *how*, on the other hand, addresses the ways in which semiotic systems interact with one and another. A model's stance on this issue is typically

reflected in its choice of source SFL systems, i.e. which linguistic systems have been adapted in the description of intersemiosis.

Table 2.3 An overview of the major intersemiotic models

	Stratification		Metafunctional focus	Systemic descriptions	
	Number(s) of strata across semiotic systems	Strata/stratum in which integration occurs		Informing linguistic systems	Availability of systemic descriptions ¹
Lemke (2002)	NA	semantics	all three	e.g. speech function, logico-semantic relations, cohesion	NA
Matthiessen (2007)	language: 3 SSOLs: ¹ 2	semantics	ideational	rhetorical relation - RST	yes ⁵
Unsworth & Cléirigh (2009)	language: 3 SSOL: 2	semantics	ideational	identification	yes
O'Halloran (2005, 2008) ³	3	all strata	all three	e.g. transitivity, speech function, modality, logico-semantic relations, etc	partial
Martinec & Salway (2005)	NA	semantics	ideational	logico-semantic relations	yes
Royce (1998, 2007) ⁴	3	semantics	all three	e.g. lexical cohesion, modality	partial

1. For instance, the availability of system networks, paradigmatic choices, entry conditions and structural realization.

2. SSOLs is short for 'Semiotic system other than language'.

3. Matthiessen does not propose any modifications of original Rhetorical Structure Theory (RST) in his paper.

4. There have been some developments in O'Halloran & Royce's work over the years. The table presents a general summary of their model.

As Table 2.3 shows, stratification in intersemiotic models involves two key aspects.

1) *The numbers of strata a particular semiotic system consists of:* whereas O'Halloran (e.g. 2005) and Royce (e.g. 1998) extend the three-strata (semantics, grammar/lexico-grammar and expression) model of language to other semiotic systems, Matthiessen (2007) and Unsworth & Cléirigh (2009) consider lexico-grammar as a stratum unique to language. Lemke (2002b) and Martinec & Salway (2005), on the other hand, do not take up an explicit stance on this issue. 2) In which strata the intersemiotic interaction or integration occurs: there seems to be a consensus recognising semantics as the stratum that holds the main responsibility for coordinating semiotic resources of various types. Although O'Halloran's (2008) framework does include intersemiotic systems at the strata of grammar and the expression plane, the theoretical rationale behind this approach is not transparent.

Regarding metafunctions, there exist two general approaches. The metafunctional approaches (e.g. O'Halloran, 2008; Royce 2007) propose separate intersemiotic systems for each of the three metafunctions (ideational, interpersonal, and textual). O'Halloran (e.g. 2005, 2008), for instance, proposes the system of intersemiotic ideation (ideational metafunction) as a way to capture the activity sequences and relations across language and visuals, and the system of intersemiotic appraisal (interpersonal metafunction) for describing the evaluative resources across semiotic systems. The alternative approaches (e.g. Martinec & Salway, 2005, Matthiessen, 2007a) attempt to capture intersemiosis through one semantic system. Martinec & Salway (2005), for instance, capture the relations between image and text in new and old media through the system of status and logic-semantic relations. Matthiessen (2007), on the other hand, considers Rhetoric Structure Theory (RST) (Mann & Thompson, 1992) as a potential tool for investigating the relation between various semiotic systems on a multimodal page.

Table 2.3 also compares the major models with respect to the linguistic systems they have adapted from systemic functional linguistics. This choice is often a reflection of a model's understanding of the nature of intersemiosis. For example, Unsworth & Cléirigh (2009) draw on Halliday's description of relational clauses (Halliday & Matthiessen, 2004), and perceive the relation between verbiage and language as one of identification (i.e. Token-Value or abstraction). In contrast, Martinec & Salway (2005) build their descriptions on logic-semantic relations (following Halliday, 1994). In their view, the relation between image and language thus is analogical to that between two clauses.

In summary, the differences between major models lie in their conceptualization of SFL theoretical categories (Halliday, 2002 [1992]) such as stratification, metafunctions and paradigmatic systems, as well as their adaptation of descriptive categories, for example, Logico-semantic relations, Appraisal, etc. Despite these differences, the existing intersemiotic models share one common ambition—to provide consistent systemic (paradigmatic) accounts (cf. Matthiessen, 2007, p. 3-4). In the next section, I shall discuss the nature this challenge and the possibility of fulfilling this challenge in the context of my research.

2.2.3.3 Modelling intersemiotic relations in MIs: Challenges and solutions

To provide what Matthiessen (2007) calls a consistent systemic account of intersemiotic relations in MIs, I need a model—whether by adapting one of the existing models or building a new one—that is both comprehensive and accountable. A comprehensive description should offer a sufficient number of systems to account for different types of variables, e.g. metafunctional or registeral, as well as reasonable levels of delicacy within each system. An accountable description, on the other hand, should provide the specification of entry conditions, paradigmatic choices, syntagmatic realisations (cf. Fawcett, 1989; Martin, 1987) and its basic analytical unit (Zhao, 2010a, b).

The existing intersemiotic models tend to focus on comprehensiveness at expense of accountability or vice versa. For instance, O'Halloran's (e.g. 2005) model offers an exhaustive description of intersemiotic relations across strata and metafunctions. Each individual system, however, tends to include only one level of delicacy and paradigmatic choices are sometimes not specified. In contrast, Unsworth & Cléirigh (2009) map out various systemic choices within their system of IDENTIFICATION for verbiage and image. It is not clear, however, whether this one system of relations will be able to account for all types of ideational relations between language and image, since it is developed based on one particular register, primary science.

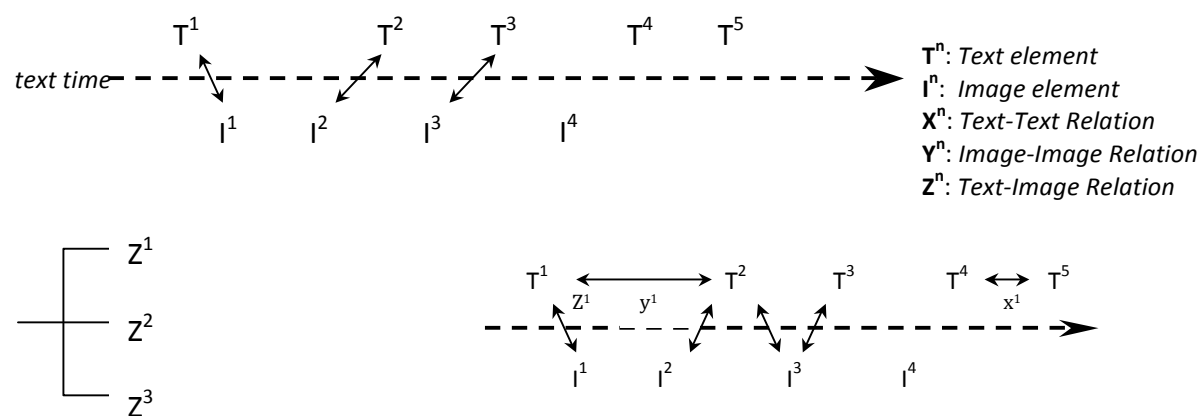
The trade-off between comprehensiveness and accountability is not a reflection on the quality of each individual model but the complexity and laborious nature of the 'perceived' task—the mapping of systemic relations between various semiotic systems. Here I highlight the word *perceived*, for the task is born of certain assumptions about the nature of intersemiosis. This particular view is best explained in Lemke's words (2002b, p. 303),

...when we combine text and images, each specific imagetext (Mitchell, 1994) is now one possible selection from the universes of all possible imagetexts, and that universe is the multiplicative product of the set of all possible linguistic texts and the set of all possible images.

Lemke's (cf. 1998, 2002b) thesis here is that intersemiosis is the combination of possibilities from different semiotic systems. To map out an intersemiotic system is, therefore, to map out all the possible combinations. To put it in another way, intersemiosis is a multiple of meaning potential, hence the multiplying of choices and/or systems.

Here, I have no intention to contest this particular notion of intersemiosis. My primary concern is the impossibility of taking up this task without making any theoretical or analytical concessions due to the qualitative nature of this research. It is also not clear to me which approach (comprehensiveness or accountability) will be more productive, that is, helpful in addressing the main research questions of the thesis.

Figure 2.5 Reinterpreting intersemiotic relations



1-a) Mapping paradigmatic relations

1-b) reinterpreting intersemiosis

My solution in this thesis is to explore a different aspect of intersemiotic relations. In my attempt to build a systemic description of MIs at an earlier stage of the research, it became noticeable that one set of intersemiotic relations is not only determined by its contrast to another set of intersemiotic relations, but also by its position in the logogenetic unfolding and its relation to the elements that come before and after them. In Figure 2.5, for example, we have Textⁿ and Imageⁿ, and the relation between them is represented as Zⁿ.

If we are to map Z^1 , Z^2 and Z^3 paradigmatically as in Figure 1-a, the challenge is to specify the motivating feature that distinguishes Z^1 from Z^2 and Z^3 . This task is far from straightforward, for Z^n is not a semiotic unit but a semiotic relation itself. The contrast between Z^1 and Z^2 is not as simple as the contrast between, for instance, the words *writing* and *typing*. In other words, from a paradigmatic perspective, intersemiosis is a relation of relations. To determine Z^n , therefore, we need to find some referential system, typically the language system in which T^n is located. But in using this linguistic system as reference point for determining Z^n , we are basically locating an image in the system of language. This creates a tension between our instinct that the relation between linguistic and visual meaning is *synergistic* (Lemke, 1998; Unsworth & Cléirigh, 2009), and the need to draw on the fixed linguistic system as our reference point in modelling (cf. Halliday & Matthiessen, 1999; Matthiessen 2007). To reconcile the two is one considerable challenge for the theorization of SF-MDA.

If we now take a step back, withholding our assumptions about the nature of intersemiosis, we can observe that all semiotic elements in Figure 1-b relate to each other through their position in the logogenetic unfolding of a text. That is to say, T^n or I^n acquires value in opposition to what precedes it, to what follows it or both. In this sense, the relations between texts and images (Z^n), the relations between texts (X^n) or the relations between images (Y^n) should be the same types of relation, since they are defined by the same values, i.e. by their position in the structure of the text. To a certain extent, this is comparable to a traditional syntagmatic approach to language.

In short, this complementary perspective on intersemiosis is interested in describing the combination of language and image in a text rather than mapping out the possible combinations between language and image. In other words, my description of MIs will focus on the relation between language and image as defined by their position in the unfolding of an instance. In this way, I shall be able to address the research questions of the thesis by examining the ways in which elementary verbal genres have 'gained new meanings' (if any) in multimodal environments. The task of developing this complementary model of intersemiosis will be taken up in Chapter 3

2.2.4 View from around: A short summary

I have started my discussion in this section with the concept of hypermodality, essentially a hypothesis of the nature of hypertext. I have examined in turn the two areas of hypermodality—hypertextuality and multimodality, by reviewing relevant literature in the respective areas. I have discussed the reason for excluding hypertextuality from the research as well as my motive for exploring a different type of intersemiotic relation. I have then present the case for pursuing intersemiosis from a structure oriented perspective.

The main point I want to put forward in this section is the interdependency between hypotheses of the nature of data and theoretical models. On the one hand, our hypotheses will impact on the descriptive models we choose. On the other, our theoretical predispositions will shape the way in which we view the data, as well as the angle of our observation. Whereas much existing MDA research tends to start by investigating the applicability of SFL linguistic tools, I place emphasis on the interpretation of the semiotic nature of data. And I shall continue with this task in the following section.

2.3 Digital hypermedia: View from below

The final perspective on hypertext approaches MIs from below, focusing on the media in which the hypertexts are embedded, i.e. the digital hypermedia. There are two interrelated aspects crucial to the interpretation of the nature of digital hypermedia. The first concerns the nature of the digital new medium and its relation to the older medium. The second aspect deals with the relation between semiotic potential and technological affordances in digital hypermedia. In this section, I provide a detailed discussion of the two aspects with respect to MIs and illustrate how our understanding of medium and technology will impact on hypertext description both in theory and in practice.

2.3.1 Beyond the page: Remediation and the digital hypermedia

2.3.1.1 Remediation: An overview

In this section, I explore the concept of remediation as proposed by Bolter and Grusin (1999). The notion of remediation essentially interprets the nature of digital new media through exploring its relations with older media formats. Through this method of comparison, I seek to establish a reference point for my description. That is to say, I am looking for here an appropriate ‘metaphor’ for MIs, that is, is it analogical to page or to screen, etc. And this metaphor will impact on various aspects of my analytical treatment of MIs in later stage of the research.

The notion of remediation originates from Bolter and Grusin’s influential work *Remediation: Understanding New Media* (1999). In their work Bolter and Grusin developed McLuhan’s notion that “the content of any medium is always another medium” (McLuhan, 1964, p. 8) and proposed the concept of *remediation*, defined as the “representation of one medium in another” (Bolter & Grusin, 1999, p. 45). Remediation, according to them, is “the defining characteristic of the digital new media” (p. 45). And the digital new media would appropriate “the techniques, forms and social significance of older forms of media to various degrees” (p. 65).

Bolter and Grusin (1999) proposed four different degrees of digital remediation. At one extreme, digital remediation sees the faithful reproduction of the content of an older medium in the digital format. An art exhibition, for example, can be digitally reproduced on a CD or DVD as a photo collection. A more common type of digital remediation is described by Bolter and Grusin as the “translucent borrowing” (1999, p. 46), in which the digital medium is presented as a similar yet ‘improved’ version of an older medium, promising features that are previously unavailable such as hyperlinks or search functions. For instance, most traditional publications, such as the *Monthly* magazine or *London Review of Books*, now offer an online edition in addition to the physical copy. Although the digital edition offers extra features such as search by contributor or hyperlinked online archive, the texts and images contents (both in terms of their ideational content and institutional context) are identical to those in the print format.

A third type of remediation takes a more aggressive form, in which the digital medium tries to refashion the older medium/media entirely, while “still marking the presence of the older media and therefore maintaining a sense of multiplicity or hypermediacy” (Bolter & Grusin, 1999, p. 46). Unlike the “translucent borrowing”, this type of digital remediation type creates a sense of “discontinuity” (p. 47) between old media and new digital media. A good example here would be the websites for specific TV programs, where the television medium is refashioned into an interactive digital one. For instance, the *Gruen Transfer*, a popular ABC (Australian Broadcasting Company) comedy show that examines the practices of advertising industry, runs a program website parallel to its 25-minute (approx.) show. The TV show consists four or five show segments, unfolding in a predictable sequence. Each segment addresses either a particular advertising practice (e.g. viral advertising) or a particular ‘genre’ of advertisement (e.g. beauty products), and the themes covered are usually topical to the time of broadcasting. On the program website, the original show is reorganized into hyperlinked sections based on (mainly but not exclusively) interactivity, e.g. if a section allows viewing only and/or viewer interactions, and what types of interactions are available. Two different TV show segments can be placed in the same page. Similarly, the same show segment can occur under different web sections. A web section typically combines a range of media formats (e.g. digitalized video clips, html documents, photographic images) through graphic interfaces. These graphic interfaces enable the viewers not only to watch the original segments from the show, but also interact with the show through discussion, role-playing (taking up the challenges set for the expert panellists on the show), or re-editing the TV clips, etc. While moving through these various media on the program website, the viewers are constantly aware of the old TV medium, at the same time engage with its content in a new context.

The fourth and most radical remediation is one in which the digital new media tries to ‘absorb’ the old media entirely so as to eliminate the sense of discontinuity between the old and the new media. Role-playing computer games, such as *Tomb Raider*, are the epitome this type of remediation. On the one hand, this particular genre promises a virtual reality that is ‘unmediated’ and ‘present’. On the other hand, it draws— acknowledged or unacknowledged—largely on the conventions (e.g.

narrative structures, camera angles) of the older medium such as television or film. Bolter and Grusin argue that despite of the radical nature of this type of remediation, the new digital medium will not efface the older medium, instead it “conceals its relationship to earlier media in the name of transparency” (1999, p. 49).

One key argument that has emerged from Bolter and Grusin’s (1999) discussion of remediation is that the new digital medium will not, as some theorists believe (Holtzman, 1997), transcend the older media, instead it “will function in a dialectic with earlier media” (Bolter & Grusin, 1999, p. 50). For Bolter and Grusin, a medium is defined by its ability to remediate. This notion of the dialectic relation between digital and traditional media offers a useful starting point for understanding various types of hypermedia data. In theory, by identifying the type of remediation that occurs, we should be able to recognize the earlier medium or media that engage(s) in this ‘dialectic’ relation with hypermedia. This medium could then serve as the basic reference point for our investigation. That is, we would be able to build our description of the new based on and/or in relation to our models for ‘the old’.

2.3.1.2 Hypermedia description in SF-MDA: The page metaphor

In SF-MDA research, two types of hypermedia have been extensively researched, one being website homepages (e.g. Djonov, 2005; Djonov, 2007, 2008; Knox, 2009a, b, Kok, 2004; 2010; Lemke, 2002b; O’Halloran & Baldry, forthcoming; Tan, 2010), and the other being CD-ROMs designed for learning (Jewitt, 2002; Jones, 2006, 2007; Unsworth, 1999; Zammit & Callow, 1999). In most of these studies², there exists, explicitly (e.g. Unsworth, 1999b; Jones, 2006) or implicitly, an underling assumption of a dialectic relation between digital hypermedia and print media. To put it in another way, the majority of this research has used print-based media as the point of

² Here, I do not include Jewitt’s research (2002), which deals with a specific form of digital literature (for extensive discussions on digital literature and interactive fiction in SF-MDA tradition, see Unsworth, 2006; Unsworth, Tomas, Simpson, & Asha, 2005). There seem to be two different stages of remediation in her data, first the novel is remediated from print to film. The digital media then combines the two different media through interactive interfaces. Jewitt in fact treated her data as screen-based rather than page-based medium.

origin in hypertext description. In a sense, page has been the dominant metaphor for understanding hypermedia in SF-MDA. The prevalence of the page metaphor is both justifiable and understandable: justifiable, for the two types of hypermedia data (home page and educational CD-ROMs) typically are the product of translucent borrowing; and understandable, since the page is what makes discourse analysts feel most at ease (Martin, 1994). In some cases, the analyst does make a deliberate decision to exclude the data that does not fit the page metaphor (e.g. Bateman, 2008a).

Embracing a page metaphor has profound implications for hypertext description. Firstly, it impacts on the choice of research focus. For instance, our research would be more likely to focus on function of hyperlinks, since we assume it is the fundamental feature that sets hypermedia apart from print. Secondly, it also shapes the way in which we interpret the relation between semiotic potential (potential for meaning making) and technological affordances (possibilities for interacting with the medium), a point I will elaborate on in Section 2.3.2.

Most importantly, the page metaphor dictates our choice of descriptive model. A preferred descriptive model for this particular metaphor will be a constituency-based one. For instance, the research on hypertextuality discussed in Section 2.2.2, works predominately with a page metaphor. In these studies (e.g. Lemke, 2002; Djonov, 2005), a 'webpage' (a unit imposed by digital medium) has been analogised to a page or a paragraph (units imposed by print medium). In this perspective, a webpage can be treated as a semantic unit, comparable to traditional linguistic units such as clause or clause complex, etc. In essence, research that works with a page metaphor treats the webpage or other hyperlinked items as an extension and/or variation of print texts, and extends the constituency-based model of written (print) text to hypertext description.

To understand the nature of MIs, therefore, I shall first ask if the page metaphor is valid and effective in this case. And if it does not hold, what other medium/media could potentially be used as the reference point for research. I will address these questions in the following section through the concept of remediation.

2.3.1.3 Remediation in Multimedia Interactives (MIs): Towards a space metaphor

In this section, I explore the types of remediation taking place in the MIs. My main aim is to identify the medium/media that the MIs have reproduced, borrowed, refashioned or absorbed. In this process, I hope to establish a point of reference for my description of MIs.

In the five MIs used in this research, two types of remediation can be identified, belonging both to the aggressive end of spectrum: 1) complete refashion (Section 2.3.1.1) in which the digital medium transforms an older medium while marking its presence, 2) absorption (Section 2.3.1.1), a type of radical remediation where the digital medium seeks to create an ‘unmediated’ virtual reality obscuring the influence of the older medium/media. Interestingly, these two types of remediation occur respectively in the two types of MIs—product-oriented (e.g. *New Homes*) and mission-oriented (e.g. *Gold Rush!*).

Plate 2.6 Remediation in product-oriented MIs

a. Interface with images and audio clip: *New Homes*

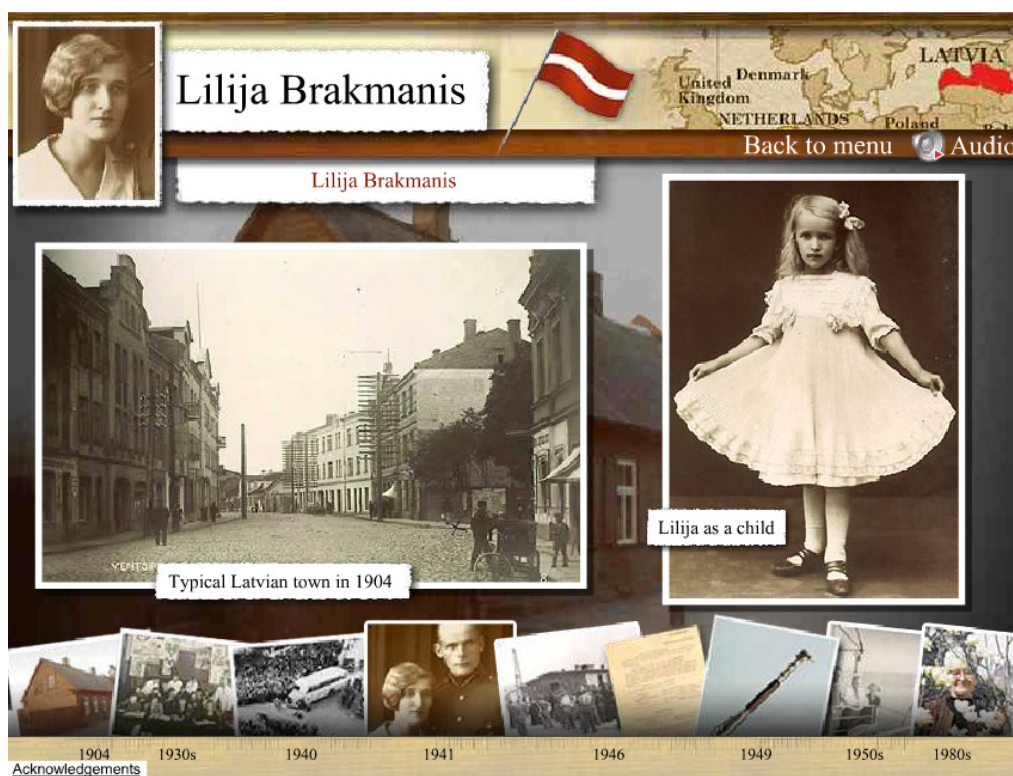
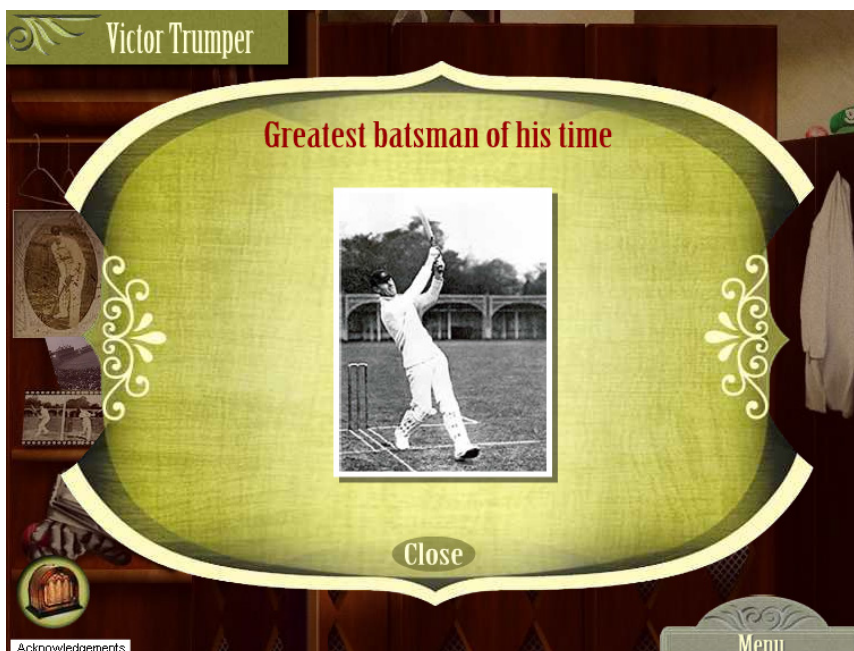
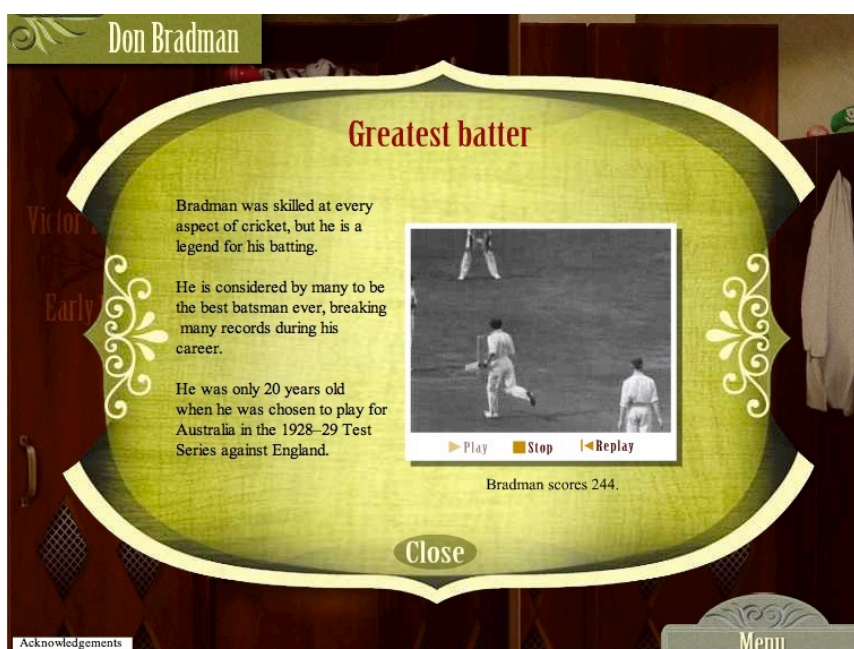


Plate 2.6 (continued) Remediation in product-oriented MIs

b. Interface with images and audio clip: The First Golden Age of Cricket



c. Interface with video clip: The First Golden Age of Cricket



A typical product-oriented MI combines a wide range of older forms of media into an interactive interface. *New Homes* (see Plate 2.6a), for instance, utilises predominantly photographic images and audio clip, while the *First Golden Age of Cricket* (see Plate 2.6b) includes a much wider range of media, such as video and news clipping, etc.

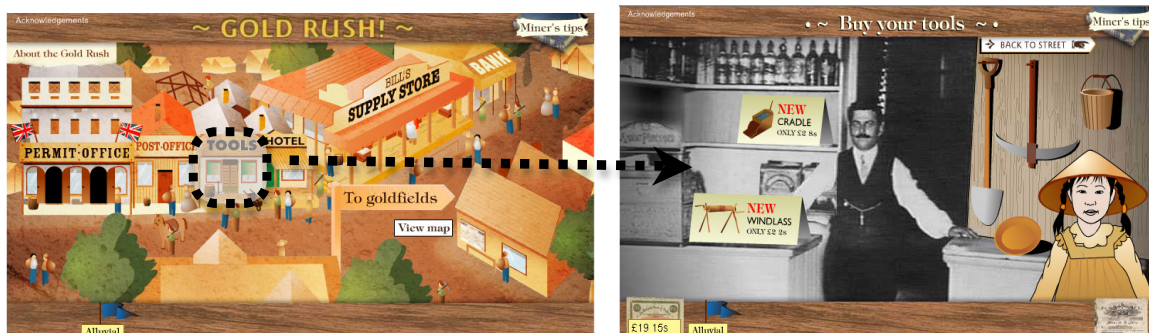
Within each interface, we would be able to actively select the media we want to engage with. For example, we can listen to audio information by clicking on the audio button (as in Plate 2.6a & b), or play the video (as in Plate 2.6c).

In the case of product-oriented MIs, there is the unambiguous presence of the medium of museum space. While navigating through the MIs, we are constantly reminded of the museum medium. At a superficial level, the media artefacts used have been sourced from the National Museum of Australia or other similar institutions (e.g. Melbourne Cricket Club Museum). These MIs also try to replicate, to some extent, the experience of a museum tour. For instance, on screen, the information is organised in a way that mimics a display panel in a museum exhibition, with various artefacts (e.g. photography, news cutting, etc) surrounded by verbal descriptions (either through audio or vision channel). The information in the audio clips is delivered in the authoritative tone of a museum guide. At the most fundamental level, the MIs reflect the core function of the museum as a social-cultural institution for public display and education (cf. Stenglin, 2004). In short, product-oriented MIs remediate the 3-D space medium of a museum into the digital interactive hypermedia. These MIs can potentially be mediated 'back' to multimedia interactive museum exhibitions since remediation occurs in both directions (cf. Bolter & Grusin, 1999).

In contrast, the digital remediation that takes place in mission-oriented MIs is similar to that of role-play game such as *Tomb Raider*. The main characteristic of this type of remediation is to create a virtual reality where the media experience for the user heightens the sense of present and immediacy. In *Gold Rush!*, for instance, we are invited to play the role of gold miner. The 'real' locations (e.g. street, shops, mines) are recreated in 2-D images accompanied by sounds effects (see Plate 2.7). A 'real' character, Ling, accompanies us throughout the game, telling us her family stories (e.g. "Hi I'm Ling. My father has come to Australia from China to find gold".), informing us of the history of gold mining in Australia (e.g. *Miners from around the world have brought their mining skills to the Australian goldfields*), as well as providing us guidance (e.g. "Most of the goldfields are a couple days of walk away, so you need to

make sure you have everything you need before setting out”). Our activities are described as if they are unfolding in real time (e.g. “We have arrived in Ballarat.”)

Plate 2.7 Remediation in mission-oriented MIs: *Gold Rush!*

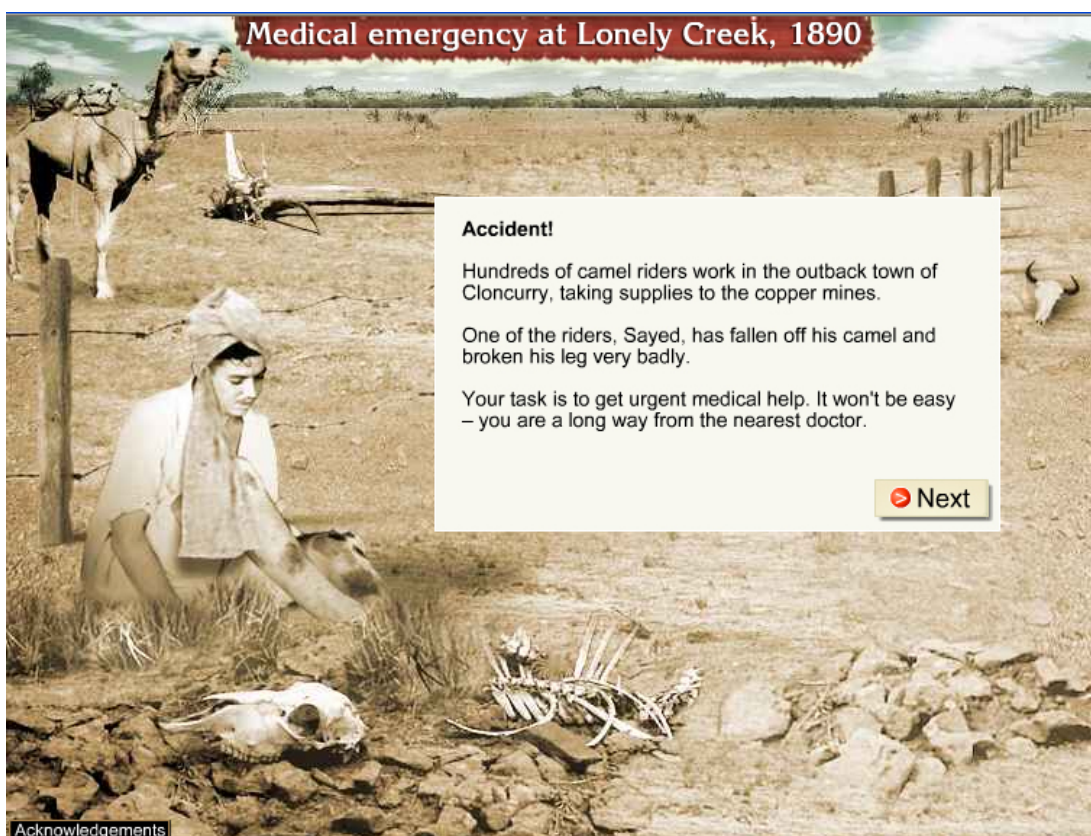


Although MIs are similar to role-playing computer games in terms of the process of remediation, the older being remediated in these two cases (i.e. MIs and role-playing computer games) is not necessarily the same. In virtual games, there are unambiguous traces of the film medium. This type of game, for instance, relies heavily on the plot devices of film. Take *Tomb Raider* for example; the series is built around various adventure stories of its main character Lara Croft—a role that the user plays throughout the game. The activities in the game are woven seamlessly into the narrative. There are also extensive uses of film camera angles in the game, e.g. subjective shot (where we see the world through Lara’s point of view) and objective shot (where we observe the world in which Lara dwells). It is, therefore, unsurprising that many of these games (e.g. *Prince of Persian*, *Tomb Raider*) have been ‘remediated’ into film.

In contrast, the traces of old media (and what types of old media) in MIs are less obvious, and it takes a few more steps to uncover them. Like the role-playing computer games, each mission-oriented MI also contains a story of some kind. In *Gold Rush!*, it is the ‘story’ of a miner’s life during the gold rush in Australia in 1865; while in *Medical Emergency at Lonely Creek* (see Plate 2.8, for overview of the game see Chapter 1 Section 1.3.2), it is the ‘story’ (in fact, two similar stories) of rescuing a rider named Sayed in the Queensland outback. However, these stories are set up to provide the background (where, when and who) for the tasks and activities in the

game rather than to provide an overarching narrative for it. That is to say, the activity sequence of the game does not correspond to the narrative sequence, nor does it advance the story telling. In *Gold Rush!*, for instance, a miner (us) can choose to wander randomly among the shops and offices on the street of Ballarat rather than following the advised sequence. This choice will delay us from completing the mission of the game; 'the story' being told is nevertheless the same one.

Plate 2.8 Remediation in mission-oriented MIs: *Medical Emergency at Lonely Creek*



Like in role-playing games, we also encounter a range of characters (e.g. Ling, Sayed) and move through various locations (Ballarat, Lonely Creek, tool shops, mine fields, etc.) in mission-oriented MIs. Through the multimedia interface, we are able to click on and manipulate (to some degree) the objects, and in some cases the game characters (e.g. Ling) talk to us directly. These characters, places and objects are always presented to us at a frontal angle on the screen, allowing us to view the virtual world and engage with the activities as a miner or a rescuer would.

Our sense of interaction with the MIs, however, is a 'false' one. On the one hand, we are invariably at the receiving end of the information. We, for instance, can not 'talk' back to Ling in the *Gold Rush!*, nor do we have control over her action. In this sense, Ling functions more like a museum guide (or teacher if from the perspective of pedagogic discourse) than a game avatar. On the other, the interactive features in MIs allow us to do little more than solicit information. By clicking on the anchors, we cannot bring out action or further interaction. In a sense, what we essentially interact with is the hypermedia technology rather than the hypermedia text.

Again using *Gold Rush!* as an illustration, clicking on the icon for Tool Shop (please refer to Plate 2.7) brings us into the space of the shop. In the shop, we can then click on different types of mining tools. Each time we interact with the MIs through clicking, we are presented with more information, and our interaction will not change any physical order of the shop space or the objects it contains. In this sense, the shop is not a setting in the mining 'story', rather a virtual 'container' for the 'information' on mining. In a similar vein, we are seeing the tool shop less from a miner's perspective, and more from a visitor's perspective viewing an exhibition space. To put it in another way, we are engaging with the mission-oriented MIs *as if* rather than *as* a miner or a rescuer.

In fact, many museum exhibitions for children employ a similar strategy to these mission-oriented MIs. In Australian Museum's exhibition *Who's the murder* (2006), for example, an exhibition on forensic science, the artefacts (e.g. finger printing devices) are organised according to their roles in different stages of forensic investigation. The children are invited to engage with the information through a process of detection.

To sum up, although on the surface level, mission-oriented MIs appear to be a type of role-playing game, there is little chance for 'genuine' interaction (e.g. creating an alternative narrative, manipulating of game figure or objects, etc) to be created with these MIs. It is reasonable to suggest that mission-oriented MIs grow essentially out of the museum medium. They can be seen mainly as a remediation of the space medium of a museum.

So far, I have examined the two types of remediation in the two types of MIs. I have shown that despite their differences, both types of MIs can be seen as engaging in a dialectic relation with the space medium of museum. I, therefore, propose space as the main metaphor for understanding MIs. This space metaphor will reflect in many key notions discussed in the later parts of this thesis. For now, I shall look the most immediate impact of this type of metaphor, that is, how it assists in understanding the nature of technology affordances in MIs.

2.3.2 Technology affordances and digital hypermedia: Anchors in MIs

2.3.2.1 Perspectives on technology affordances: An overview

In this section, I turn to the technology aspect of hypertext, focusing on hypermedia interactive elements in MIs—anchors (cf. Djonov, 2005). An anchor is a clickable area in hypertext that activates a hyperlink, which enables the user to move to a different page or frame, or open a new application (e.g. play a video clip). In MIs, anchors are always represented semiotically, i.e. in language, image or symbols. Using *Gold Rush!* (plate 2.9) as an example here, the image of a tool shop (Tools) in the screenshot on the left is an anchor. By clicking on it, we activate a hyperlink and enter the page of tool shop (the screenshot on the right). What I intend to explore in Section 2.3.2 is whether a semiotic unit like the image of the tool shop is a (ideational) meaning unit in the logogenetic unfolding of a MI. That is to say, how semiotic units used to represent a particular anchor may form certain types of ideational relation (e.g. a lexical chain, or identity chain) with other non-interactive semiotic units in the MIs or if its sole function is to represent the anchor.

Plate 2.9 Semantic statuses of anchors in MIs: *Gold Rush!*



The starting point for my discussion here is the concept of technology affordances. The term affordance has its theoretical origin in Gibson's (1979) work on perceptual psychology. In essence, affordances are properties of the world defined with respect to people's interaction with it (cf. Gaver, 1991, p. 80). In Gibson's original conceptualisation, there are three fundamental aspects to an affordance: it 1) exists relative to the action capabilities of a particular actor; 2) exists independent to the actor's ability to perceive it; 3) does not change as the needs and goals of the actor change. To illustrate Gibson's notion, let us imagine a small gap on a garden fence that is just big enough for a 5 year old to squeeze through. The gap provides the affordance of entrance for the child since he/she has the *ability* to pass through the fence. The same affordance, however, does not exist for an adult since he/she won't be able to squeeze through due to body size. Moreover, the entrance affordance exists regardless of the original (or more likely the lack of) purpose of the gap, or the child's ability to perceive the affordance, i.e. if the child understands that the gap can be used to enter the garden based on his/her previous experience or knowledge, etc.

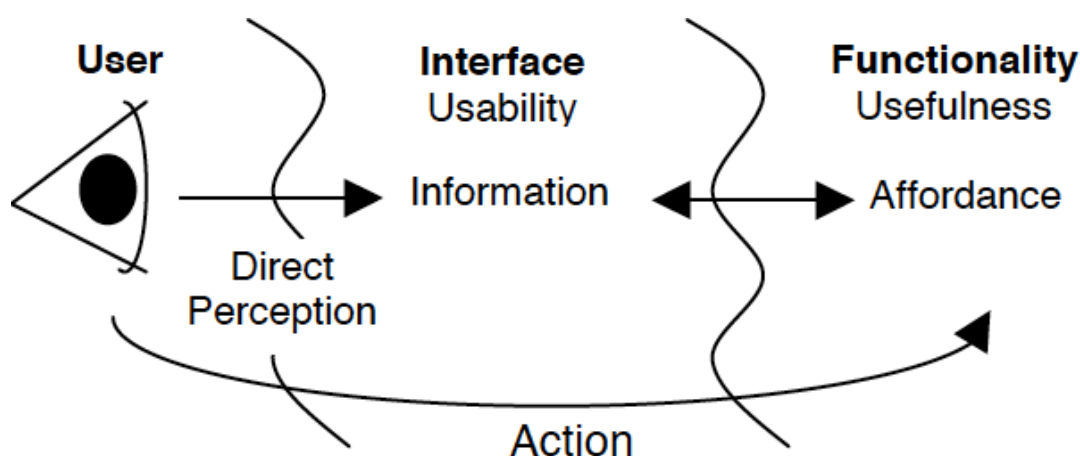
The notion of affordance was later popularised in the Human-Computer Interaction (HCI) design community mainly through the work of Donald Norman (e.g. Norman, 1988, 1999, 2007). Norman defines affordances as "the perceived and actual properties of the thing, primarily those fundamental properties that determine just how the thing could possibly be used" (1988, p. 9). Affordances provide "strong clues to the operations of things" (p. 9) and "suggest the range of possibilities" (p. 85).

It is important to note that Norman's definition of affordance has diverged (cf. 1988, p. 219) from Gibson's original conceptualisation. Firstly, for Gibson, affordances are an action possibility or offering, while in Norman's term, they are at the same time an action possibility and *the perceived suggestion* (of the possibilities for action). Moreover, Gibson defines affordance in relation to the *action ability* of a user, and an affordance is independent from the actor's cultural knowledge and experience or perceptual ability. Norman, in contrast, highlights the *mental* and *conceptual ability* of an actor, and an affordance thus is highly context-based—dependent on an actor's previous knowledge and experiences. Using the gap on the garden fence example here again, now imagine the gap is in an odd shape that does not represent any of the

regular types of entrance that a 5-year-old child could have possibly seen or used. In this case he/she is unlikely to conceive that it can be used for entering the garden. In this scenery, the gap is still an affordance according to Gibson, since the child is still physically able to pass through it. In Norman's definition, in contrast, the gap may not be an affordance since the child has not learned to interpret the existing information, namely that any gap in space can be used as an entrance regardless of its shape. Simply put, if the child could not perceive the possibility for entering the garden through the gap, the gap is not an affordance.

Within HCI design community, there is a mixed use of Gibson and Norman's concept of affordance. The differences between and the merits of (i.e. if they are useful for design practices) these two different ways of defining affordances have been extensively reviewed (cf. McGrenere & Ho, 2000). The topic is nevertheless beyond the scope of this thesis. For the purpose of this research, I need a definition that can be easily translated to a semiotic perspective. To be more precise, it will assist in identifying the semantic status of anchors in MIs. To achieve this goal, I shall work from a model for understanding technology affordances in software application (as opposed to physical objects such as the gap on the garden wall in the example given earlier) proposed by McGrenere and Ho (2000), which is reproduced in Figure 2.6.

Figure 2.6 McGrenere & Ho's model for technology affordances (2000, p.180)

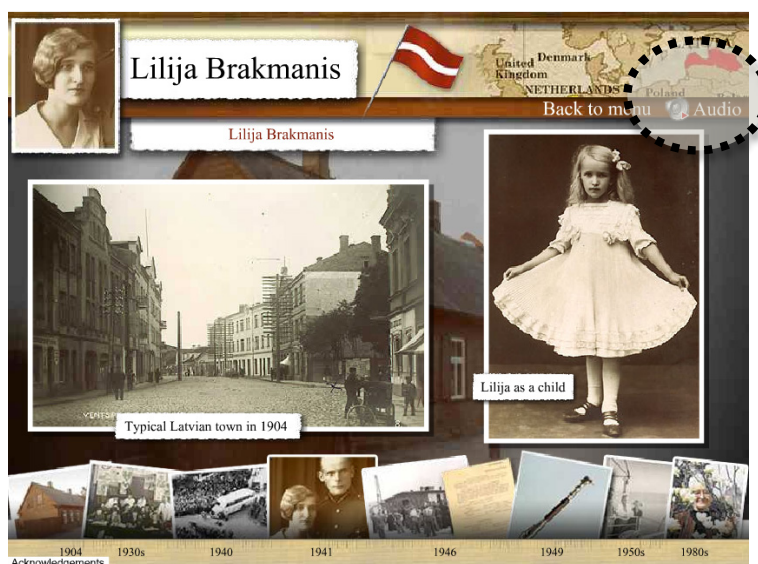


The main purpose of McGrenere and Ho's model is to offer a framework for designing Human Computer Interface (HCI), in particular software applications. For them, HCI

design involves two aspects: 1) designing the affordances; and 2) designing the *information* that specifies the affordances, an idea in debt to Gaver's (1991) work on affordances in software applications. In other words, it is the distinction between 1) usefulness (functionality, the possible actions a user can undertake, e.g.. text editing, clicking, strolling) and 2) usability (interface, how easy it is for the user to interact with a particular design object in order to perform the action). To illustrate the differences, I shall use respectively two screen snapshots from *New Homes* and *The First Golden Age of Cricket*, as shown in Plate 2.10.

Plate 2.10 Technology affordance in MIs: Interface with audio clip

a. Audio button in New Homes



b. Audio button in The First Golden Age of Cricket



On both screens, we can observe an audio anchor designed in the shape of speaker. In *New Homes*, the speaker is a modern one, with the word 'audio' placed next to it, while in *The First Golden age of Cricket*, the audio anchor is represented in the form of antique speaker. When we click on each audio anchor, we can listen to a short audio description of the photo(s) on the screen. Here, the modern and the antique speaker represent the difference in design of usability rather than functionality. That is to say, in both MIs, the affordances (i.e. the audio playing function) of the anchors are the same, while their usability could be potentially different. It is more likely³ that a user would recognise the affordance in *New Homes* for a range of reasons, e.g., it is represented in both language and image, and/or they are more familiar with the image of a modern speaker than an antique one, etc.

In essence, McGrenere and Ho's model is a synthesis of both Gibson and Norman's concept of affordance. On the one hand, their model follows Gibson in defining affordance as "possible actions" (or functions in software design). On the other, their model reworks, to some extent, Norman's (e.g. 1988, 1999) notion of affordance as "perceived suggestion" as "information that specifies affordance". For Norman, an affordance offers clues for the possibilities of actions (cf. 1988); while for McGrenere and Ho, it is the information (that specifies the affordance) that offers these clues. And affordance can exist regardless of correct interpretation of the information by the user. In other word, the affordance (or function) is independent from user's perception of it (cf. McGrenere & Ho, 2000, p.184-185).

In synthesising two perspectives (i.e. Gibson & Norman), McGrenere and Ho have also offered a model for affordance that is more readily translated into a text-based research such as this one. More specifically, the model provides a basic framework in which anchors in MIs can be examined from a semiotic perspective. To begin with, McGrenere and Ho recognise the 'objective' nature of affordance, i.e. it is not bound by an agent's perception or ability to perceive. In MIs, this entails that anchors can be

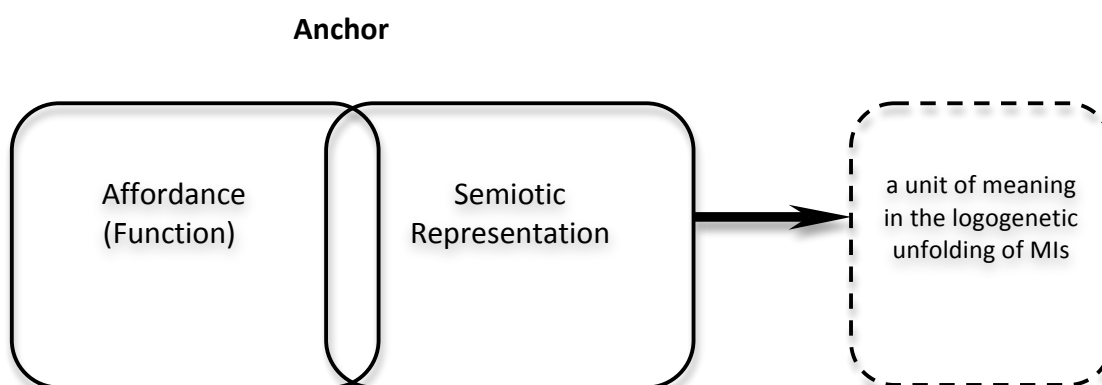
³ The usability of the two audio anchors is based purely on speculation; my purpose here is simply to illustrate the differences between usefulness and usability. The study of usability often requires the combination of a range of methods (e.g. Nielsen, 2000; Nielsen & Loranger, 2006; Nielsen & Pernice, 2010; Pearrow, 2000; Shum & McKnight, 1997), which is beyond the scope of the current research.

categorised based on the affordance (function) they provide. Once the basic categories of anchors are established, I can then examine in detail the information used to specify these affordances. In MIs, what McGrenere and Ho refer to as *information* is essentially the semiotic resources used to specify anchors, such as language (e.g. the word 'audio' in Plate 2.10a) or image and symbols (e.g. the two speakers in Plate 2.10 a & b). In the following section, I will attempt to build a model in which anchors in MIs can be examined.

2.3.2.2. Anchors in MIs: Affordances and semantic status

My aim in this section is to provide a characterisation of anchors in MIs from a semiotic perspective. I propose here a framework for understanding anchors in MIs, drawing on McGrenere and Ho's (2000) notion of affordance, as discussed in the previous section. Figure 2.7, offers an overview of the model. I shall state at onset that my model is an analytical rather than a theoretical one. That is to say, I seek to use this model to find out whether the semiotic representation of an anchor (i.e. a text or image unit) needs to be considered in the description of intersemiotic ideational patterns in the later stage of the research. I shall, however, not explore the semiotic nature of the anchor itself. For instance, I am *not* arguing for anchor as a connotative semiotic system (Hjelmslev, 1961), which takes other semiotic systems as its expression form, where the relation between the affordance of an anchor and its semiotic representation would be one of realisation. This type of theorisation is beyond the scope and the nature of the current research.

Figure 2.7 Anchors in MIs: Technology affordances and semiotic potentials



In my proposed model, an anchor consists of two aspects: 1) its affordance (or function)—the types of action it enables; 2) its semiotic presentations—verbiage, image or symbols. In classifying the functions of anchors, I shall return to the space metaphor established in Section 2.3.1.3. In the virtual space of MIs, all anchors can be seen as fulfilling two basic functions: 1) allowing us to move around various virtual spaces; and 2) enabling us to engage with different types of media artefacts within each space. I shall call the first function **Navigation** and the latter **Inspection**, and use them as the basic categories for classifying anchors in MIs.

Table 2.4 summarises the main types and subtypes of anchors in MIs, and these anchors are named after the kinds of affordances they provide. In the columns on the right, I examine semiotic representations of various categories of anchors, including 1) the types of semiotic systems used (language, image or both), 2) if the semiotic unit is a unit of meaning in the logogenetic unfolding of a MI, i.e. it forms semantic relations with non-interactive elements. Since *field* is the focus of my research, I shall focus primarily on the ideational relations.

Table 2.4 Major types of anchors in MIs: An overview









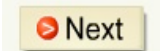

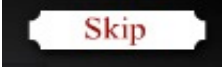

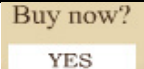
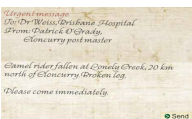
Affordance		Examples	Semiotic Representation	
			Semiotic system(s)	a logogenetic unit?
Navigation	Entrance	 GR: Tool Shop  Petronella Wensing New Home: Pentronella  Victor Trumper Early 1900s FGAOC: Trumper's locker  MEALC: Go to post office in Cloncurry	Language and/or image	Yes

Table 2.4 (continued) Major types of anchors in MIs: An overview

Affordance		Examples	Semiotic Representation	
			Semiotic system(s)	a logogenetic unit?
Navigation	Exit	 NH: back to menu  GR: shop exit	Language	No
	Viewing	 GR: Cradle  MOOTI: history of the object  FGAOC: Victor Trumper batting	Language, Image, and/or symbols	Yes
Navigation	Scroll	 EMALC: next page of description  MOOTI: to previous/next image	Language, and/or visual symbol	No
	Control	 GR: skipping animation  FGAOC: stop video playing	Language, Visual symbol	No






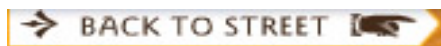
There is a third type of anchor in MIs, which I shall call **Semiotic Acts** (see Table 2.5). By clicking on this type of anchor, the user essentially completes an exchange of goods & services or information with MIs. I list these anchors as a separate category since they mainly facilitate interpersonal functions in MIs.

Table 2.5 Semiotic acts: An overview

Affordance	Examples	Semiotic Representation	
		Semiotic Systems	Semantic Status
Exchange Semiotic Services	 GR: purchasing tools  MEALC: sending telegraph	Language	moves: A1

Navigation

Table 2.6 Navigation anchors in MIs

Affordance	Examples	Semiotic Representation	
		Semiotic system(s)	a logogenetic unit?
Entrance: entering a virtual space	 <p>GR: Tool Shop</p>  <p>FGAOC: Trumper's locker</p>  <p>Petronella Wensing</p> <p>New Home: Petronella</p>  <p>MEALC: Go to post office in Cloncurry</p>	Language and/or image	Yes
Exit: exiting a virtual space	 <p>NH: back to menu</p>  <p>GR: shop exit</p>	Language	No

As shown in Table 2.6, **Navigation** anchors allow us to navigate through the virtual spaces in MIs. There are two basic types of navigation anchors: **Entrance** (entering a space) or **Exit** (leaving the space). In *Gold Rush!* (Plate 2.11a), for instance, we enter the 'real' tool shop by clicking on the 'tool shop' anchor on the screen, and then leave the shop by clicking on the anchor 'back to street'. Similarly, in *New Homes* (Plate, 2.11b), we can enter (clicking on Entrance anchor presented by the image of Petronella) and exit (clicking on Exist anchor 'back to menu') Petronella's personal space—the town of Tachwingen in the Netherland where she was born. Unlike in *Gold Rush!* where we feel as if we are entering a 'real' space, the space in this case is closer to an exhibition space in which the image of Tachwingen is used as the 'background' for displaying items, i.e. various photos and audio clips.

Plate 2.11 Navigation anchors: Entrance and Exit



a. Entering and Exiting: Gold Rush!



b. Entering and Exiting: New Homes

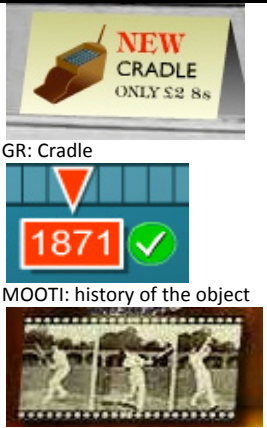
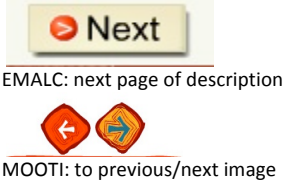

The Entrance anchors are represented in both image (e.g. the image of a tool shop in *Gold Rush!*, or the image of lockers in *The First Golden Age of Cricket*) and verbiage (e.g. ‘To the post master in Cloncurry to send for the doctor’ in *Medical Emergency at Lonely Creek*). The Exit anchors, on the other hand, are largely presented in language (e.g. ‘back to street’ in *Gold Rush!* or ‘back to menu’ in *New Homes*.)

The images and/or verbal units used to represent Entrance functions often form Ideational relations with other non-interactive elements in MIs. For instance, they can be elements in a ‘lexical string’. Taking *Gold Rush!* (see Plate 2.11a) as an example, the ‘tool shop’ forms a classification relation (Martin, 1992; Martin & Rose, 2007) with various commercial entities and government institutions in Ballarat, e.g. supply store, permit office, banks, hotel, etc. At the same time, the ‘tool shop’ is one part that makes up the town of Ballarat. Other elements in this composition relation (Martin 1992; Martin & Rose, 2007) include people, trees, shops and so on. Some semiotic elements in these lexical relations such as ‘supply store’ and ‘permit office’ are anchors like ‘tool shop’, while the other items like bank, hotel, and people on the street are non-interactive elements. The specific types of ideational patterns these semiotic units form with other units in the MIs will be discussed in detail in later chapters of the thesis (see Chapter 4 & Chapter 5).

In contrast, the verbiage used to represent Exit anchor does not form ideational relations with other non-interactive elements in MIs. In *Gold Rush!*, for instance, ‘back to street’ (see Plate 2.11a) is not linked ideationally with any other elements in MIs⁴. It has, therefore, ‘no meaning’ beyond signalling the affordance/function of the Exit anchor. In a sense, this type of anchor is analogical to reading a direction sign in museum exhibition, e.g. “*turn left to see Monet’s earlier works*” or “*exit the exhibition this way*”. When we see these signs in a museum, we carry out physical actions accordingly in order to move from one section of an exhibition to another. To navigate through virtual space of MIs, on the other hand, we click on anchors.

Inspection

Table 2.7 Inspection anchors in MIs

Affordance	Examples	Semiotic Representation	
		Semiotic system(s)	a logogenetic unit?
Viewing: <i>activate multimedia documents</i>	 <p>GR: Cradle MOOT: history of the object FGAOC: Victor Trumper batting</p>	Language, Image, and/or symbols	Yes
Scroll: <i>scroll text</i>	 <p>EMALC: next page of description MOOT: to previous/next image</p>	Language, and/or visual symbol	No
Control: <i>control multimedia applications</i>	 <p>GR: skipping animation FGAOC: stop video playing</p>	Language, Visual symbol	No

⁴ Although the ‘street’ in ‘back to street’ is related to the next page (the image of the street) ideationally, I focus here on Back to Street as one single meaning unit, which specifies the affordance of the anchor.

The second major category of anchor in MIs is **Inspection**, as shown in Table 2.7. Inspection anchors enable the user to engage with various multimedia artefacts within a certain space in MIs. Three subtypes of affordances/functions can be identified within this category: **Viewing** (activate multimedia documents), **Scroll** (scroll text) and **Control** (control multimedia applications).

Plate 2.12 Inspection anchors: Viewing

a. Gold Rush!: Cradle





Plate 2.12 (continued) Inspection anchors: Viewing

b. The First Golden Age of Cricket: MCG



Plate 2.12 (continued) Inspection anchors: Viewing

c. Mystery Object: Torres Strait Island

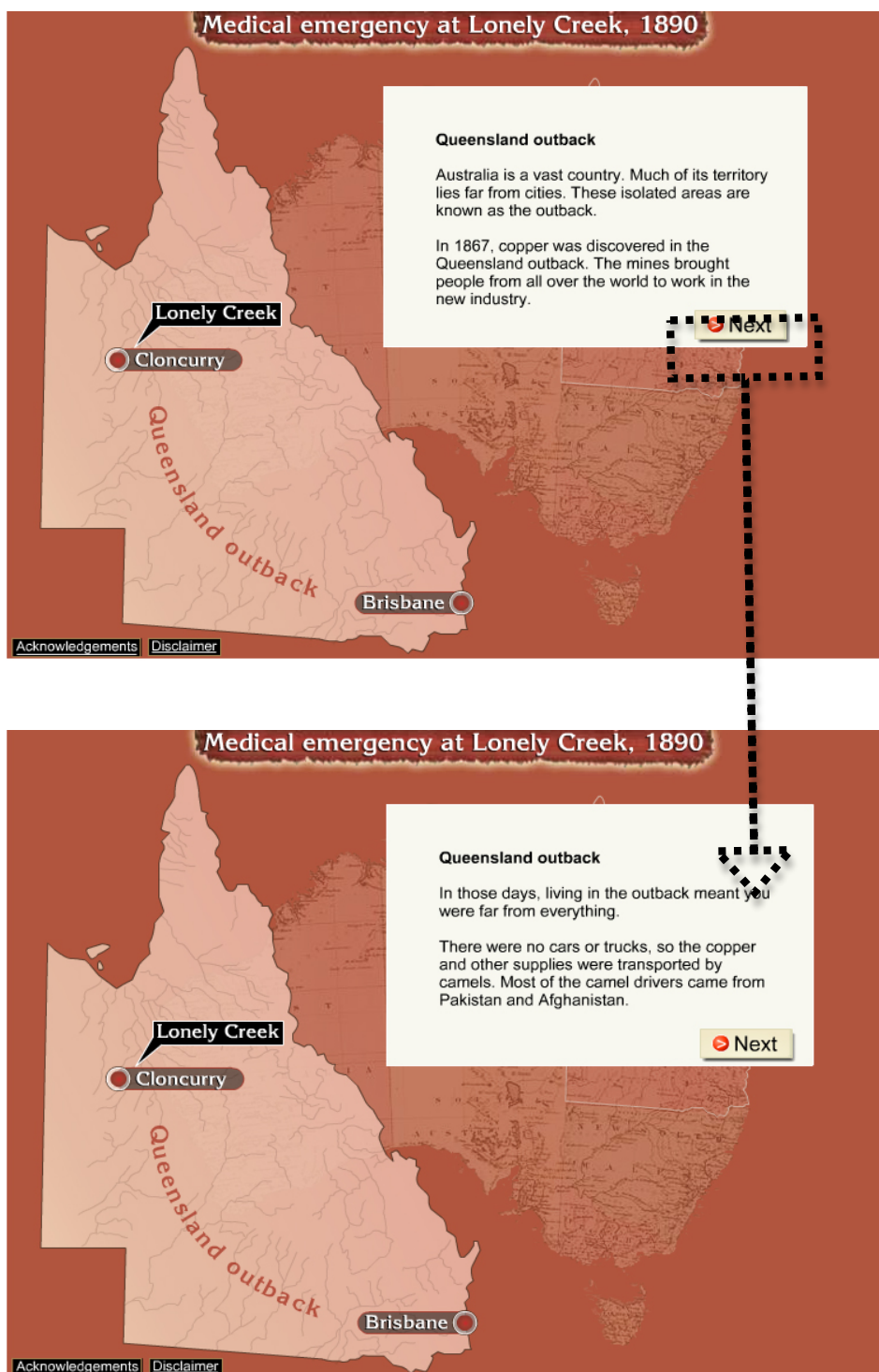
Mystery object: Torres Strait Islands	What could it be?	Where is it from?	When was it used?	How big is it?	A closer look	What could it be used for?	What is it?
Explore the timeline to find out more about the mystery object.							
<p>Mid-1800s: Pacific Islanders and pearl shell</p>  <p>Pearl diver</p> <p>Modern materials</p> <p>Torres Strait Islander music has been influenced by other cultures</p>				<ul style="list-style-type: none"> In the mid-1800s, large amounts of pearl shell were found in the Torres Strait Islands. Pacific Island, Malay and Japanese divers came to dive for the shell. Their songs, languages and dances influenced Torres Strait Islanders. Today, Torres Strait Islander objects can be made from modern materials such as plywood, fishing line, and even hose fittings. 			
 <p>Thousands of years ago ✓</p> <p>Mid-1800s ✓</p> <p>1871</p> <p>Today</p>							
Acknowledgements							

Viewing is the most common type of interactive function in MIs. This type of anchor allows us to read a verbal or multimodal text, listen to an audio clip or watch a video clip. For example, in *Gold Rush!*, in the tool shop when we click on the ‘cradle’ anchor, which is presented as a price tag for cradle on the shelves of the shop, we activate a new frame. In this frame, we can read a short description of the usage of cradle in gold mining (see Plate 2.12a). The Viewing anchors are usually represented by language (e.g. ‘cradle’ in *Gold Rush!*), image (the photo of MCG in *The First Golden Age of Cricket* in Plate 2.12b), and/or visual symbols (e.g. the scale symbolising historical timeline in *Mystery Object: Torres Strait Islands* Plate 2.12c).

As in the case of Navigation anchors, the semiotic units used to represent Viewing typically contribute to the logogenetic meaning making of MIs by forming certain types of (inter)semiotic relations with non-interactive units. For example, the cradle sign in *Gold Rush!* (Plate 2.12a) forms a classification relation with other types of mining tools (e.g. the bucket, the shovel, etc.) as well as a composition relation with

other elements in the shop (e.g. the owner, bottles on the wall, etc.). The time scale in *Mystery Object: Torres Strait Islands*, on the other hand, functions as a Hypertheme that predicts the thematic progression of the section. It is essentially a visualised ‘theme of time’ (Topical theme), which frequently occurs in history genres (cf. Coffin, 2006; Martin, 2003).

Plate 2.13 Scroll anchor



The last two types of anchors—**Scroll** and **Control**—enable us to ‘physically’ manipulate the multimedia objects we are engaging with. **Scroll** anchor allows us to control space-based information, such as text and image. Plate 2.13 presents an example of Scroll anchor, and it contains a screen snap shot taken from *Medical Emergency at Lonely Creek*.

In this example, a text box is placed to the top right of a map of Queensland outback (the image on the left). The main title of the text box is ‘Queensland Outback’. When we click on the ‘next’ button, we are presented with a new section (the screen snapshot at the bottom) of the information under the same title. By continuing clicking on ‘next’, we can read the text ‘Queensland Outback’ to the end. The Scroll anchors are often presented in language or/and visual symbol. These semiotic elements, however, have no meaning in the context of a particular MI beyond the affordance it specifies. To put it in another way, these anchors allow us to carry out action that is similar to turning a physical page, scrolling down the scrollbar in a Words window, or using the space metaphor here, turning our gaze to a different text panel in an exhibition. They do not, therefore, form semantic relations with other non-interactive units in the logogenetic unfolding of a MI.

A **Control** anchor is used for time-based information, such as animations, recordings of speech and film clips. The top image in Plate 2.14 is a screen snapshot taken from a short animation in *Gold Rush!* played before the user sets off for the mining trip. In this animation, we are introduced to Ling’s family history as well as some general background information of gold rush in Australia around 1865. We can choose not to play the animation by clicking on the ‘skip’ button on the top-right corner of the screen. As in the case of Scroll anchor, the semiotic recourses used to specify control function do not form any semantic relation with non-interactive elements in MIs. Although taking the form of on-screen clickable buttons, this type of anchor essentially allows us to perform the similar function as the physical buttons (play, stop or skip) on a DVD player.

Plate 2.14 Control anchor





Gold Rush!: Skipping Animation

Semiotic Acts

There exists a third type of anchor in MIs—**Semiotic Acts**, as shown in Table 2.8. This type of anchor enables the user to perform a certain type of exchange MI. It is called **Semiotic Acts** since what is being exchanged here is essentially semiotic goods-&-services (Ventola, 1987).

Table 2.8 Semiotic Acts

Affordance	Examples	Semiotic Representation	
		Semiotic Systems	A meaning unit?
Exchange Semiotic Goods	 <p>GR: purchasing tools</p>	Language	Yes
Exchange Semiotic Services	 <p>MEALC: sending telegraph</p>	Language	yes

In *Gold Rush!* (Plate 2.15a), for example, by clicking on ‘yes’, we can ‘purchase’ a mining permit (exchange of goods). In *Medical Emergency at Lonely Creek* (Plate 2.15b), on the other hand, we can perform a semiotic service by ‘sending’ a telegraph to the doctor in Brisbane.

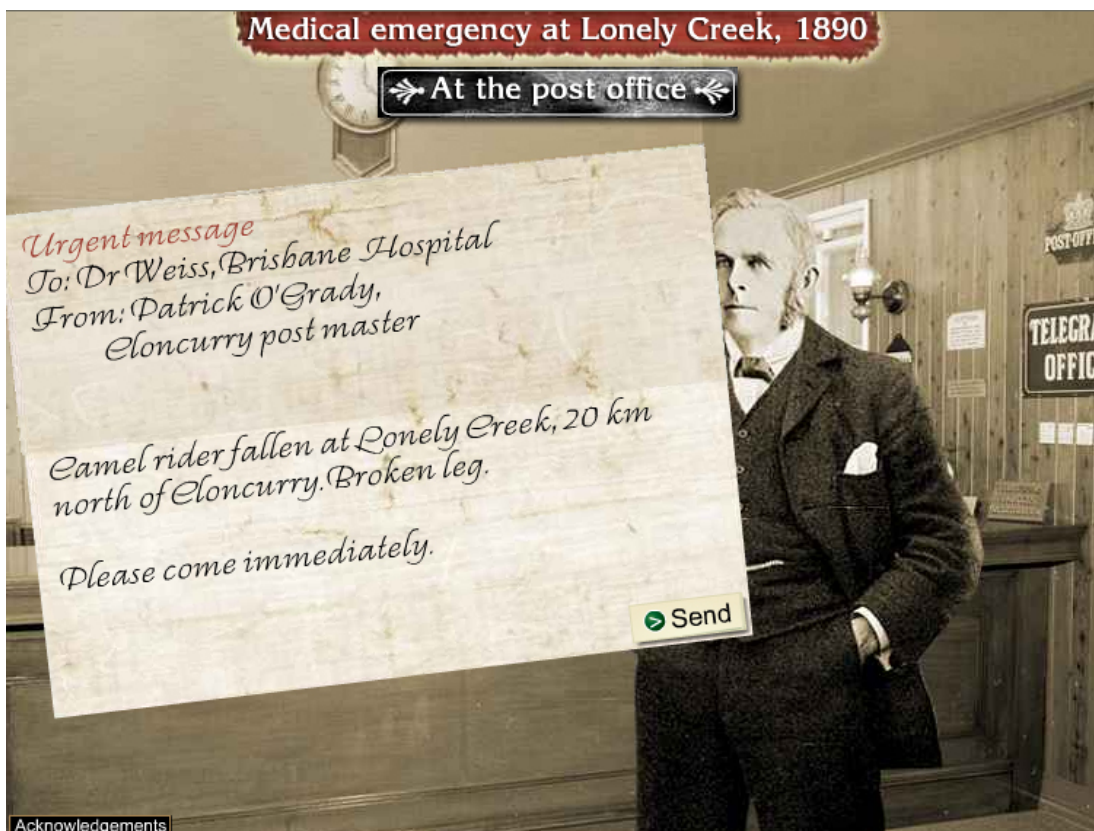
Plate 2.15 Semiotic Acts

a. *Gold Rush!*: Exchange of goods: Buying permit



Plate 2.15 (Continued) Semiotic Acts

b. Medical Emergency at Lonely Creek: Exchange of service: sending telegraph



Semiotic Acts anchors are always presented as verbiage. These verbal elements are essentially moves in exchange structures. In *Gold Rush!*, for instance, 'yes' can be analysed as a A1 (Primary actor: *who carries out the action*) Follow-up move to the question 'buy now?'. By clicking on this type of anchor, we fulfil our speech role and complete an exchange with MIs. However, it is interesting to note that the user cannot negotiate the speech role or the nature of the move in MIs. In this sense, the verbiage used to specify semiotic acts affordances contributes primarily to interpersonal meaning making in MIs.

So far I have discussed the two major—**Navigation (Entrance & Exit)** and **Inspection (Viewing, Scroll and Control)** - and one minor (**Semiotic Acts**) type of anchor in MIs, focusing on the semantic status of the semiotic elements that are used to represent these anchors. As I have mentioned in the beginning of the section, the main purpose of this exercise is to determine if the semiotic representation of a certain anchor forms semantic relations (mainly ideational) with non-interactive

elements in the logogenetic unfolding of a MI. My discussion has suggested that there is an observable trend across different types of anchors. While semiotic elements used to represent Viewing and Entrance anchors often form a certain type of ideational relation with other non-interactive elements, this does not necessarily hold true for other types of anchors (Scroll, Control and Exit). Verbiage used to represent the Semiotic Acts, on the other hand, constitutes a move in an exchange, thus realises primarily interpersonal meaning. In the description of intersemiotic ideational patterns in MIs in later stages of the research, I shall consider the semiotic units that are used to represent Viewing and Navigation, while setting aside those representing the other four types. Moreover, the process of classifying anchors has also assisted in observing the relations between the two nodes or units linked through hyperlinking affordances, and to some extent the type of registers (regulative or instructional) a particular affordance is enabling. This classification thus provides the basis for analysing intersemiotic ideational relations in later stages of the research.

2.3.3 View from below: A short summary

In this section, I have examined the MIs from the perspective of hypermedia, focusing on two aspects: medium and technology. The first aspect is concerned with the 'origin' of the digital hypermedia in which MIs are embedded. I have shown that these MIs can be seen essentially as the digital **remediation** of the space medium of museum. I have subsequently established **space** as the main metaphor to be used in this thesis for MIs, and this metaphor will impact various theoretical and analytical decisions to be made in this research. The second aspect deals with the hypermedia interactive technology. I have proposed a model for understanding the interactive elements—anchors—in MIs. The model offers a twofold definition for anchors, including its affordance/function and its semiotic representation. I have shown that some semiotic units used to represent anchors have semantic status in the logogenetic unfolding of MIs, while the others have no meaning-making function beyond the anchors they represent. Filtering out the latter type of semiotic units in MIs is critical for the description for semiotic and intersemiotic relations in later stages of the research.

2.4 MIs as multisemiotic pedagogic discourse: Implications for a SFL-based descriptive model

2.4.1 The three perspectives: A synopsis

In this Chapter, I have examined MIs through three different perspectives: 1) MIs as social discourse and process (the view from above); 2) MIs as multimodal artefacts (the view from around); and 3) the nature of the hypermedia MIs are embedded in (the view from below). The main purpose of this exercise is to show that although in a text-based research, the emphasis is inevitably placed on investigating the process of semiotic or intersemiotic relations and patterns, it is worthwhile taking a step back and ask some basic questions about the nature of the data under examination, for our theoretical predisposition tends to influence the way in which we form hypotheses about the nature of our data, the angle of our observation as well as the descriptive model we adopt.

The approach I have taken up in this chapter is essentially a top-down one. I have started the investigation of the nature of MIs by placing it in its broader social context. I have examined the basic types of elementary verbal genres and the macrostructures of MIs. In doing so, I have been able to identify two general fields MIs are agnate to—primary social science and hypermedia navigation activities. I have also recognised the nature of MIs as a type of pedagogic discourse that allows the projecting of an instructional register through a regulative one. In other words, the field of the primary social knowledge (instructional register) is recontextualised in the fields of the MIs (regulative register). Subsequently, I have mapped out the two research focuses for this research:

- the multimodal construal of primary social science knowledge in MIs
- the recontextualisation of the field of primary social science knowledge in MIs

To further pursue these research directions requires a detailed textual analysis. In the next step, therefore, I have moved onto textual level, focusing on the nature of MIs as multimodal texts. My aim has been to explore the types of semiotic relations in MIs

and the potential methods for capturing these patterns. I have centred my discussions around two much explored types of semiotic relation in SF-MDA: hypertext semantics (hypertextuality) and intersemiotic relations (multimodality). I have presented the reason for excluding hypertextuality from my research. I have also argued the case for a complementary perspective on the nature of intersemiotic relations in this research, in which the focus of the modelling is the forming of relations between various semiotic units in the unfolding in an instance rather than the potential combinations of choices from various semiotic systems. Finally, I have turned to the medium and technology aspects of MIs. I have established space as the reference point for understanding the nature of hypermedia in which MIs are embedded. I have also examined the semantic status of the semiotic units used to represent the interactive anchors in MIs, considering whether they form ideational relations with non-interactive elements in MIs. The preliminary analysis conducted here will be used as references for analysing intersemiotic patterns in MIs.

2.4.2 Implications for a SFL-based descriptive model

The most important point to emerge from the investigation conducted in this chapter is that MIs can be analysed as a type of pedagogic discourse, a multisemiotic text and a text presented in a space-like medium. In the following Chapter 3, I endeavour to develop a SFL informed descriptive model for analysing intersemiotic patterns in MIs that takes into account the unique nature of the data. The model shall also be able to help in addressing the two basic questions of this research 1) How is primary social science knowledge construed multimodally in MIs? 2) How primary social science knowledge is recontextualised in MIs.

More specifically, this model should provide:

- a method for recognising basic analytic units in hypertext
- an account for the ideational relations between various semiotic units formed in the unfolding of a MI

- an account for both context (construal of field) and text (intersemiotic ideational patterns)

Chapter 3 Intersemiotic relations as logogenetic patterns: towards a time-based SF-MDA model

3.0 Overview

In Chapter 2, I have mapped out two central research questions to be addressed in this research,

- How is primary social science knowledge construed multimodally in MIs?
- How is the field of knowledge recontextualised in the digital learning process of MIs?

In Chapter 3, I explore the possibility of developing a *descriptive* model for intersemiosis that will assist in answering these questions. The model I propose in this chapter is based on a reinterpretation of the nature of intersemiotic relations, the rationale for which has been discussed extensively in Chapter 2 (see Chapter 2 Section 2.2.3.3). In this complementary perspective, intersemiotic relations (more specifically, verbiage and image) are modelled as patterns formed during the logogenetic unfolding of a multimodal text rather than the systemic relations between semiotic resources of various kinds.

The theoretical underpinning for this logogenetic model for intersemiosis is that of systemic functional linguistic theory (Halliday & Matthiessen, 1999, 2004; Martin, 1992; Martin & Rose, 2007, 2008; Matthiessen, 1995). In particular, I incorporate into the model several key SFL notions, including stratification, metafunctions (with a focus on ideational), syntagm, instance and logogenesis. Based on these basic SFL parameters, I then introduce the concept of time as a modelling dimension (or axis). The time axis provides the reference point for determining analytical units and accounting for relations between semiotic variables. The motivation behind my theorisation and modelling strategies as well as the key aspects of the proposed model are discussed in detail in this chapter.

In developing the model, I also give emphasis to the dialogical relation between data and theory, in this case, multimodal texts and SFL (cf. Zhao, 2010b). I hope to demonstrate throughout the chapter that multimodal discourse analysis goes beyond the simple adaptation and modification of SFL categories. The engagement with multimodal texts will bring about “catastrophic change” (Halliday, 2002 [1992], p. 203) in our conceptualisation of SFL theoretical categories, our development of modelling techniques, and ultimately in our thinking about human semiosis.

Chapter 3 consists of four sections. Section 3.1 discusses major SFL theoretical categories, with a focus on stratification, metafunctions, syntagm and logogenesis. The aim of this section is to map out the existing SFL theoretical resources that can be utilised in the building of a logogenetic model for intersemiosis. Section 3.2 describes the logogenetic model, focusing on three concepts— time axis, logogenetic unit and logogenetic pattern. Section 3.3 illustrates the ways in which these descriptive categories have been applied in analyzing Multimodal Interactives (MIs) with a focus on the selection of basic analytic unit. The final section 3.4 provides a short summary of the theoretical arguments presented in this chapter.

3.1 Systemic functional linguistic theory and multimodal discourse analysis

In this section, I examine major theoretical parameters of SFL, including stratification, metafunctions, paradigm/syntagm and logogenesis (Halliday & Matthiessen, 1999, 2004; Martin, 1992; Martin & Rose, 2007, 2008; Matthiessen, 1995). In doing so, I seek to examine how and to what extent these basic SFL parameters can be used to build a logogenetic model. My discussion proceeds from the categories that will be directly integrated into the new model (e.g. stratification, instantiation and metafunctions) to those that require various degrees of reinterpretation and re-conceptualisation (e.g. syntagm and logogenesis). Another major SFL parameter—rank—will be discussed in relevant points throughout the section.

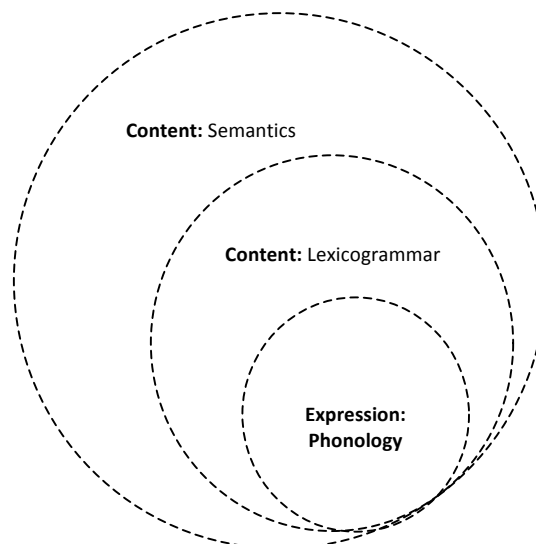
3.1.1 Stratification, Instantiation and Metafunctions

3.1.1.1 Stratification, Instantiation and Metafunctions: An overview

Stratification

SFL theory deploys a stratified model of language, first proposed by Hjelmslev. In *Prolegomena to a Theory of Language* (1961), Hjelmslev made the basic distinction between the content and the expression planes of sign systems. The content plane is concerned with the construal of meaning, the expression plane (phonology or graphology depending on the mode of the language, spoken or written) with the organization of the segmental and prosodic expression. Developing this idea, SFL further stratifies the content plane into 1) lexicogrammar, focusing on grammatical recourses of clauses and smaller units (phrases and groups, words and morphemes) and 2) semantics (Halliday & Matthiessen, 2004) or discourse-semantics (Martin & Rose, 2007), dealing with the linguistic resources for integrating clauses as text. This tri-stratal model of language is outlined in Figure 3.1.

Figure 3.1 A stratified model of language

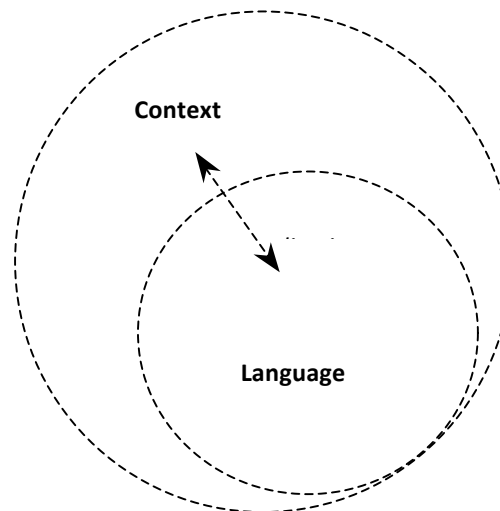


In the SFL model, the relation between each stratum is perceived as one of realisation. From content plane to expression plane, the higher stratum is in turn

realised by the lower one—discourse semantics is realised by lexicogrammar, which is realised by phonology/graphology. Lemke (1984,1995) describes this phenomenon as “metaredundancy”. Realisation does not, however, suggest an isomorphic relationship across strata. Some SFL linguists (Martin & Matthiessen, 1991) have observed that on the realisation cline, there is a tendency towards generalization - that is to say stratal descent always entails a generalization, and “this generalization is reflected in a relatively smaller number of realising systems” (p. 353).

Similarly, SFL theory treats the relation between language and social context as that of realisation, i.e. context is *realised* by language, or language *realises* social context (Figure 3.2). In Hjelmslev’s terms (1961), context is a connotative semiotic system—a semiotic system whose expression plane is constituted by another semiotic system, which uses language as its expression form.

Figure 3.2 Language and context: Connotative semiotics

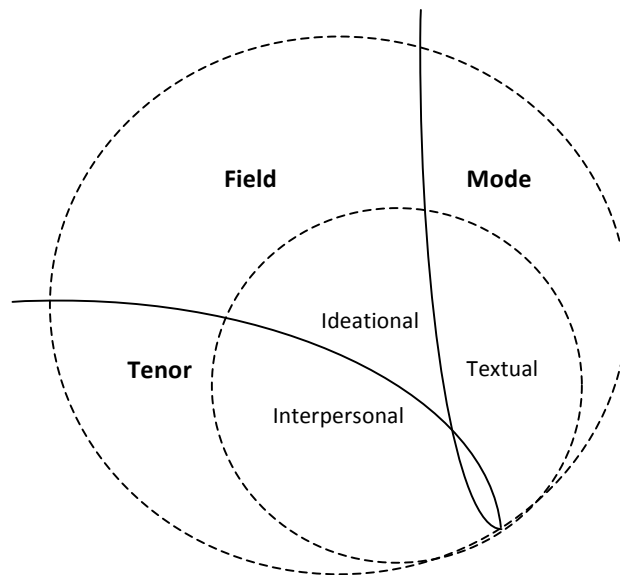


Metafunctions

A second notion key to the SFL model of language is metafunctions. The metafunction hypothesis suggests that language is organized along three lines of meaning, or metafunctions. The ideational metafunction, including experiential and logical subcomponents, is concerned with the construal of experience; the interpersonal

metafunction enacts personal and social relations; and the textual metafunction builds up the sequences of discourse, organizes the discursive flow - creating cohesion and continuity as it moves along.

Figure 3.3 Metafunctional diversification and contextual variables



This intrinsic (Martin, 1991) functional organization of language is projected on to context, generating three corresponding *contextual variables* (Figure 3.3):

Field: the social action: what is happening, the nature of the social action that is taking place: what is the participants are engaged in, in which the language figures as some essential component.

Tenor: the role structure, who is taking part, the nature of the participants, their statuses and roles: what kinds of role relationship obtain among the participants, including permanent and temporary relationships of one kind or another, both the types of speech role that they are taking on in the dialogue and the whole cluster of socially significant relationship in which they are involved.

Mode: the symbolic organization: what part language is playing, what is that the participants are expecting the language to do for them in the situation: they symbolic organization of the text, the status that it has, and its function in the context, including the channel (is spoken or written or combination of the two?) and also the rhetorical

modes, what is being achieved by the text in terms of such categories as persuasive, expository, didactic, and the like (Halliday & Hasan, 1985, p.12)

The modelling of contextual variables or context has been an ongoing challenging for systemic functional linguistic theory (Halliday, 1978; Halliday & Hasan, 1985; Matthiessen, 1993; Martin, 1992, 1999; Martin & Rose, 2007, 2008). The two dominant models for context in SFL so far have been the Register Model (Matthiessen, 1993; Halliday & Matthiessen, 1999, 2004;) and the Genre Model (Martin, 1992; Martin & Rose, 2008). To understand the differences between the two, I need to introduce a further theoretical parameter in SFL—instantiation.

Instantiation

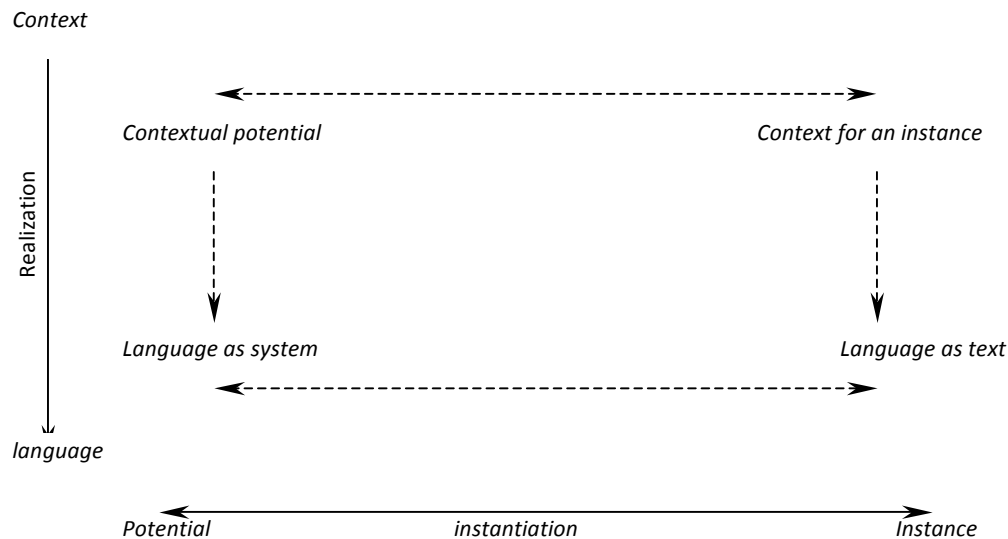
The cline of instantiation in SFL captures the relationship between potential and instance, between system and text. A classic analogy used for this is that of climate and weather:

...weather being the capricious flux we experience day to day, and climate the relatively comforting inertia we try to use to plan. Critically, weather and climate are not two different phenomena, rather they are the same phenomenon seen from different perspectives; climate is a generalization of weather patterns, while weather is an instance of climatic trends. Similarly, system is the generalized meaning potential (the climate) of language which 'instantiated' in the form of text (the weather) (Halliday, 2009[1992], p. 276).

Instantiation permeates through all strata on the realization cline—context, content (semantics and lexicogrammar) and expression. Simply put, all strata 'instantiate'. On the semantic stratum, for instance, instantiation involves the move from the semantic potential within a general system (e.g. APPRAISAL system) to the instantiated potential in a text (e.g. evaluative resources of a text).

Instantiation and realization (stratification) in SFL are often presented as two intersecting theoretical dimensions. Figure 3.4 offers a preliminary model for understanding the relation between the two parameters.

Figure 3.4 Instantiation and stratification matrix



In the matrix presented in Figure 3.4, I do not differentiate the two approaches—Register Model and Genre Model—to modeling context. The purpose of the matrix is to highlight the shared strategies for stratification and instantiation in the two models. In essence, both approaches treat the relation between context and language as one of realization, and recognize instantiation as the theoretical dimension that captures the relation between potential and instance in both language and context. Having outlined their similarities, I shall now turn to the differences between these two models of context.

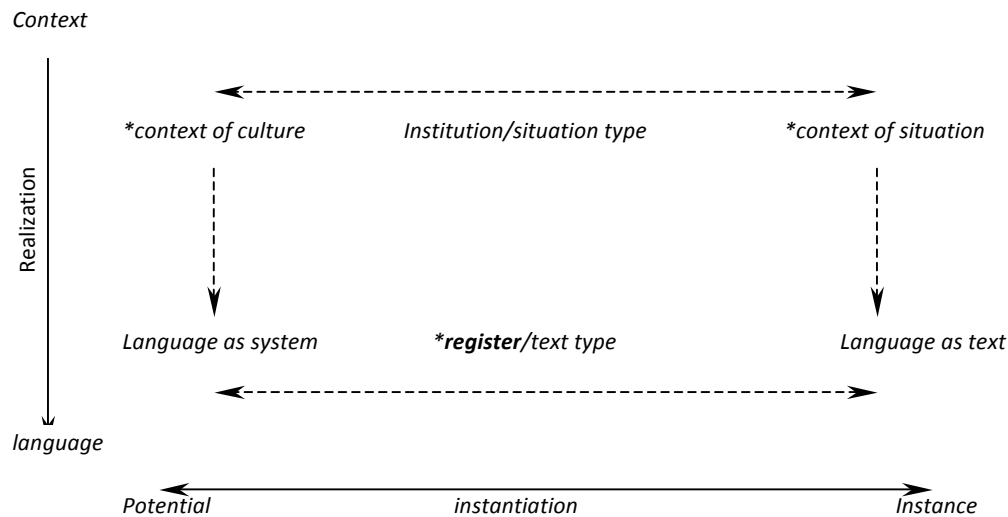
3.1.1.2 Modelling context in SFL: Two approaches

The difference between the two models originates from the different stratification and instantiation strategies each model deploys. To illustrate this difference, I use the matrix in Figure 3.4 as the basis and map onto it the key elements from each model.

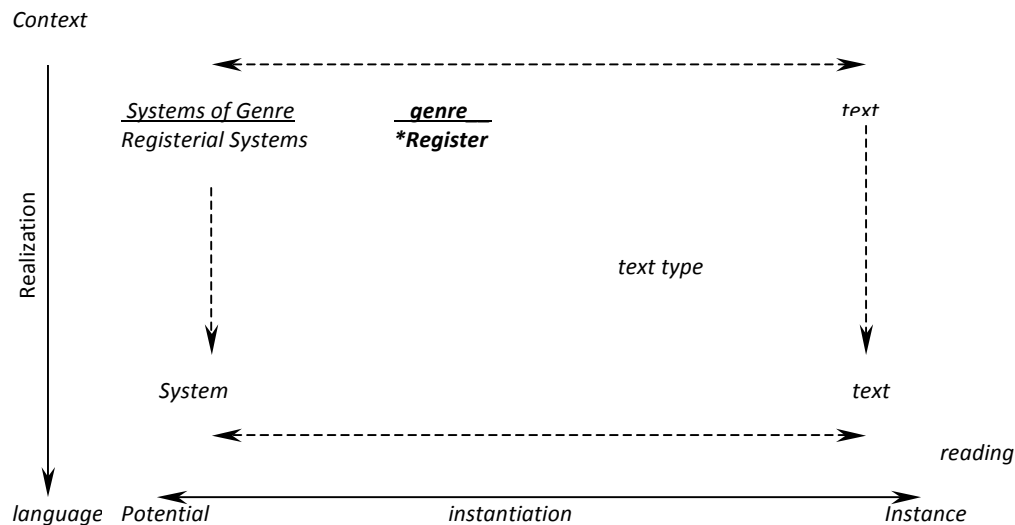
Figure 3.5a and Figure 3.5b offers respectively an overview of the Register Model and the Genre model in terms of their strategies for stratification and instantiation.

Figure 3.5 Register Model and Genre Model: A comparison in stratification and instantiation strategies

a. Register Model (based on Halliday & Matthiessen, 1999, 2004; Matthiessen, 2005)



b. Genre Model¹ (based on Martin & White 2005; Martin, 2008, 2010)



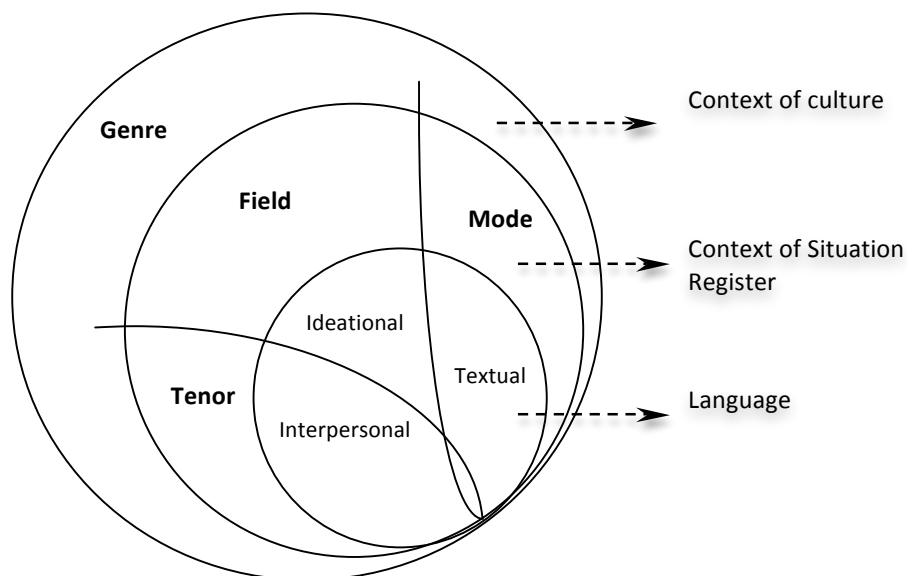
Note: * There are three overlapping terms in the two models: register, context of culture and context of situation. As I will discuss in this section, these are NOT theoretically equivalent terms. To differentiate the uses of the same wording in the two models, I use capital for initials in these terms if they are from the Genre Model (e.g. Register, Context of situation, Context of culture) and I use this labelling practice throughout the section. Please also note, genre is not a theoretical term in the register model, but a 'folk' term used interchangeably with text types.

¹ In fact, the Genre Model cannot be entirely mapped onto the matrix. The difficulty occurring here reflects the theoretical tension in modelling context and instantiation in SFL. I nevertheless use the same matrix here to assist the discussion in this section.

Differences in stratification

The first major difference between the two models concerns the different stratification strategy for context plane. Whereas the Register Model treats the context plane as one single stratum, the Genre Model (see Figure 3.6) further stratifies the context plane into 1) Context of culture and 2) Context of situation. On the realisation cline, Context of situation, known as Register, comprises the three contextual variables—field, tenor and mode. Context of culture, referred to as genre, accounts for the configuration of registeral variables in different stages through the unfolding of a text. Genre is a level of abstraction above and beyond metafunctions.

3.6 Genre Model: Stratified content

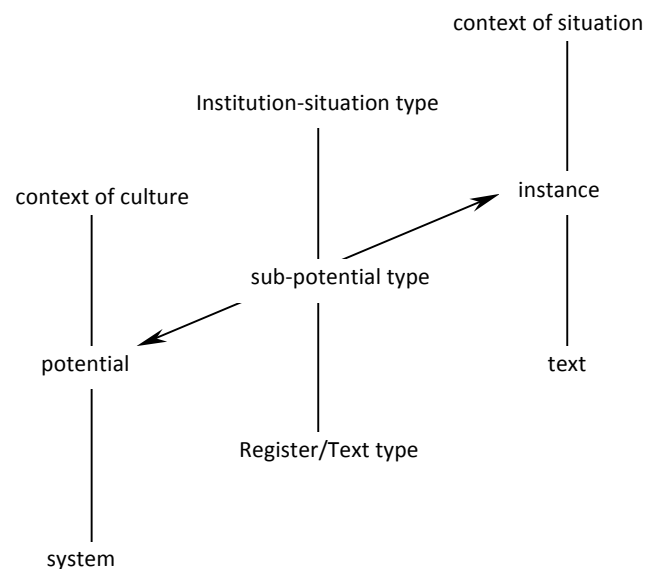


Differences in instantiation

A second difference between the two models consists in the ways in which the cline of instantiation is modelled. In the Register Model, while the cline of instantiation and realisation are presented as two intersecting dimensions, they are fundamentally independent parameters, as presented in Figure 3.7. In Figure 3.7, if we foreground the instantiation cline, we can observe the relation between potential and instance at any given stratum. In the context plane, context of culture (potential) and context of

situation (instance) occupies the two poles of the instantiation cline; with institution/situation type somewhere around the cline, representing the sub-potentials. Within language itself (content & expression), system is the underlying potential of a language, which is ‘instantiated’ in forms of text. Between the two poles, there are intermediate patterns, known as register or text type. At every point on the instantiation cline (e.g. situation type-text type), variables of context correlate with the metafunctions of language, field with ideational, tenor with interpersonal, and mode with textual.

Figure 3.7 Register Model: Instantiation/Stratification matrix (Halliday & Matthiessen, 2004, p. 28)

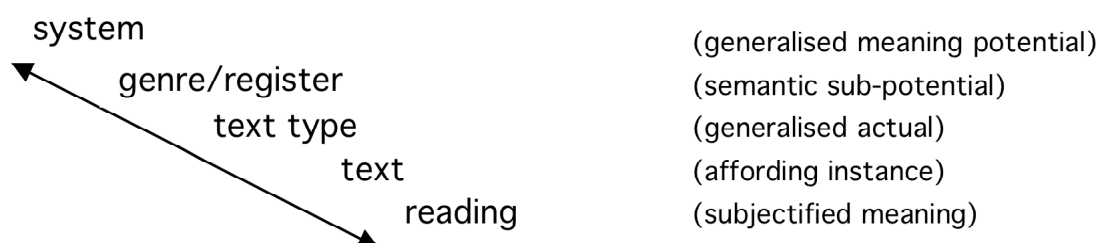


It is important to point out that register and text type in this model are not two different locations on the instantiation cline but different interpretations of the same phenomenon. If we start our observation from the instance end of the pole, we observe patterns shared by instances, referred to as a text type. If we change the starting point of our observation to the system end of the cline, we treat these intermediate patterns as sub-systems, or register. Register (cf. Halliday, 1978) here refers to the functional variety of language (in contrast to contextual variables in the Genre Model)—the patterns of instantiation of the overall system associated with a given type of context (i.e. situation type) (Halliday & Matthiessen, 2004, p. 27).

The patterns along the cline of instantiation are largely modelled through statistical *probability* (Halliday & James, 1993; Matthiessen, 1999, 2006; Nesbitt & Plum, 1987), globally expressed as systemic probabilities, and locally expressed as frequencies in text. In between potential and instance, “systemic profiles” (Matthiessen 2006, p.104) can be built at various points on the cline. A register, for instance, can be presented as a particular setting of systemic probability. Using a single spoken interview, a collection of spoken interviews, spoken texts and spoken/written texts, Matthiessen (2006) has demonstrated the ways in which frequencies can illustrate patterning along the cline of instantiation.

In the Genre Model, in contrast, although instantiation is treated as a theoretical dimension independent from realisation, there is an observable degree of overlapping between the two clines. To illustrate my point, I shall focus on two key concepts in the model—Register and genre. Register and genre have positions in both the realisation and instantiation cline in the model. On the realisation cline, Register or context of situation, consists of three contextual variables (field, mode, tenor). It occupies the lower level of abstraction in the content plane, realising the level above— context of culture (genre). On the instantiation cline (see Figure 3.8), however, Register and genre are considered as of the same level of generality or sub-potentially (cf. Martin, 2010). They are, therefore, positioned on the same point on the cline of instantiation, one notch down from the system. Further down on the same cline, text type, text and reading (individual reading of an instance) are also included.


Figure 3.8 Genre Model: Instantiation strategy (Martin & White, 2005 p. 25)



This particular model of instantiation has been adopted by Martin and White (2005) in the study of linguistic resources for construing evaluative meanings in media discourse. Martin and White’s account of evaluative patterns along the cline of

instantiation is summarised in Table 3.1. On this cline, the potential for language making evaluative meaning is the APPRAISAL system (an interpersonal semantic system). Variations of the general meaning potential associated with a particular type of voice—the commentator, the correspondent or the reporter—are evaluative registers, referred to as key. Within a given key, patterns of evaluative meaning associated with different styles of authorial voices are called stance (text type). In an instance of text, there are patterns of evaluative meanings, which can then be reacted to through resistant, compliant and tactical readings.

Table 3.1 APPRAISAL: Evaluative patterns along the lines of instantiation (Martin & White, 2005, p.163)

	<p>1. appraisal (system)</p> <p>- the global potential of the language for making evaluative meanings, e.g. for activating positive/negative viewpoints, graduating force/focus, negotiating intersubjective stance</p>
	<p>2. key (register)</p> <p>- situational variants or sub-selections of the global evaluative meaning making potential – typically reconfiguration of the probabilities for the occurrence of particular evaluative meaning-making options or for the co-occurrence of options</p>
	<p>3. stance (text-type)</p> <p>- sub-selections of evaluative options within text; patterns of use of evaluative options within a given ‘key’ associated with particular rhetorical objectives and the construction of authorial personae</p>
	<p>4. evaluation (instance)</p> <p>- instantiation of evaluative options in text</p>
	<p>5. reaction (reading)</p> <p>- the take-up of evaluative meanings in a text according to the listener/reader’s subjectively determined reading position; the attitudinal positions activated by the reader as a result of their interaction with the text</p>

As Martin (cf. 2010) has pointed out, this model of instantiation is continuously evolving and requires considerable amount of theorisation. It is, for instance, not clear whether terms such as register, key, stance, and evaluation refer to textual patterns (i.e. patterns of language) associated with a set of contextual values or they

are in fact the correlation relations between textual and contextual variables. In the former case, a different set of terminology for corresponding contextual patterns on the instantiation cline would be needed. In the latter case, there is a call for rethinking of the relation between instantiation and realisation hierarchies, and how this relation can be formalised in metalinguistic models. These challenges nevertheless will not be taken up here due to the scope and the focus of this research.

So far in this section, I have compared two major models of context in SFL—the Register Model and the Genre Model. My main purpose is to demonstrate that the differences between the two models originate from the different stratification and instantiation strategies each model employs. In incorporating existing SFL models, therefore, I focus on adapting the theorisation strategies behind a model rather than the theoretical model *per se*. In the following section, I will discuss the specific strategies for stratification, instantiation and metafunctions used in building the logogenetic model to be outlined in this thesis as well as the motivations behind these theoretical choices.

3.1.1.3 Field and Ideational patterns: Strategies for incorporating stratification, instantiation and metafunctions

The strategies for incorporating instantiation, stratification, and metafunctions in the logogenetic model are summarised in Table 3.2.

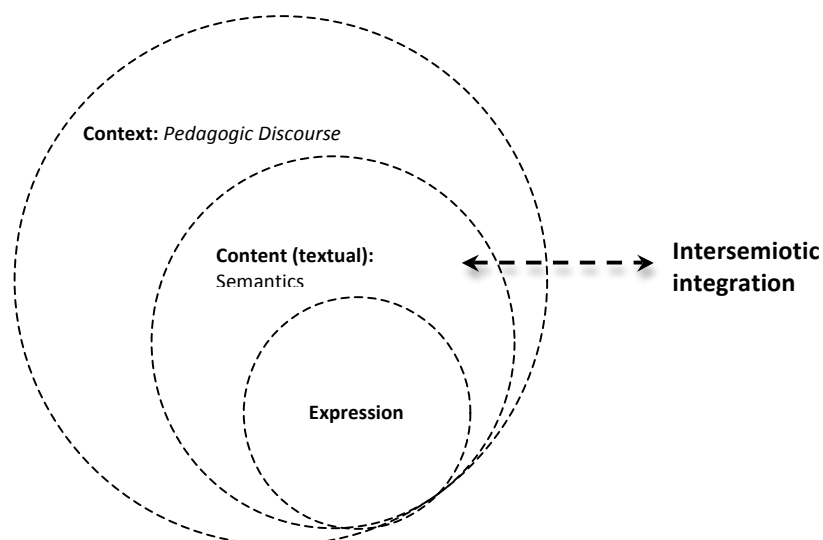
Table 3.2. Instantiation, stratification, and metafunctions in the proposed model

Parameters	Strategies	
Instantiation	Instance	<i>as the starting point for observation as the centre of theorisation</i>
Stratification	Context	<i>digital pedagogic discourse</i>
	Content	<i>semantics as the stratum responsible for intersemiotic integration and interaction</i>
	Expression	<i>N/A</i>
Metafunctions	Contextual	<i>Field of instructional discourse: primary social science Field of regulative discourse: multimedia interactive activities</i>
	Textual	<i>intersemiotic Ideational patterns</i>

On the instantiation cline, I take instance as the starting point of my observation. My description focuses on the generalised intersemiotic patterns within an instance, more specifically, the relations between verbiage and image as defined by their position in the logogenetic unfolding of a Multimedia Interactive text. The motivation for focusing on intersemiotic patterns in an instance of text has been discussed in Chapter 2, Section 2.2.3.3, and I shall not revisit the arguments here.

With regards to stratification (see Figure 3.9), I adopt a basic three strata model, including from the higher level of abstraction to the lower, context, content and expression. In this model, I treat pedagogic discourse as a connotative semiotic system, which takes language and another semiotic system as its expression form. In other words, pedagogic discourse in this context is realised in digital multimodal texts. I do not further stratify the context plane into genre (context of culture) and register (context of situation) (cf. Martin & Rose, 2008). This is not to say, however, that I am not interested in genre as a theoretical category. Rather, as I will illustrate in later sections of the chapter, I shall model genre through logogenesis rather than stratification.

Figure 3.9 Stratification strategies for the logogenetic model



The content plane in the model is concerned with meaning or semantics. Following Matthiessen (2007, see also Bateman, 2008a), I recognise semantics as the stratum

that holds main responsibility for coordinating various semiotic systems. Simply put, semiotic resources of various types integrate through meaning. Intersemiotic relations in my model, therefore, are semantic patterns. In the remainder of the thesis, I shall refer to content plane as textual plane, reflecting the fact that the model is located at the instance end on the instantiation cline.

I do not further stratify content plane into lexico-grammar and semantics for both practical (analytical) and theoretical considerations. On the one hand, the description of semantic resources should suffice to address the two central research questions. On the other hand, there is no definite theoretical evidence as to whether the lexico-grammatical stratum is applicable to semiotic resources other than language. In this thesis, I lean towards the position taken up in Matthiessen (2007), accepting lexico-grammar as a feature unique to language (for a position similar to Matthiessen see Bateman, 2008a, for an alternative position see O'Halloran, 2005, 2008). I nevertheless shall not further pursue the issue of stratification in MDA in depth. By a similar line of reasoning, my descriptions do not extend to the expression plane (for account of the interaction between expression plane and the materiality of technology, see Bateman, 2008a, c).

The description of metafunctions in the logogenetic model focuses primarily on the ideational metafunction. On the contextual plane, I explore the construal of two different fields—the field of primary social science (instructional discourse) and the field of multimedia interactive activities (regulative discourse), as well as the *projection* of the former through the latter. These two fields and the *recontextualisation* rule (i.e. how one field projects another, see Chapter 2, Section 2.1.2.1) that binds them are seen as realised in the textual plane by various intersemiotic ideational patterns.

Although field and ideational meaning are the main focus of the model, I acknowledge the importance of interpersonal meaning in realising pedagogic discourse (cf. Christie, 2002). Pedagogic discourse involves both the recontextualisation of the field of knowledge of a particular kind and the social value, relationship and identity associated with it. The description of ideational patterns inevitably provides only a

partial understanding of the interaction between knowledge and knower (cf. Bernstein, 2000; Maton, 2007).

To sum up, the intersemiotic model I develop in this research aims to provide a description of **ideational** intersemiotic patterns in MIs as well as the pedagogic **field** realised by these patterns. These intersemiotic patterns are generalised **semantic** patterns in an instance of **text**.

In Section 3.1.1, I have discussed three SFL theoretical categories—stratification, instantiation and metafunctions. I have also compared the different strategies for adapting these basic parameters used by different models within the general theoretical framework of SFL. I have then illustrated the ways in which these categories will be used in building the logogenetic model. In a sense, in this section I have explored the question of ‘what’—what patterns to be accounted for in the model. In the next two sections, I shall turn to the question of ‘how’—how the intersemiotic patterns can be described within the parameters of SFL. I will first explore in the following section the two axes: paradigm (system) and syntagm (structure). Since the logogenetic model essentially offers an account for relation between image and text as defined by their position in the structure of a text, my discussion will focus largely on syntagm.

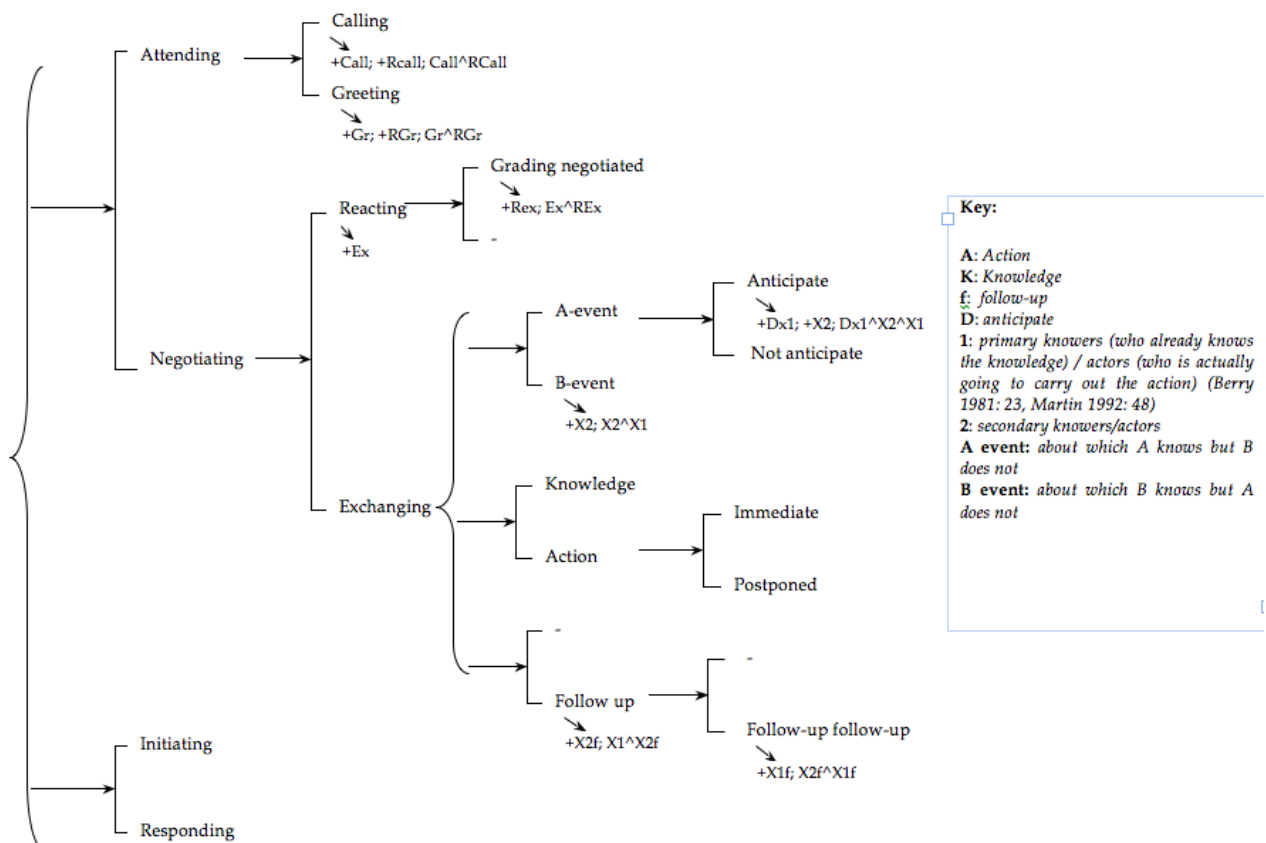
3.1.2 Paradigm and syntagm

3.1.2.1 Paradigm and syntagm: An overview

In SFL, paradigm and syntagm express two basic types of linguistic ordering: 1) paradigmatic or systemic ordering expresses ‘*or*’ (variant) and ‘*and*’ (co-variant); 2) syntagmatic structure encodes compositional relations, including ordering, inserting and serial relations. The main representational technique used in SFL to formalize paradigmatic relation is the system network. Figure 3.10 is an example of a system network; the system being represented is NEGOTIATION, an interpersonal discourse-semantic resources system. In a system network, ‘[’ expresses the ‘*or*’ relation, while ‘{’ expresses the ‘*and*’ relation. Moving from left to right in the network, the delicacy

of the systemic description increases. One of SFL's main ambitions has been to exhaust the systemic descriptions of language through increasing levels of delicacy in the systems. For many, the ultimate "grammarian's dream" is to include lexis as the most delicate level of grammar (Hasan, 1987).

Figure 3.10 Negotiation: An example of system network



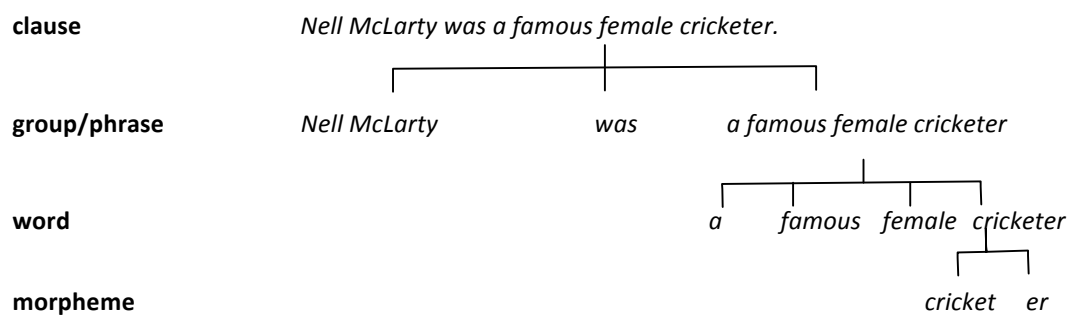
Structure in SFL is perceived as the "outward form taken by systemic choices" (Halliday & Matthiessen 2004, p. 23). In other words, structures realize systemic choices. In a system network, structure is the output of any path through the network. Structural output is usually indicated by '↓' angle next to the choice in a system. In representing syntagmatic ordering, '+' is used for inserting, while '^' is used for sequencing.

In SFL, the origin for description of system and structure is rank. In Halliday's words:

...to show that a system operates on a given rank is the first step in stating its relationship to other systems; likewise assigning an item to a given rank is the first step in stating the systemic and structural relations into which it may enter and those which it may embody within itself. On the structure axis, rank is a form of generalization about bracketing, and makes it easier to avoid the imposition of unnecessary structures... (Halliday, 2002[1966], p. 120)

Rank is essentially a constituency theory of compositional hierarchy. In the SFL model of English (see Figure 3.11), for instance, there are four levels of constituency at the lexicogrammar level, known as ranks (from the highest to the lowest): clause, phrase/group, word, and morpheme:

Figure 3.11 Rank scale in English



Each rank consists of one or more units of the rank immediately below. Through grammatical resources such as logico-semantic relations (e.g. elaborating, extending, projection), units at every rank can form complexes, e.g. clause complexes, group complexes, etc. A unit at higher rank may also down-rank to function in the structure of a unit of its own rank or of a lower rank (cf. Halliday & Matthiessen, 2004).

As its name suggests, systemic functional linguistics thrives on systemic descriptions. The description of language system in SFL evolves around two main themes. The first involves the mapping of clausal systems (transitivity, mood and theme) of various languages (Caffarel, 2006; Halliday & Matthiessen, 2004; Li, 2007; Matthiessen, 1995; Matthiessen, Caffarel, & Martin, 2004; Teruya, 2007), while the second concerns the description of various discourse systems (Egins & Slade, 1997; Martin, 1992; Martin & Rose, 2007, 2008; Martin & White, 2005). Through SF-MDA research, systemic

descriptions have also been developed for various semiotic systems [for a full list of reference see Chapter 1.2.1) and intersemiotic relations (for a full list of reference see Chapter 2, Section 2.2.3.2).

The foregrounding of system/paradigm provides considerable theoretical advantages, for “the paradigmatic representation frees the grammar from the constraints of structure”. However, “structure is to be still accounted for” (Halliday, 2002 [1996], p. 403), and I will now turn to the theorisation of structure in SFL, in particular text structure.

3.1.2.2 Theorising text structure in SFL

As discussed earlier, SFL identifies language as organised along three distinctive metafunctions, ideational (experiential and logical), interpersonal and textual. Metafunctions organise syntagmatic relations (structure) as well as paradigmatic ones (system). At the lexico-grammatical stratum, as shown in Table 3.3, SFL recognises two basic types of structure: multivariate and univariate (cf. Halliday & Matthiessen, 2004).

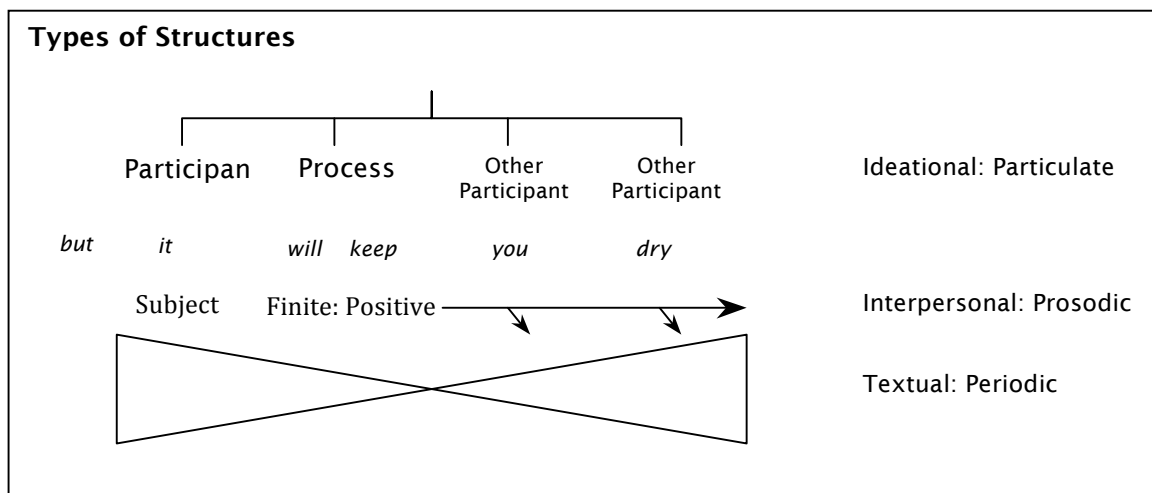
Table 3.3 Types of structures and types of meaning: Lexico-grammar (cf. Halliday & Matthiessen, 2004)

Metafunctions		System	Structure		
Interpersonal		Mood	multivariate	Subject ^ Finite	prosodic
Textual		Theme		Theme ^ Rheme	periodic
Ideational	Experiential	Transitivity	univariate	Participant ^ Process ^ Circumstance	Particulate orbital
	Logical	Logical-semantic relations		e.g. α (main clause) ^ β (dependent clause), or 1 ^ 2 (two clauses of equal status)	Particulate: serial

A **multivariate** structure is a configuration of functional elements within a given rank. At the clause level, for instance, SFL identifies three types of structure (see Figure 3.12) corresponding to three types of meaning, experiential—particulate (part-whole), interpersonal—prosodic, textual—periodic. It is important to note that

these three types of structure map onto each other in a clause, which makes the clause a *structurally stable unit*. Theoretically speaking, only experiential structure (particulate) is strictly multivariate (Martin, 1996; 2000c), since multivariate structure is essentially modelled in terms of constituency, i.e., each element has a distinctive function with respect to the whole. Nevertheless, the concept of multivariate is usefully in capturing the “organic configuration” (Halliday & Matthiessen, 2004, p 21) of units within a given rank, distinguishing it from the *interdependent relations* between units of the same rank.

Figure 3.12 The mapping of functional structures in a clause



The interdependency among units of same rank is modelled as **univariate** structure. A univariate structure is essentially the iteration of the same functional relation. At the lexico-grammatical level, logical structure is univariate. It combines clauses into clause complex through two types of TAXIS (interdependency): hypotactic (linking clause of equal status, e.g. *It won't keep you warm, but it will keep you dry*) and paratactic (linking main clause and dependent clause, e.g. *You will find yourself in Ballarat, where you can buy all you need for life on the goldfields.*). In summary, a multivariate structure involves more than one functional variable, with each occurring once, whereas a univariate structure involves one functional variable reoccurring one or more times. While a multivariate structure is a closed one, univariate structure is open-ended, which potentially allows for indefinitely extendable recursion. Projection in English is an example of open-ended univariate structure, e.g. *She told me that you said that he thought that...* ($\alpha^{\wedge}\beta^{\wedge}\gamma^{\wedge}\delta\dots$).

In SFL, linguistic patterns that are neither multivariate nor univariate are modelled through three different approaches. The first approach, adopted by Halliday & Hasan (1976), treats these patterns as non-structural textual grammatical resources. Semantic systems, such as REFERENCE, CONJUNCTION, and LEXICAL COHESION, are responsible for creating cohesion in a text and belong to textual metafunction. These relations are non-structural for they transcend grammatical structure. For example, in the following text “*The windlass helps lift heavy buckets of dirt up from the mineshaft. It is a tool with a rope wrapped around a drum*”; it is linked to *the windlass* through anaphoric reference. However, the link is a semantic one since there is no lexico-grammatical structure realising this phoric relation.

A second approach is taken up by Mann and Thompson (Mann & Thompson, 1988, 1992; Mann, Matthiessen, & Thompson, 1992) in developing Rhetoric Structure Theory (RST). RST utilises both conjunctive relation and interdependency structures. It treats text semantics as a complex of rhetorical relations, which in turn are realised through a combination of CONJUNCTION and TAXIS. These rhetorical resources are assigned to a separate stratum known as semantics.

Table 3.4 Types of structures: Discourse-semantics (cf. Martin, 1992)

Metafunction	System	Structure	Direction of dependency
Interpersonal	NEGOTIATION	multivariate & covariate	prospective & retrospective
Textual	IDENTIFICATION	covariate	retrospective
	CONJUNCTION	covariate	retrospective
Ideational	IDEATION	covariate	prospective & retrospective

The third and alternative approach, proposed by Martin (1992, see also Martin & Rose, 2007), argues that although cohesive relations are non-structural from the lexico-grammatical perspective, they can be treated as discourse structures. To model these relations, Martin sets up a stratum equivalent to semantics (Halliday & Matthiessen, 2004)—discourse-semantics. In *English Text* (1992), Martin identifies four major systems corresponding respectively three metafunctions: NEGOTIATION (interpersonal), IDENTIFICATION & CONJUNCTION (textual) and IDEATION (ideational) (see Table 3.4). A further interpersonal system—APPRAISAL has since been developed by

Martin and his colleagues (Hood, 2010; Martin, 2000; Martin & Rose, 2007; Martin & White, 2005).

In Martin's research on discourse structures (e.g. Martin, 1996, 2000), he observes that multivariate structures (particulate, periodic and prosodic) can be found in discourse-semantic units such as exchange (NEGOTIATION). He shows that in certain formal institutional registers (e.g. service encounter, classroom), different types of structures can map into each other in an exchange as they do in a clause. However, in casual conversations (Eggins & Slade, 1997), this type of mapping is far less likely. Consequently, Martin (1996, 2000) argues for developing techniques for modelling non-constituency based structures such as prosodic and periodic ones.

Martin and his colleagues have also explored the potential for modelling discourse using univariate structure. Ventola (1987), for instance, has proposed the concept of move complex. A move complex is comparable to a clause complex, in which two moves (a semantic unit associated with system of SPEECH FUNCTION) are linked through logico-semantic relations. Univariate structure has also been applied in modelling relations between various stages and phases of genre (cf. Martin & Rose, 2008), as well as relations between various genres in a macrogenre (Martin, 1994, see also discussion of macrogenre in Chapter 2, Section 2.1.1).

Although the structural types observed in the lexico-grammatical stratum can be used for modelling text structure, Martin identifies **covariate relations** (Lemke, 1985) as the principle structure forming principle in discourse-semantics. A covariate is a structure in which a semantic interdependency is constructed between units and in which dependent items have the potential to themselves be depended on (cf. Martin, 1992, p.25). In other words, it is a relation of mutual dependency. One critical element in Martin's covariate structure is the notion of direction of dependency. That is, one unit can depend on the preceding units (*anaphoric*) or/and predict ensuing ones (*cataphoric*). In the following text, for instance, **they** links retrospectively to **the flakes or lumps of gold** (phoric relations), while the riverbed depends simultaneously on the preceding lexical item creeks and rivers and the succeeding the sand or dirt.

Text 3.1 Alluvial Gold

1. Alluvial gold is gold that has been chipped out of rocks by the wind and the weather.
2. **The flakes or lumps of gold** wash into creeks and rivers,
3. where **they** sink to the riverbed.
4. To find alluvial gold,
5. miners separated the sand or dirt from the heavier gold.
6. They did this using a pan or a cradle.

So far, I have examined the main types of structures, including discourse structures that have been theorised in SFL. In the following section, I shall explore the possibility of incorporating these existing SFL structural descriptions into the logogenetic model.

3.1.2.3 Beyond language: Structure in multimodal text

In this section, I address one simple question: whether (if so, to what extent) SFL's structural account can be adapted for the description of intersemiotic relations. To provide the answer, I examine both the advantages and the disadvantage of SFL's structural account in dealing with the relations between two different types of semiotic resources, more specifically, verbiage and image.

The first major advantage of SFL's structural account lies in its recognition of different types of structural relations, multivariate (organic configuration or constituency relation), univariate (semantic interdependency) and covariate (directional semantic interdependency). If we start our description from the syntagmatic axis, therefore, it is possible that we will find that text and image integrate through not one but two or more types of structures. To put it in another way, a verbal text and an image in an intersemiotic pair might behave both like two functional elements of a clause (multivariate), two clauses in a clause complex (univariate) or something completely different. It does not have to be one way or another. If we use paradigm as the main axis, on the other hand, we tend to focus on one type of relation at the cost of another, since we need to incorporate different types of structural relations into one system.

To illustrate my point, I use two existing intersemiotic systems as examples, one being the LOGICO-SEMANTIC system developed by (Martinec & Salway, 2005), the other being the IDENTIFICATION system proposed by (Unsworth & Cléirigh, 2009). I shall acknowledge upfront that the purpose of this exercise is not to compare these two models since they are built for different purposes. Nor do I seek to comment on the models *per se*. Again, what I am interested here is the theorisation strategies behind the models. In essence, Martinec and Salway treat the relation between image and text as semantic interdependency (based on logical-semantic relations, following Halliday, 1994, Martin, 1992), whereas Unsworth and Cléirigh treat the relation between verbiage and text as an organic one, i.e. mutual identification (based on description of relational clause in Halliday & Matthiessen, 2004).

Plate 3.1 includes two examples taken from the two studies respectively. Plate 3.1a is an example from Martinec and Salway (2005). In their analysis, Martinec and Salway treat the relation between the image (the part in the image that looks like a starfish) and the verbiage (*tentacles*) as [Elaboration: Exposition: Text more general] (p.353). In Unsworth and Cléirigh's framework, however, the relation between the two would be analysed as [Encoding: Intensive: Quality]; that is the image visualizes the qualities—shape, colour, and texture—of the identified participant.

In this case, Unsworth and Cléirigh's treatment would be more adequate. Firstly, the relation between verbiage and image here is not one of generality but abstraction (Token/Value). That is to say, the part of the image that looks like a starfish is called/named/termed a *tentacle*. The verbal label here identifies (or names) the visual item rather than describing the information in the image. Secondly, the verbiage and the image here form a closed structure as two functional variables in a multivariate structure. If, hypothetically, there were lengthy text descriptions of tentacles accompanying this image, the image and the verbal label would enter a lexical string as one unit of message (cf. Martin, 1992), since they are both tentacles.

Plate 3.1 Intersemiotic relations: Semantic interdependency and organic configuration

a. Martinec & Salway, 2005, p. 353

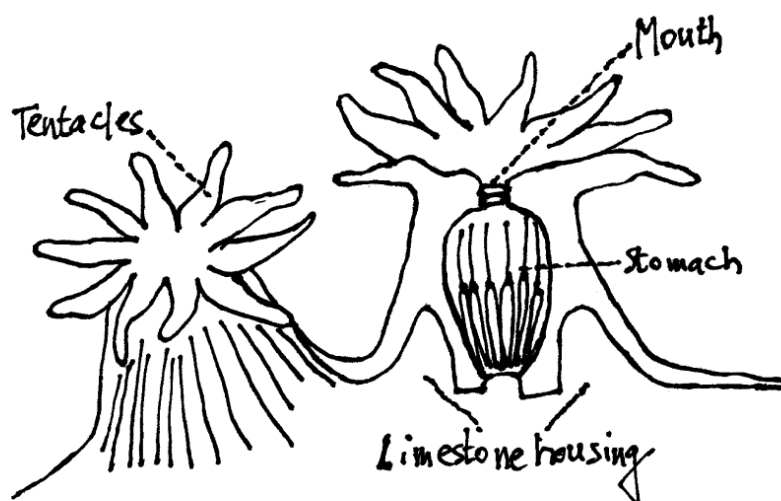
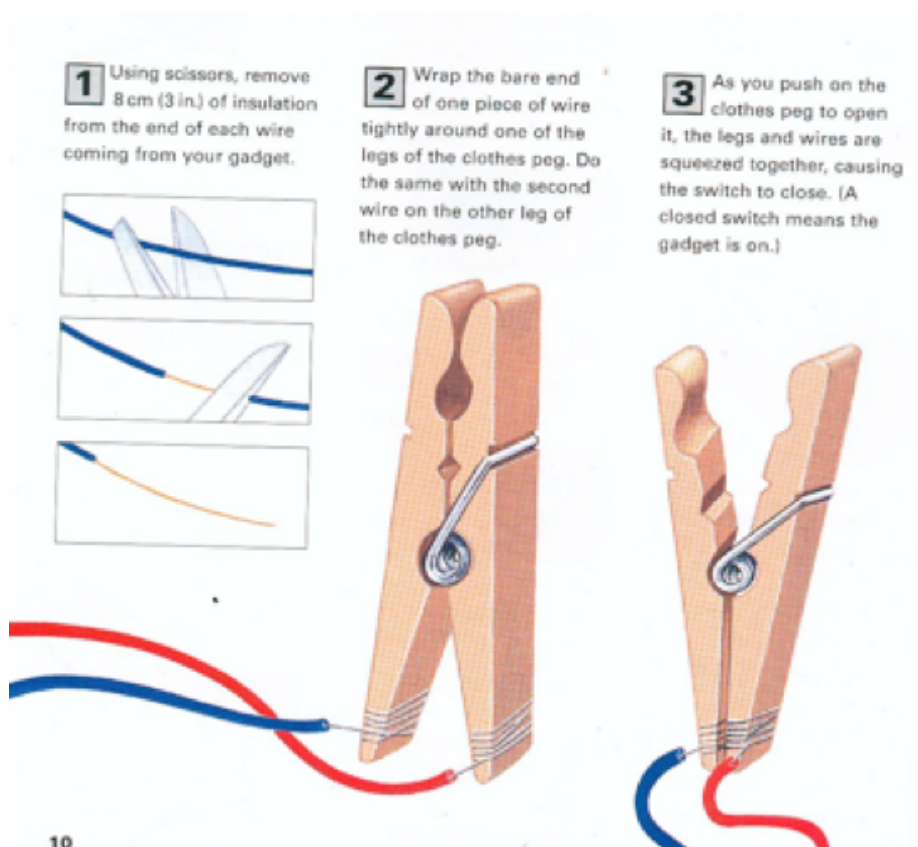


Figure 15(a) and (b) Examples of [exposition] and [text more general] image–text relations. Drawings after (a) a screen from *Dangerous Creatures* (Microsoft Corp., 1994) and (b) ‘Battle Gear’ (*National Geographic*, 2000).

b. Unsworth & Cléirigh, 2009, p. 158



In analysing image in Plate 3.1b, Unsworth and Cléirigh (2009, p. 157) treat the image accompanying step 2 (middle section in the plate) as the [Cause: Result] of the verbiage. While the verbiage states “*Wrap the bare end of one piece of wire tightly around one of the legs of the clothes peg. Do the same with the second wire on the other leg of the clothes peg*”, the image is showing the result of the action, i.e. the uninsulated red wire is wrapped around the right peg leg and blue wire around the left peg leg. Using Martinec and Salway model, in contrast, the relation between the two would be analysed as [Enhancement: Causal].

In this instance, although both analyses are adequate, Martinec and Salway’s analysis would be more effective. To use the language analogy here, if we adopt Unsworth and Cléirigh’s analysis, we basically treat the text and the image *as if* they are two elements in a clause. If we then want to explain the relation between the verbal text in Step 2 with the other two texts or the image with the other images, we need to build a second system to account for these relations (hypothetically, e.g. cohesion). On the other hand, if we adopt Martinec and Salway’s analysis, we treat all visual and verbal elements equally *as* clauses. In this way, we only need one system to account for the dependency relations between each element. That is to say, we can simultaneously account for the relation between the text and image in step 2, between the texts in three different steps (which can be read on their own), and between the three images (which can also be read on their own).

In summary, I have examined two models of intersemiosis by applying them to each other’s data. In doing so, I have demonstrated the potential risk of obscuring the two (or possibly more) different types of configurations (constituency and interdependency) between text and image by foregrounding paradigmatic axis in description. My main purpose is to show that it could be useful if we map out the basic structural configurations between image and text before we impose a systemic description.

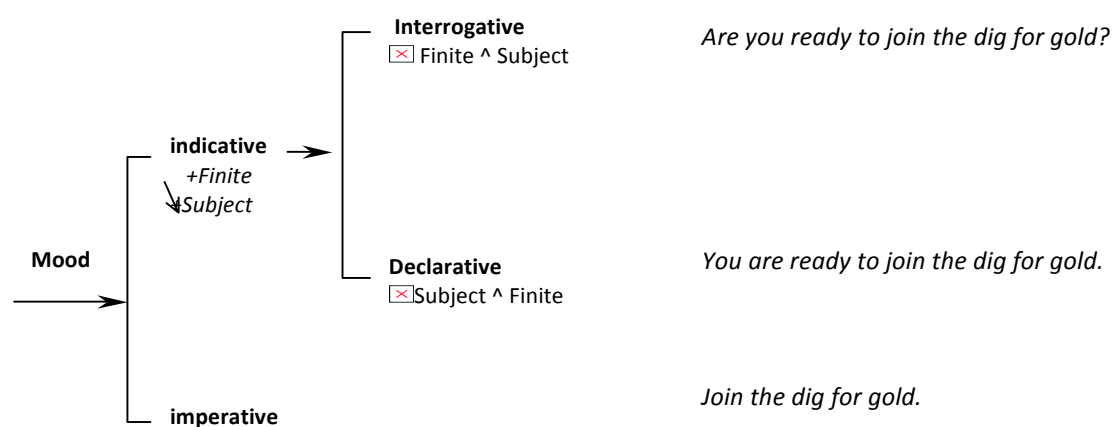
The second major advantage of traditional SFL text structure theory is that it provides an account for unbounded structures, i.e. univariate and covariate ones. Open-ended structures offer potential for modelling semantic interdependency in

large-scale semantic units (e.g. text). One example of exploring such structures is the studies of macrogenre (e.g. Christie, 2002; Jordans, 2002; Iedema, 2003; Muntigl, 2004). This modelling strategy has also been proven productive in treating intersemiotic relations (see Tseng, 2009 for description of IDENTIFICATION in film) and hypertext semantics (see the discussion of Djonov's work on LOGICO-SEMANTIC relations of children's websites in Chapter 2.2.2.1).

Although SFL's accounts of structures have obvious theoretical advantages for dealing with multimodal data, these structural accounts are not readily translatable into a logogenetic model. There exist two theoretical constraints. The first has to do with the relation between structure and system in SFL modelling and the nature of theoretical borrowing, and the second, a more fundamental one, concerns the way in which analytical units are recognised and defined in SFL.

In modelling system and structure, SFL traditionally privileges the former over the later. System is viewed as the determining feature, whereas structure is interpreted as the "outward from taken by systemic choices" (Halliday & Matthiessen, 2004, p. 23). To illustrate the relation between system and structure as modelled in SFL, I shall use the MOOD system as an example. For the convenience of discussion, I greatly simplified the system, as presented in Figure 3.13.

Figure 3.13 A simplified mood system



As can be observed in the system network, if the mood elements—Finite (*are*) and Subject (*you*)—are both present in the clause structure, there are two possible sequencing: Finite can either precedes (*are* ^ *you*) or succeeds (*you* ^ *are*) Subject. By foregrounding the paradigm axis, the difference in sequencing is modelled as realising different choices in system. That is, if interrogative is chosen, Finite precedes Subject, if declarative is chosen, Finite comes after Subject.

Since structure is the outward expression of system, it is difficult to borrow any existing structural account from SFL without acknowledging its underlying system. What we have now is a methodological paradox—we cannot directly borrow the structural account without borrowing the underlining system, and we cannot determine which system to borrow since we are yet to discover the basic structural configurations. One possible solution is first to map out all the possible structural configurations between image and text and then to adapt systemic descriptions from SFL accordingly. For instance, we could borrow the IDENTIFICATION system for the types of intersemiotic configurations in Plate 3.1a (the tentacle text) and then the LOGICO-SEMANTIC system for those in Plate 3.1b (the wire text). Although this solution appears to be workable, it brings us back to the difficulties concerning how to systematise intersemiotic relations, in particular in this research, as raised in Chapter 2, Section 2.2.3.3. I shall not revisit those arguments here since there is a more fundamental issue to discuss with respect to borrowing structural accounts from SFL.

A more fundamental aspect of SFL structure theory is that it is closely tied with the notion of constituency. As mentioned earlier, SFL identifies three different types of structures corresponding with three types of metafunctions: ideational with particulate, interpersonal with prosodic and textual with periodic. Of the three types of functional structures, only the particulate structure encodes constituency relations. Constituency nevertheless serves as the principal criteria for determining structural units in SFL. Grammatical units such as clause, and semantic units such as exchange (Ventola, 1987, Martin, 1992) and rhetorical units (Cloran, 1994) all involve constituency.

At the lexico-grammatical level, defining structure in terms of constituency appears to be a conscious theoretical choice. In Halliday and Matthiessen's words, "constituency structure is the simplest kind of structure, from which the other more complex kinds can be derived, it is the natural one to take as prototypical" (2004, p.61). The fact that prosodic and periodic structures map onto particulate structure in a clause further provides descriptive advantages for a constituency model, for structural mapping entails a structurally stable unit (i.e. clause), which constitutes the first step in ensuring a consistent systemic description.

At the level of semantics or discourse semantics, the theoretical advantage of a constituency-based model is less clear. On the one hand, there may not be a generalised compositional scales and compatible structure units across different types of texts. A survey of the literature seems to suggest that texts of different registers operate with different rank scales (e.g. Cloran, 1994; Eggins & Slade, 1997; Jordens, 2002; Sinclair & Coulthard, 1975). On the other hand, Martin (1996, 2002) has demonstrated the limitation of constituency representation of text structures and advocated the modelling of non-constituency structures (periodic and prosodic) and orbital/serial. Martin & White's (2005) work on APPRAISAL, for example, has explored the potential of prosodic structure (see also Cléirigh, 1998 on prosodic structure in phonology). More recently, Halliday (2009) has suggested that each metafunction would allow for different bounding of structural units. However, it is not clear at this stage how these theoretical notions can be translated into analytical practice. That is to say, systematic principles for determining complementary structural units, such as those for recognising rank scale in lexicogrammar, are yet to be formalised.

If we are to adopt SFL's structural accounts, a constituency model will be naturally assumed. In this case, we face one immediate question—whether the other semiotic resource in an intersemiotic relation (image) construes experiences in terms of part-whole relation, the same way language does. The answer to this question is far from clear. In SF-MDA, for instance, both the constituency model and the constituency-free model have been applied in describing visual structures. The merits of each approach are yet to be widely debated (Martinec, 2005; Zhao, 2010a). Moreover, as has been discussed in Chapter 2 (see Section 2.2.2), hypertext units are divided by hyperlinks.

A hyperlink, however, does not always signal the boundary between two textual units. In other words, a technological unit such as node does not always map on to a semantic unit such as text. A constituency model may obscure these two types of boundary, for it is all too easy in analytical practice to use the boundary of the medium as our main guide for picking text units (see Martin, 1994 on the ways in which page influences our perception of text).

The alternative solution I am pursuing in this thesis is to explore the possibility of developing an account of intersemiotic relations that is not restrained by the notion of constituency. Of all SFL theoretical categories, the one that is least bound by constituency seems to me to be the concept of semiogenesis, in particular logogenesis. Instead of treating text as a product and a constituent, logogenesis highlights the notion of text as a **process** of meaning making. In the next section, I shall explore the notion of logogenesis as theorised in SFL.

3.1.3 Logogenesis

3.1.3.1 Logogenesis: An overview

In SFL theory, language (semiosis) is perceived both as a product and a process (cf. Halliday & Matthiessen, 2004). The process aspect is modelled through the concept of **semiogenesis**—the process of meaning making. Halliday and Matthiessen (1999, p. 17-18) identified three basic types of semogenetic processes, taking place within three different timeframes: 1) **phylogenesis**, the evolution of meaning potential in the human species (the phylogenetic timeframe); 2) **ontogenesis**, the development of an individual's meaning potential (the ontogenetic timeframe); and 3) **logogenesis**, the unfolding of meaning in a text (the logogenetic timeframe).

The research of phylogenesis in SFL focuses largely on the evolution of texts of a particular register (as defined in Halliday & Matthiessen, 1999, 2004) or genre (as defined in Martin & Rose, 2008). Halliday (1988), for instance, has explored the evolution of scientific English since Chaucer. There has also been extensive research on the evolution of news reporting both in print (Nanri, 1993; Scott, 2010) and online

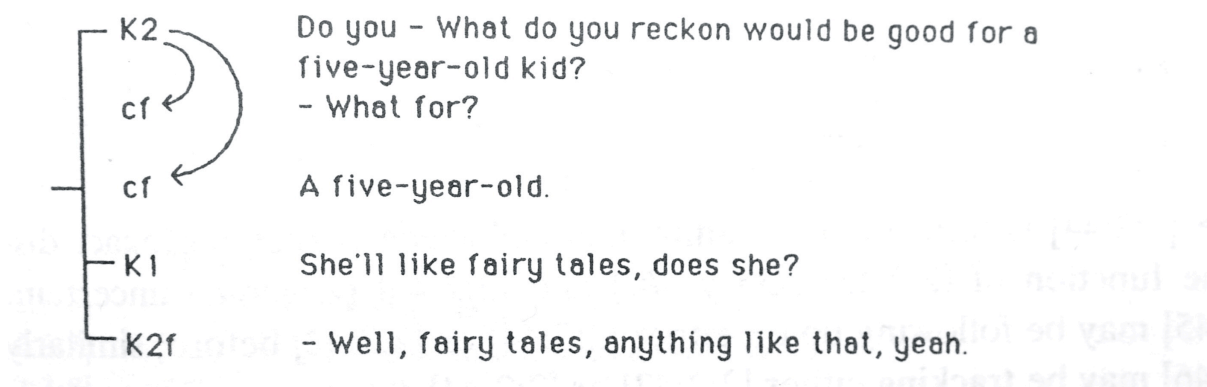
(Knox, 2010). The study of ontogenesis in SFL falls roughly into two categories. The first type deals with first language development in early childhood (Derewianka, 1995; Halliday, 2004; Painter, 1991, 2001; Torr, 1997), while the second type is primarily concerned with literacy development during the years of schooling (Christie & Derewianka, 2008; Coffin, 2000; Williams, 2004).

Of particular interest here is the modelling of logogenetic process, i.e. the unfolding of meaning in a text. The modelling of logogenetic process, often referred to as dynamic modelling in SFL, has been approached largely from two different angles: text generation and text analysis.

Approaching from the perspective of generation, Matthiessen (1993) has proposed the concept of an instantial system, referring to the system that is being built up through ongoing selection of linguistic features in the logogenetic process, and is particular to the text being generated. The process of building such system in the unfolding of a text has been further explored in series of studies in 1990s assisted by computational techniques available at the time (Bateman, 1989; Fuller, 1995; Matthiessen & Bateman, 1991; O'Donnell & Sefton, 1995; Zeng, 1996).

Dynamic modelling has also been explored in the 1980s from the angle of text analysis. The main theoretical challenge at the time has been to capture of the 'dynamic' nature of conversation flow through the study of exchange structure (Berry, 1981; Martin, 1985; Ventola, 1987). The researchers experimented with a series of representational techniques. The NEGOTIATION system (as shown earlier in Figure 3.10 see Section 3.1.2.1), for instance, includes an elaborated system for moves, which specifies the structural slot a unit can fill in the exchange. In the analysis of a move/move complex (see Figure 3.14), constituency relations are shown to the left, and dependency to the right. In this way, the analysis would offer both the synoptic and the dynamic perspectives on the move. The flow-chart model (Fawcett, van der Mije, & van Wissen, 1988) was also applied in the study of social interactions such as service encounters (Ventola, 1987).

Figure 3.14 Modelling conversation structure: An example [Martin 1992, p. 85]



Besides these two main trends in dynamic modelling, efforts have also been made in modelling context—the ways in which contexts are open to negotiation by the participants in process of interaction (O'Donnell, 1990; O'Donnell & Sefton, 1995); and textual metafunction (Ravelli, 1995). Regardless of the differences in approach, research on dynamic modelling in SFL in 1980s and 1990s has centred on the exploration of what I shall call *systemic dynamism*. Systemic dynamism is essentially concerned with the meaning potential released from the system during the unfolding of a text. More precisely, it models the ways in which previous choices in the system either restricts or opens up the potential of subsequent choices.

The primary modelling technique at the time has evolved more or less around system networks. In text generation, the instantiation process has been presented as involving traversal of the system network and activation of realisation statement (Matthiessen & Bateman, 1991); while in text analysis, dynamism has been modelled by incorporating the structural status of a unit in the system network (Berry, 1981; Martin, 1985; Ventola, 1987; Eggins & Slade, 1997) or by remapping systemic choices in a text sequence onto a flowchart (Ventola, 1987).

Although earlier efforts in dynamic modelling have provided inspiration for this research, it is nevertheless difficult to pursue the agenda of systemic dynamism in multimodal description. In the following section, I shall elaborate on this point and discuss the possibility of a different approach to logogenesis.

3.1.3.2 Systemic dynamism: Theoretical and practical constraints

To understand the difficulty in pursuing systemic dynamism in this research, I shall first unpack the most fundamental aspect of this particular approach to dynamic modelling—the question of what process is being modelled. To put it in another way, what type of process is a text? Text in SFL is viewed as “the process of instantiation” (Halliday & Matthiessen, 2004, p. 525). This concept defines logogenesis from the perspective of *generation*. In Halliday & Matthiessen’s words,

A text is generated within logogenetic time-frame. In fact, generation is a logogenetic process; it creates meaning in the course of instantiation as the text unfolds. If we look at logogenesis **from the point of view of the system (rather than point of view of each instance)**, we can see that logogenesis builds up a version of the system that is particular to the texts being generated...the speaker/write uses this changing systems as a resources in creating the text, and the listener/reader has to reconstruct something like the system in the process of interpreting the text—with the changing system as a resource for the process of interpretation... (Halliday & Matthiessen, 1999, p. 384) (bold mine)

In essence, the meaning making process of a text in SFL is modelled as the process of an instance locating or relocating itself within the system of language. The earlier dynamic models of texts have been based largely on the study of verbal texts, written or spoken. The possibility for developing these models lies in the availability of robust descriptions of lexico-grammatical and (discourse-)semantic systems of language in SFL. To put it in a simpler way, there are systems which dynamic models can be built on.

More recently, Martin (2008, 2010) has pointed to the importance of modelling the process of instantiation in multimodal descriptions. Two key concepts in his model include ‘coupling’ (the quotation marks are added to distinguish it from the concept of coupling used in this thesis, see discussions in Section 3.2.3.3) and commitment. Coupling refers to the combining of meanings at relevant levels of generality, and commitment deals with the amount of meaning manifested (or amount of potential released) in instances of language use. Martin (2010) suggests coupling as the main

strategy for integrating various semiotic resources in a multimodal meaning space. This approach has been applied to the study of phonology and gesture (Zappavigna, 2010a). The concept of commitment has been also been explored in MDA through the study of verbiage and image relations in children's picture books (Painter & Martin, In press).

Although Martin's model opens up possibility for modelling multimodal text as process, it essentially follows the tradition of systemic dynamism. That is, it relies largely on the description of the evolving relation between text/instance and system/potential during the unfolding of a text. However, in a multimodal environment this type of modelling strategy faces a few challenges and requires further investigation. Taking Martin's idea of commitment as an example, commitment is defined by the degree to which meanings in optional systems are taken up and, the degree of delicacy selected within systems (cf. Martin, 2010). In multimodal environments, however, it is not clear how the degree of commitment can be measured accurately since instances of different semiotic systems are involved, and the meaning making potential of the two systems are not necessarily comparable.

Ultimately, it is for the purposes of natural language generation that the model of systemic dynamism is most suited (for discussion on the limitation of the model in automatic text analysis see Bateman, 2008b). Halliday has suggested that, "features of a description, and therefore of the model lies behind it, are relatable to the aims of the model and through these to a particular applications of linguistics" (Halliday, 2003[1964], p. 46). The features of a dynamic systemic model, including its definition of logogenesis and consequently its representational technique (Matthiessen, 1988), are not adequate in the context of this research for they have been developed for a different purpose and application. What is needed here is a model of logogenesis that serves the specific purpose of (multimodal) discourse analysis. In the following section, I shall explore what this new perspective on the logogenetic process will involve.

3.1.3.3 Modelling logogenesis: A (multimodal) discourse analytical model

In this section, I propose a model of logogenesis from a discourse analytical perspective. The differences between the discourse analysis model and the generation model are summarised in Table 3.5.

Table 3.5 Two models of logogenesis: Discourse analysis & generation

	Discourse Analysis	Generation
purpose of the model	interpreting social-cultural process	assist natural language generation
logogenesis	as the process of configuring and reconfiguring linguistic patterns	as the process of instantiation
angle of observation	instance	system
foregrounding axis	syntagm	paradigm

Notably, in the first instance, the two models are developed for different purposes. In other words, they engage with different sets of research questions. The generation model has been built to assist natural language generation—the automatic production of natural language texts (cf. Mitkov, 2003). The central research concern is to provide interaction between systemic linguistic description and computational instantiation of the theory. The discourse analysis model, in contrast, aims to provide an understanding of a particular social process (e.g. digital learning in the case of this research) and addresses practical concerns (e.g. how can we help teachers and students engage with multimodal texts more efficiently).

Secondly, logogenesis is defined differently in the two models. In the generation model, logogenesis is defined in terms of generation, and is viewed as the process of the instantiation of the system in text (cf. Halliday & Matthiessen, 1999). The discourse analysis model defines logogenesis as the process of configuring and reconfiguring linguistic relations and patterns. These textual patterns realise more abstract patterns of social-cultural processes. In other words, social-cultural processes are seen as *realised* in the processes of (re)configuring textual or intertextual patterns (an issue that will not be addressed in this thesis; for intertextuality see Bakhtin, 1981, 1986; Lemke, 1995).

Thirdly, the two models take different observation angles. In the generation model, logogenesis is observed from the perspective of system. From this perspective, logogenesis builds up a version of the system that is particular to the texts being generated. The discourse analysis model of logogenesis takes text as its main site of investigation. This is not, however, to deny that all texts are instances of the system. Rather, it suggests that from a discourse analytical point of view, these systemic potentials are not accessible to theoretical descriptions (see also, Bateman 2008b for discussion of paradigmatic potential and syntagmatic potential in texts).

Lastly, the generation model depends upon the paradigmatic axis, presenting logogenesis as the process of traversing through system network and activating realisation statement. The discourse analysis model, on the other hand, foregrounds the syntagmatic axis. It models the positioning of semiotic units in the text structure. To put it in another way, it is interested in the meaning created by sequential arrangement of semiotic variants (or choices made in the systems, if we are to keep the system in perspective).

To sum up, the discourse analysis model of logogenesis has a different research purpose from one that motivates the generation model (systemic dynamism). The difference in aim prompts a distinct perspective on process. In my discourse analysis model, logogenesis is observed from the perspective of instance, and is understood as the process of (re)configuring semiotic patterns. The model hinges on the modelling of structural ordering in the text. What is key to this model of logogenetic process thus is a theoretical parameter that can handle *sequential unfolding*. In next section 3.2, I shall introduce this new modelling dimension—time.

3.1.4 SFL parameters and the logogenetic model: A summary

In Section 3.1, I have examined five main theoretical parameters of SFL, in sequence, stratification, metafunction, instantiation, system/structure, and logogenesis. I have demonstrated the ways in which the theoretical categories of stratification, metafunctions, and instantiation will be adapted in the new model and discussed the

motivations behind these theoretical choices. Based on a discussion of advantages and disadvantages of SFL's structure theory, I have argued for a non-constituency approach to handling structural configurations in multimodal environments. I proposed that one possible way to free our description from constituency constraint is to model text as process. I then put forward a notion of logogenetic process from the perspective of discourse analysis, in which text is modelled as a process of configuring and reconfiguring semiotic relations and patterns.

In summary, the descriptive model I develop in this research will provide description of **ideational** intersemiotic patterns in MIs as well as the pedagogic **fields** realised by these patterns. These intersemiotic patterns are generalised **semantic** patterns of an instance of **text** and account for the **structural** configuration between text and image. In this model, multimodal text will be treated as **process**—a process of meaning making through configuring and reconfiguring semiotic patterns. To further pursue this particular model of process, I need to introduce a new theoretical parameter—the time axis.

3.2 Intersemiotic relations as logogenetic patterns: Towards a time-based model for multimodal analysis²

In this section, I introduce a new parameter key to the proposed logogenetic model—time. Time as an axis provides a reference point for determining units of analysis and observing relations between semiotic resources of various kinds. I explore, in sequence, the notion of time as a modelling dimension, the method in which units of analysis can be determined using time as the main reference point, and time-based linguistic patterns, which will be called logogenetic patterns (for the study of 'logogenetic patterns' using the generation model, see Halliday & Matthiessen, 2004, p. 525-529).

² An earlier version of this section has appeared in Zhao (2010b). Although the basic premise is the same, there have been some theoretical fine-tunings.

3.2.1 Time

3.2.1.1 Notions of time in SFL and SF-MDA

Time is a term we often encounter in the theoretical descriptions of systemic functional linguistics. One of the most familiar uses of the term perhaps is Time as a circumstance type in experiential grammar. In the clause “*In 1871, the London Missionary Society introduced Christianity to the Torres Strait Islands*”, *in 1871* is the circumstance of time, it construes the location of the unfolding of the process (*introduced*) in time. When we talk about time here, we essentially refer to ‘physical time’ (i.e. time measurable by clock, cf. Reichenbach, 1958) and we are interested in the way in which it is construed in language. In other words, how we make sense of ‘physical time’ through grammar. The linguistic resources for construing time have been explored in a series of pieces of research on history discourses (Coffin, 2000, 2006; Martin, 2002a, 2003), and I shall revisit some of the literature in the later chapters of this thesis.

In multimodal research, we also talk about time as in time-based media (Hall, 1971). Examples of time-based media include film, television and animation. In time-based media, the viewers experience the unfolding of the texts in real time. In a sense, spoken discourse is a type of time-based medium. The determining feature of a time-based medium is the synchronicity between giving and receiving information. It is reasonable to suggest that when we are referring to time here, we are still within the realm of ‘physical time’.

In hypertext research, time has been used in a wide range of ways (Luesebrink, 1998). These uses of time more or less refer to either ‘physical time’ of some sort, for instance, loading time, interactive time (i.e. the time for a user to navigate through a particular hypertext), or the construal of ‘physical time’ in hypertexts, e.g. narrative time (i.e. the ways in which digital literature construes narrative sequences differently from print based narrative).

3.2.1.2 Time axis: Time as a modelling dimension

When the notion of logogenesis was introduced in earlier section of this chapter, we encountered the word time as in logogenetic timeframe. When the word time is used in this context, we start to move away from the realm of ‘physical time’ since the unfolding of meaning cannot actually be measured by physical devices. That is to say, although we can say a film or a conversation lasts for three hours, we do not say the meaning of the film or the conversation unfold in three hours. So, what do I mean by time when talking about logogenetic timeframe?

From a process perspective, all social phenomena, including semiosis (meaning making), can be viewed as ongoing processes. To be able to model these processes, we need to set a boundary in time—timeframe—for the process we describe. Within this timeframe, we can then describe relations, causalities, and change of states in terms of their temporal ordering. When time is used in terms such as logogenetic time or logogenetic timeframe, therefore, it is understood as the **temporal axis**, the main parameter for observing and analysing processes.

Using time as the main axis or modelling dimension involves at least two key aspects. First, the boundary in time marks the boundary between units. In other words, the timeframe we choose for observation indicates the boundary for the unit of analysis. Second, temporal order determines the relations between semiotic variables. That is to say, we describe relations between semiotic variables based on their places in time within a certain timeframe.

To introduce the time axis to the logogenetic model, therefore, involves two aspects: 1) the recognition of the basic time-based analytical unit, which will be called **logogenetic unit**, and 2) the description of temporal semiotic patterns, which will be referred to as **logogenetic patterns**. In the following two sections I shall illustrate the notion of logogenetic unit (Section 3.2.2) and the main types of logogenetic patterns (Section 3.2.3).

3.2.2 Logogenetic unit

3.2.2.1 Text as a constituency unit

In a discipline such as history, the question of setting timeframe for analysis is (to a certain extent) a straightforward task, since the timeframe of observation is typically conflated with the physical timeline in which historical events took place. When a historian sets fifty years or even five hundred years as the frame for analysis, they in fact mean they will account for events occurring in a period of fifty or five-hundred years. The assignment of a particular timeframe is largely determined by the research question asked (e.g. a micro timeline to elucidate the role of an individual in a certain historic event, while a macro timeline to explain how the change of economic structure leads to the same event). The particular scale of time a historian choose will in turn impact on the interpretations of causal relations between historic events (cf. Huang, 1997). Compared with history, the concept of time or a timeframe sits uncomfortably with linguistic research. After all, where is 'time' in Nigella Lawson's recipe or a Shakespearian sonnet?

The unease the semioticians feel about time seems to me to originate from our predominantly constituency based view of language. The concept of constituency is best explained in Pike's theory of tagememics (Pike, 1982). Taking the following clause for example—*Eddie Gilbert is signing autographs*, we would observe that the clause is made up of parts or particles (*Eddie—Gilbert—is—signing—autographs*), and each of these parts is in turn made up of smaller particles (*auto—graph—s*). A particle is called a constituent. Constituency theory can be seen more or less as the result of the preoccupation with written language in early modern linguistic descriptions. The graphological system and print page tend to segment language in a constituent-like fashion, a clause, a paragraph, a page or a book. If, however, we read the clause aloud in a natural manner, we will notice that the boundaries between the particles become fuzzy. We might not, for instance, be able to separate *Gilbert* from *is*.

In a constituency model, a text is naturally viewed as a constituent. For example, in SFL, a text is defined as a semantic unit (Halliday & Hasan, 1976; Halliday & Matthiessen, 2004; Martin, 1992), made up of smaller units or constituents like

generic stages (Martin & Rose, 2008) or rhetorical units (Cloran, 1994). In analysing written text, we recognise a text by the spatial boundaries imposed by print medium—text frames (e.g. those separate articles in newspapers), pages or books. In this way, we inadvertently conflate the two types of boundaries: the spatial boundary between elements in print medium and the structural boundary between linguistic units (i.e. text). As a result, although spoken discourse or speech is marked by temporal boundaries (i.e. end of a conversation), we still treat them as if they are written text, consisting smaller units such as exchanges and moves (Eggins & Slade, 1997).

If we introduce the time axis and define units by timeframe, we immediately notice that written discourse and in fact all texts that use a space-based medium (e.g. sculpture, museum, many types of hypertext) have become the odd ones out, since we cannot measure the unfolding time of such texts. The question now is how can we impose a timeframe on something that appears to be ‘time-less’?

3.2.2.2 Text as a logogenetic unit

To address the question raised in the previous section, we need to withhold our preconceptions about text—written, spoken or hypertext - and focus solely on a process called meaning making. The question now becomes this—how do we recognise this process. Simply put, how do we know a meaning making process starts and stops (at least temporarily) without any non-linguistic signals? Scientists³ recognise the completion of a process by detecting the change of states in a physical object (e.g. ice turns into water) or biological organism (e.g. tadpole evolves into frog). Historians identify the completion of a historic process by observing the changes in economic, political or social-cultural structure (e.g. the Industrial Revolution ended with the establishment of a fully industrialised capitalist economy). Although the processes we semioticians deal with are entirely different in nature, the

³ I acknowledge my somewhat oversimplified descriptions of other research disciplines in this section. These should be read as common-sense examples.

underlining principal is the same. That is, there will be some observable signs that indicate the completion of a meaning making process.

A notion in SFL that may help us to recognise these signs is that of genre. However, I need to strip away all the theoretical baggage genre comes with, focusing solely on its definition. Martin & Rose (2008) define genre as a goal oriented, staged, social process. They observe that genre is “staged, because it usually takes us more than one step to reach our goals; goal oriented because we feel frustrated if we don’t accomplish the final steps; social because writers shape their texts for readers of particular kinds” (p. 6)

There are two valuable implications that can be drawn from the notion of genre. First, a meaning making process occurs for we have certain communicative goals to achieve, e.g. to purchase a book, to persuade a political opponent, to educate a child etc. Second, once the goal is achieved, the process completes. The accomplishment of a communicative task, therefore, can be used as the guide for recognising the completion of a meaning making process. In this thesis, I shall call a meaning making or exchanging process that *aims for* a given communicative purpose a **logogenetic unit**. The observation frame of a logogenetic unit is known as a **logogenetic timeframe**, which marks the beginning and the ending of the **logogenetic process**.

To keep some sense of familiarity and continuity, I shall refer to a logogenetic unit also as a **text**. The notion of text, however, is no longer bound by the constituency structure or the boundary imposed by the medium. That is to say, we define text across different media using the same principle. For instance, a written recipe, an online interactive recipe, a TV cooking program, and the live demonstration of cooking a meal are all identified as texts (i.e. logogenetic units) because each includes a complete process of meaning exchange. These texts can be analysed within the same logogenetic timeframe, since the meaning making processes (i.e. cooking instruction) involved are comparable.

This new definition of text might seem to be of less significance in analysing language or multimodal data from traditional media, since the temporal (e.g. intervals between

TV programs) or spatial (e.g. text frames in a magazine) boundary of these media usually give a good indication of (albeit not the determining criteria for) the unit boundary of a text. However, in hypermedia, in particular the World Wide Web environment, there is no clear boundary in time or space, and the potential traversals could be indefinite. This particular way of defining text, as I shall demonstrate later in this chapter (Section 3.3.1), is critical in determining the basic unit of analysis.

3.2.3 Logogenetic patterns

3.2.3.1 Reinterpreting paradigm and syntagm

In the previous section, I have discussed the impact of a time axis on the ways in which semiotic units are recognised. In this section, I shall explore how the introduction of time as a modelling dimension reconfigures linguistic relations. The point of departure I take is the two basic types of linguistic relations. As have been discussed in Section 3.1.2.1, SFL recognises two types of linguistic relations: paradigmatic and syntagmatic. The former expresses 'or' and 'and' relation, while the latter encodes inserting and ordering principles. The two types of ordering can be reinterpreted respectively as space-based and time-based patterns. The paradigmatic relation essentially describes the potential semiotic variables that can occupy the same *space* in a unit. For example, in the following structure '_-a-t', the empty space indicating the initial consonant can be filled by 'c' (*cat*), or 'b' (*bat*), or 'r' (*rat*), etc. Syntagmatic ordering, on the other hand, concerns the potential *point in time* a semiotic variable may occur. For instance, 'c' can come before 'a' (c ^ a ^ t) and after 'a' (a ^ c ^ t) but not after 't'.

In current SFL models, the temporal aspect of syntagm is largely missing. On the one hand, the notion of structure is bound by the space-based constituency theory. On the other hand, structure is considered as the outward expression of the system. Since the paradigmatic system removes the time dimension in linguistic relations, it is very difficult to recover it in syntagmatic realisations. However, if we discard the constituency notion while keeping the 'ordering' aspect of the syntagm, we can easily translate it into a time-based model. Time-based patterns, therefore, are patterns

concerned with what comes *before, with* and *after* in the process of meaning making. In other words, time-based patterns capture the temporal positioning of semiotic variables within a given timeframe. Patterns occurring within a logogenetic timeframe are called **logogenetic patterns**.

In this thesis, I propose three basic types of logogenetic patterns. The identification of these patterns is based a combination of inductive (observed in data) and deductive reasoning (from previous discourse analytical research in SFL and other related theory). In the following sections I shall introduce in turn these three types of logogenetic patterns, **sequencing, coupling, and clustering**.

3.2.3.2 Sequencing

Sequencing deals with the overall temporal positioning of variables within a logogenetic timeframe. Simply put, it explains the way in which altering the position of two or more elements may impact on the meaning (interpersonal or ideational) of the text. To illustrate sequencing patterns, I shall use J. M. Coetzee's 1999 Booker Prize winning novel *Disgrace* (Coetzee, 1999) and its 2008 movie adaptation of the same title (Jacobs, 2008) as an example. While acknowledging the difference between written text and film, between language and (moving) images, I nevertheless shall not dwell on these differences since sequencing is my sole concern here.

The novel *Disgrace* traces the fall from grace of David Lurie, a professor of communications at a Cape Town university. After an affair with a female student, Lurie loses his position in the university. He later finds refuge at his daughter Lucy's farm in East Cape. At the farm, Lurie spends the days helping Lucy out and volunteering at a local animal shelter. The monotonous yet peaceful country life is soon disrupted by a house invasion and the rape of Lucy by three African young men. After the event, due to Lurie's failure to comprehend Lucy's reaction to the event, a rift starts to emerge between the father and the daughter. As a result, Lurie returns to Cape Town while keeping in touch with Lucy on phone. During the phone conversations, Lurie senses that Lucy is hiding some distressing information from

him. To find out about the truth, Lurie returns to the farm and discovers that Lucy is pregnant from the rape. Lucy has made a conscious decision to keep the child, which Lurie strongly opposes. Having failed to convince Lucy, he resigns and rents a room in Grahamstown to help her at the market on Saturdays and to dedicate himself to the disposal of the dogs' bodies at the animal shelter. Although widely admired for its literary technique and philosophical depth, the novel was deeply controversial at the time of publication due to its bleak portrait of the post-apartheid era South Africa.

In 2008, *Disgrace* was made into a movie, directed by Steve Jacobs and based on the screenplay by Anna Maria Monticelli. The movie is faithful to the original novel in terms of dialogue, narrative sequences, and the portrayal of characters, physical setting and scene arrangement. In short, it “captures about all there is to capture in the novel *Disgrace*” (Kennicott, 2009). The only notable difference between the movie and the novel is the arrangement of the last two scenes.

In the novel, the second to last scene describes a walk Lurie takes from his rented apartment through the veld of East Cape towards Lucy's farmhouse where he meets her at the gate. Coetzee lavishes the scene with poetic details: *“The wind drops. There is a moment of utter stillness which he would wish prolonged for ever: the gentle sun, the stillness of mid-afternoon, bees busy in a field of flowers; and at the center of the picture a young woman, das ewig Weibliche, lightly pregnant, in a straw sunhat. A scene ready-made for a Sargent or a Bonnard”*. The last scene in the novel unfolds at the animal shelter, where Lurie decides to put down a crippled dog that has been under his care. When asked if he is certain that he does not want to keep the dog a bit longer, Lurie replies “Yes, I am giving him up”, which concludes the novel.

In the movie, all the details (conversations, details in scenery, etc) in these two scenes strictly follow those described in the novels. The sequencing of the two scenes, however, has been swapped and the movie now ends with the farmhouse scene. The simple change of sequencing has produced significant effects, for it turns a “deeply pessimistic book” (Lowry, 1999) to a movie that “offers the hope that seems nearly absent from the novel”(Torrance, 2009). In SFL's term, the variation in temporal ordering of elements in logogenesis result in semantic variation, more precisely

differences in interpersonal prosody (Martin & White, 2005) between the novel and the movie.

By comparing the two versions of *Disgrace*, I seek to illustrate the significance of sequencing plays in logogenetic meaning-making process. That is, while all other variables keep constant (although strictly speaking, it is not the case in this example), the simple change of sequencing can create variations in ideational or interpersonal meanings.

At this stage, however, semiotic analysis of the techniques involved in describing and modelling sequencing patterns faces a number of challenges, including research design and modelling technique. Methodologically speaking, the description of sequencing patterns requires strict variable controls in data selection so that the effect of other semiotic patterns in creating semantic variations between texts can be minimised (though in natural language text it can never be eliminated). From a modelling perspective, sequencing patterns involve a large amount of variables and possible combinations of temporal orders of the variables. As a result, this type of pattern cannot be handled adequately by manual analysis, and requires sophisticated computational modelling techniques such as visualisation (for discussions of visualisation technique and SFL descriptions see Zappavigna, Dwyer, & Martin, 2010). Due to the scope and focus of the research, the modelling of sequencing patterns will not be explored further in this thesis.

3.2.3.3 Coupling

Coupling concerns the temporal relation of ‘*with*’: variable *x* comes with variable *y*. To put it in another way, it is the relation formed between two semiotic elements at one given point in time within the logogenetic timeframe. Coupling can be formed between metafunctional variables (e.g. ideational and interpersonal), between different semiotic resources (e.g. image and verbiage) and across strata (e.g. semantics and phonology).

The theoretical hypothesis here is that although there exists potentially an indefinable amount of coupling possibilities between semiotic variables (metafunctional, stratal, intersemiotic, etc), a given culture at a particular historic period will produce a set of stable coupling patterns that can be theoretical described. This is compatible with Bakhtin's (1981) notion of speech genres as stable patterns of utterance—a Bakhtinian term comparable to *parole* in Saussure's (1959) and instance in SFL (see also Martin's work on genre 1992, 1997, Martin & Rose, 2008, which models genre as cultural potentials or sub-potentials, and shares the same theoretical assumption).

Since a given culture is inclined towards a stable set of coupling patterns, the disruption of these patterns can often create comical, satiric, artistic or other effects. I shall use the comedy sketch series WWII RAF (Armstrong & Miller, 2007-) by the British comedy duo Alexandra Armstrong and Ben Miller as an example here. The black-white TV sketches depict the lives of two Royal Air Force officers, played by Armstrong and Miller, during the Second World War. The two characters speak with an old fashioned 'public school boy accent' that is often associated with 'posh' RAF officer in WWII movies. However, the grammatical structures (e.g. *I was like...*) and lexical choices (e.g. *random, innit*, etc) of the characters involve mimicry of contemporary British youth talk. Moreover, while the subject matters centres around WWII (e.g. lives in prisoner-of-war camp), the evaluative language is contemporary (e.g. *this is against human rights and all that*). The comic effect of the sketches hinges on the disruption of a series of coupling patterns, for instance, the stratal coupling between phonological, grammatical and semantic variations associated with the RAF (In SFL, this phenomenon is explained from the perspective of system as codal and dialectal variations see Halliday, 1978; Matthiessen, 2005); or the metafunctional coupling between experiential and interpersonal meaning associated with WWII.

The notion of coupling can be traced back to Martin's (2000) earlier work on APPRAISAL system in English, in which he has explored the 'coupling' of ideational and interpersonal during the unfolding of a text. However, as has been discussed previously, in more recent development, Martin (2008, 2010) has been attempting to remap the notion of 'coupling' onto his model of instantiation. As a result, 'coupling' in

his model relies on paradigmatic descriptions and is modelled from the potential end of the instantiation cline (see detailed discussions in Section 3.1.3.2 and 3.1.3.3). Therefore, despite the similarity in conceptualisation, the theoretical position of the **coupling** as conceived in this thesis has diverged greatly from Martin's notion (for studies of intersemiotic coupling using Martin's framework see Caple, 2009). The coupling between image and verbiage will be explored in details in Chapter 4. In particular, I will discuss the theoretical principle for forming semantic couplings between image and verbiage (**the minimal mapping hypothesis**) as well as the analytical criteria for recognising image-verbiage couplings.

3.2.3.4 Clustering

The final type of logogenetic pattern deals with the temporal relation of 'after'. It describes the ways in which a newly (i.e. later point of time in the logogenetic timeline) formed pattern expands (extend, enhance or elaborate) earlier patterns. These patterns are called **clustering**. In essence, **clustering** patterns deals with the phenomenon anecdotally described by SFL discourse analysts as 'snowballing'—the accumulation of meaning as the text unfolds. In SFL, there has long been an interest in the accumulative affect of evaluative patterns, for example, the work on interpersonal prosody by Martin & White (2005). More recently, computational visualisation technique has been introduced in modelling the forming of APPRAISAL clusters (Zappavigna, et al., 2010).

The clustering patterns to be explored in this thesis concern the ideational metafunction. The theoretical hypothesis about coupling also applies to clustering, that is, a given culture tends to utilise a stable set of clustering patterns, and a genre (Bakhtin, 1981) is often associated with a particular clustering pattern. The inspiration for ideational clustering is largely drawn from Martin's (1992) work on lexical relations and Hasan's work on cohesive harmony (Hasan, 1984). In particular, I explore the potential of translating concepts such as chain/string interaction and token density into the logogenetic model. The intersemiotic clustering patterns will be discussed in detail in Chapter 4. Here, I shall address briefly the issue concerning

the handling of clustering patterns through manual analysis. In doing so, I also provide a simple illustration of the notion of ideational clustering.

Like sequencing, clustering cannot be handled adequately by manual analysis in particular in multimodal environments due to the amount of variables involved. During an earlier experiment with modelling logogenetic patterns, however, it was discovered that a clustering pattern could be observed to a certain degree by focusing on one variable, for instance, participants. Text 3.2 lists the texts and Figure 3.15 is a demonstration of difference in clustering patterns between two verbal texts and.

Text 3.2 Ideational clustering: Rabbits and Snoopy

a. Rabbits (Marsden & Tan, 1999)

1. *The rabbits* came many grandparents ago.
2. At first *we* didn't know what to think.
3. **They looked a bit like us.**
4. There weren't many of *them*.
5. *Some* were friendly.
6. But *our old people* warned us.
7. Be careful.
8. *They* won't understand the right ways.
9. *They* only know their own country.
10. More rabbits came...
11. *They* came by water.
12. **They didn't live in the trees, like we did.**
13. *They* made their own houses.
14. **We couldn't understand the way [[*they* talked]].**

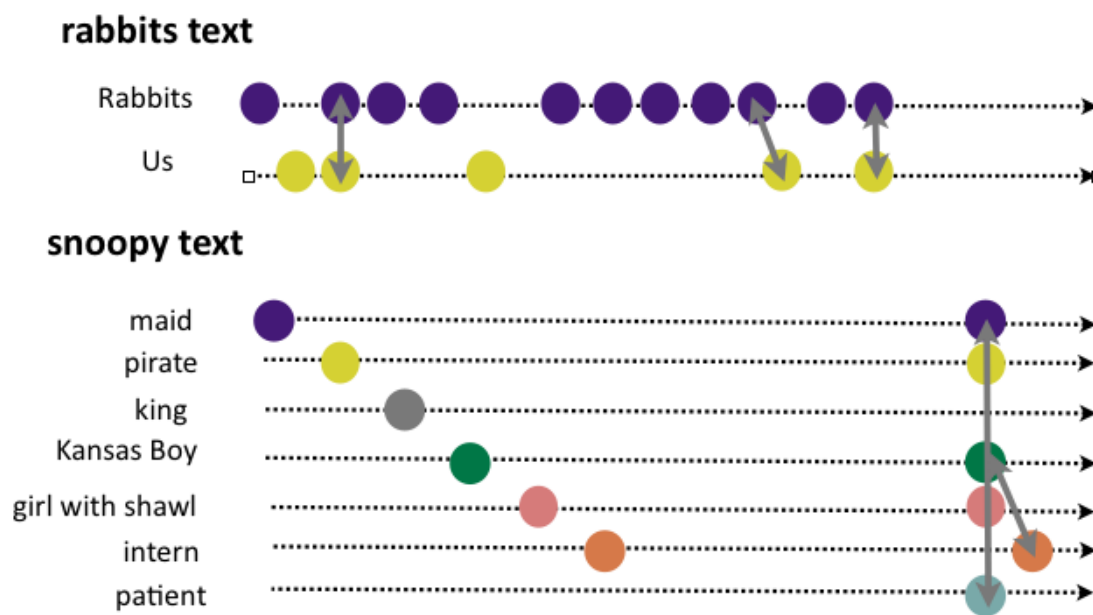
b. Snoopy⁴ (Schulz, 2007)

1. (Snoopy is sitting on top of his dog-house typing a story) --
2. It was a dark and stormy night.
3. Suddenly a shot rang out.
4. A door slammed.
5. *The maid* screamed.
6. Suddenly *a pirate* ship appeared on the horizon.
7. While *millions of people* were starving,
8. *the king* lived in luxury.
9. Meanwhile, on a small farm in Kansas,
10. *a boy* was growing up. (End of Part 1)
11. ...A light snow was falling
12. and *the little girl* with the tattered shawl had not sold a violet all day.
13. At that very moment, *a young intern* at City Hospital was making an important

⁴ Courtesy of Jim Martin, who first drew my attention to the unusual textual patterns in a series of texts he has collected throughout his career.

- discovery.
14. *The mysterious patient* in Room 213 had finally awakened.
15. **Could it be that she was the sister of the boy in Kansas who loved the girl with the tattered shawl who was the daughter of the maid who had escaped from the pirates?**
16. *The intern* frowned.
- (Snoopy: See how neatly it all fits together?
Linus: But what about the king?)

Figure 3.15 Ideational clustering patterns: An illustration



In Text 3.2, the first text (a), *Rabbits*, is an excerpt (the first half of the book) from a popular Australian children's picture book of the same name, and the *Snoopy* text originates in a famous 1965 comic strip by Schultz in which Snoopy lugs a typewriter up to the roof of his doghouse and writes the above novel. The clustering pattern of each text is presented in Figure 3.15. The representational technique used here is adapted from Martin's (1992) model for lexical strings. In the figure, each dotted line represents a participant string. The arrow (at the end of a dotted line) indicates the direction of unfolding. The circles on the string are tokens of participants. The purpose of using visual items to replace lexical item is to add a level of abstraction. That is, what is being considered here are the patterns rather than the lexical items themselves. The solid line (with arrows at both ends) indicates string interaction.

There are three aspects to ideational clustering: 1) token density, i.e. the number of tokens on each string; 2) initial string interaction, i.e. the point on the logogenetic timeline where the first interaction between two strings occur; 3) the frequency of string interaction, i.e. how many times interaction between two strings occur. The theoretical and technique details (including its relation with Martin and Hasan's work) will be elaborated in Chapter 4; here I shall focus on elucidating the concept through the interpretation of clustering patterns in the two texts.

The clustering pattern in *Rabbits* reflects the typical characteristics of a story genre. There are two participant strings in the text, the rabbits and us (non-identified participant). Comparing the two strings, the 'rabbits' string shows much higher token density, indicating the status of the rabbits as the main protagonist in the story. Interestingly, in the original picture book, the rabbits are the only visually represented character, while 'us' is completely absent throughout. The interaction between the two strings occurs at beginning on the logogenetic timeline, establishing the relation between the participants fairly early in the story. Throughout the unfolding, the two chains interact frequently (the points of interaction are highlighted in **bold** in the text), which suggests that the two characters' activities are closely related throughout the story. In the *Snoopy* text, in contrast, each string only has two lexical tokens. The strings only interact with each other once at the very end of unfolding. The *Snoopy* text creates its humorous effect by subverting the usual ideational clustering patterns of story. In a typical 'well written' story, each central character and their actions should be closely related; in other words, the ideational meaning should form a cluster (of various degrees). In fact, Schultz drew this particular comic strip as a reflection on the art of story telling and the challenges it involves for confident but struggling writer like Snoopy.

To be able to study ideational clustering patterns across various genres, we need a large quantity of data, the assistance of computational annotation and visualisation tools, and most importantly fine-grained research questions and designs. This challenge is nevertheless beyond the scope of this research. However, as will be demonstrated in Chapter 4, clustering can be modelled manually if we are to focus on one particular variable (e.g. participant) and a shorter timeframe within the

logogenetic timeframe. These ‘smaller’ clustering patterns will be referred to as **local clusters** (see Chapter 4, Section 4.3).

3.2.4 Key notions in the logogenetic model: A summary

In this section, I have introduced a new theoretical perspective for modelling logogenetic process—the **time axis**. I have illustrated the two main aspects in a time-based model: the recognition of time-based semiotic unit, known as a **logogenetic unit** and the description of time-based semiotic patterns within the **logogenetic timeframe**, called **logogenetic patterns**. I have proposed a new definition of **text** as a basic logogenetic unit. In this definition, text is not defined as a semantic constituent but rather as a meaning making process taking place within the logogenetic timeframe that aims for a certain communicative purpose. This definition, I have argued, frees the notion of text from both the constraints of constituency structure and the boundary imposed by the medium. I have also used examples to illustrate three basic types of logogenetic patterns: **sequencing** (the overall temporal positioning of semiotic variables within the logogenetic timeframe); **coupling** (the forming of relations between variables at a given point in time); and **clustering** (the expansion of meaning through clustering of patterns). The coupling patterns and local clustering patterns in Multimedia Interactives will be explored respectively in Chapters 4 and 5. In the following section, I shall take the first step in applying the proposed logogenetic model in analysing MIs—the selection of the basic analytical unit.

3.3 From theory to practice: Applying the logogenetic model in analysing Multimedia Interactives

In this section, I endeavour to apply the logogenetic model proposed in the previous section to the study of Multimedia Interactives, focusing on the determination of the basic analytical unit. As has been discussed in Section 3.2.2.2, the logogenetic unit is

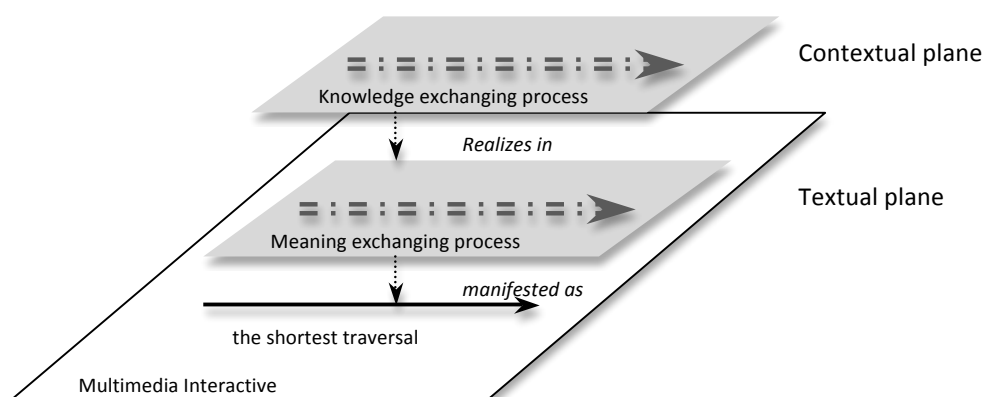
defined as a completion of a meaning making or exchanging process that aims for a given communicative purpose. The selection of a logogenetic unit as the basic analytical unit, therefore, depends on the type of process we are interested in. And the description of such process should help address the two central research questions of this thesis most effectively. The basic analytical unit I use in this research is called Critical Path. In the remainder of this section, I first introduce the notion of critical path as a logogenetic unit and the ways in which it can be identified in the MIs. I then present the theoretical motivations for choosing Critical Path as the basic analytical unit of this research. I also discuss the technique issues involved in data preparation, i.e. the coding of Critical Path.

3.3.1 Critical Path as a logogenetic unit

3.3.1.1 Critical Path: What

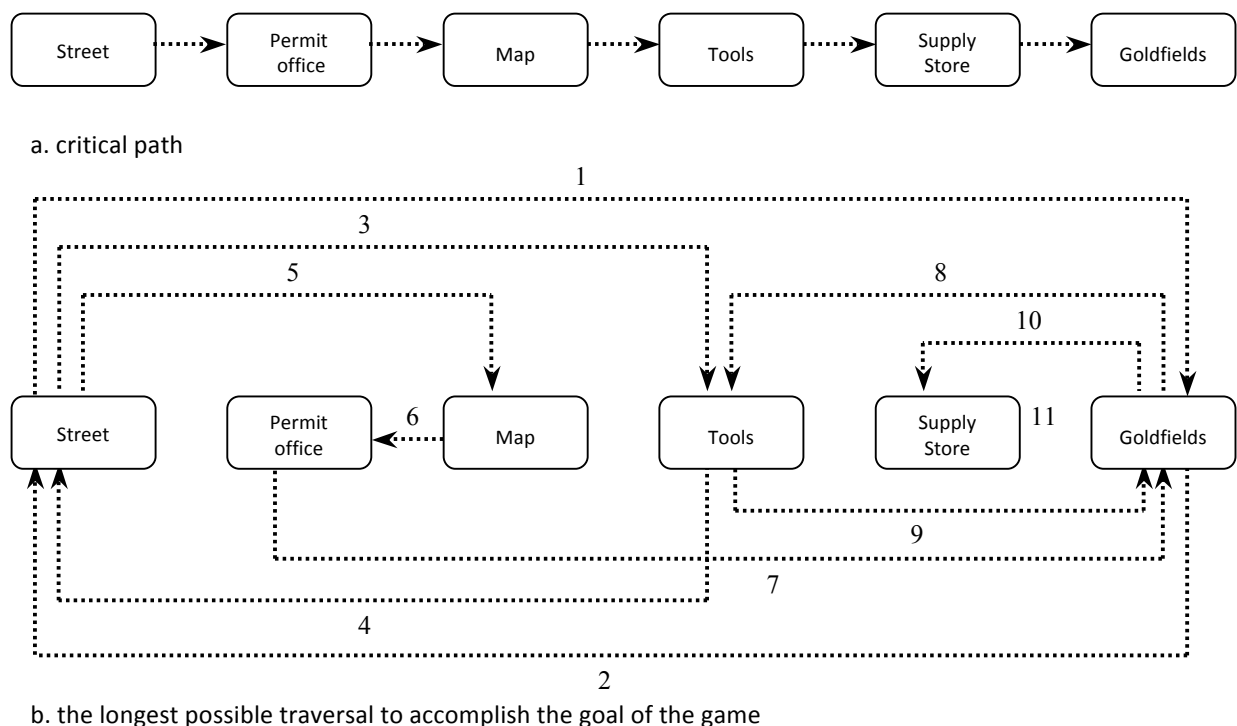
The notion of critical path (Kolman & Beck, 1995, p. 285) is borrowed from computer programming and game design theory. In a game, a critical path refers to the route to accomplish the goal of a game that covers all and the only necessary tasks. I use critical path in this thesis in more or less the same way, referring to the traversal to complete the task of a MI that involves the least amount of recursion on the same navigation path.

Figure 3.16 Critical Path as a logogenetic unit: a bi-stratal view



As a logogenetic unit, a **Critical Path** is the completion of a digital learning process by the 'ideal' learner, i.e. a learner who has adequate hypertext literacy skills to complete the tasks set in each MI most effectively. A Critical Path functions at both textual and contextual levels (see Figure 3.16). At the contextual level, a Critical Path is a social process in which a learner successfully trades one set of knowledge structures for another of a higher order. The social process of learning is in turn realized in the process of meaning making, or meaning exchange between the learner and the hypertext on the Critical Path. The meaning exchange process has its physical manifestation, or 'footprint', as the shortest traversal through a MI.

Figure 3.17 The comparison between a Critical Path and the longest possible traversal: *Gold Rush!*



In a mission-oriented MI such as *Gold Rush!*, the Critical Path can be easily identified. It usually manifests itself as the most efficient navigation path to accomplish the mission of the MI. In *Gold Rush!* (Figure 3.17), for instance, if the learner understands and follows the instruction given at the beginning of the navigation, it should only take him/her five steps to 'find' the gold (Figure 3.17a), in contrast to the traversal presented in 3.17b which takes up to eleven steps. There are potentially even longer traversals, which typically lead to failure in the task.

In a product-oriented MI, Critical Path refers to the process of navigating through the ‘idealized’ traversal. ‘Idealized’ here includes two aspects: 1) an ideal navigation traversal needs to cover all the contents on the instruction page or ‘homepage’ (Knox, 2010), and 2) the navigation sequence is predictable from the hierarchical structure (Djonov, 2008) or/and the layout (Kress, 1997; Kress & Van Leeuwen, 1998) of the hypertext. In *New Homes*, for example, the ‘product’ the user needs to create is a virtual exhibition based on the experiences of two European immigrants during the immigration wave after World War II. On the instruction page of the game (Plate 3.2a), the user is asked to “*choose of one of the three photos to begin*”. To create a successful exhibition, the learner needs to click the photo of either of the two women before clicking the ‘create exhibition’. He/she also needs to navigate through the stories of both women. Although the sequence in which the stories of the women are explored is not important here, it is reasonable to assume that a left to right reading sequence will be favoured (cf. Kress & Van Leeuwen, 2006 [1996]), i.e. Petronella Wensing’s story will be read first.

Plate 3.2 Critical Path in a product-oriented MI: *New Homes*

a. Instruction Page



Plate 3.2 (continued) Critical Path in a product-oriented MI: *New Homes*

b. Homepage for Petronella Wensing

Petronella Wensing

Select each photo below to find out more.

Back to menu Audio

Germany invades the Netherlands

Petronella around 1940

1924 1940 1948 1953 1956 1980s

Acknowledgements

c. Storeroom

New homes Storeroom

Go to exhibition Back to menu

Preview Storage area

Create your exhibition
Now create an exhibition about the experiences of displaced persons such as Petronella and Liliija, who immigrated to Australia after World War II.

Next

1 of 7

Leaving home Separation from friends and family Skills and work Room 4 title

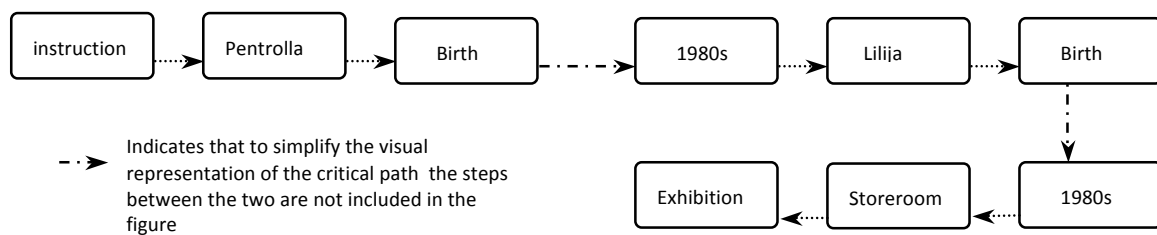
Leaving home
Edit this exhibition label in the Preview window.

Acknowledgements Work space

Once the learner clicks the photo of Petronella Wensing, they will be directed to the 'homepage' of her story (Plate 3.2b). The written instruction asks the learner to

“select each photo below to find out more”. The photos are placed near the bottom of the page. Below the photos is a timescale indicating the timeline of Petronella. The timescale indicates that the photos are arranged chronically. In a sense, the homepage is a visual ‘resemiotization’ (Iedema, 2001a) of an Biographical Recount, a type of history genre (Martin, 2003). The icon for time functions as a visual hyper-theme (Martin & Rose, 2007) here. It predicts the sequencing of the preferred navigation path, i.e. following the chronicles of Pentronella. In the next step, the user moves on to the story of Lilija Brakmanis, following a similar navigation sequence. In the final stage, the learner enters the Storeroom (Plate 3.2c), where all the images viewed during the navigation will be used to create a virtual exhibition. The ideal navigation path, i.e. the Critical Path, through New Homes is summarized in Figure 3.18.

Figure 3.18 New Homes: Critical Path



3.3.1.2 Critical Path: Why

There are two theoretical motivations for using Critical Path as the analytical unit for this study. Firstly, it offers descriptive advantages, enabling fine-grained semiotic analysis, and promises a higher level of descriptive consistency. The ability of hypertext to generate different numbers of reading pathways is well documented (e.g. Djonov, 2005; Zammit, 2007). Conventional studies of hypertext tend to focus on exploring the nature of navigation pathways, e.g. how many different reading pathways the reader can potentially form and why. This type of study essentially examines hypertext from a bottom-up perspective, i.e. taking the technological affordance of the hypertext media as a starting point. Due to the complexity of

hypermedia texts, the researcher tends to focus on the study of global structure rather than that of local semiotic patterning.

Taking online banking for example, the bottom-up perspective might explore the structure of the homepage of a bank and compare it with that of another financial institution. The time-consuming nature of such a task (e.g. Knox, 2010) means that little attention can be paid to the actual linguistic configurations on a website. If we take a top-down approach, however, we will start by asking questions such as “what is the social process of getting a home loan through digital banking”, “how is this social process realized in the texts,” or “ what (if any) are the institutional differences between major commercial banks in regards to e-banking”, etc?

In short, the top-down approach focuses on the logogenetic process of online banking as opposed to the structure of a bank website. The hypothesis here is that to complete an online home loan (efficiently and successfully) in any bank website should involve a limited number of navigation pathways regardless of the structure of the site. The ‘online pathways to home loan’ offered by different banks are comparable logogenetic units since they realize essentially the same social process. We can then start examining in detail the linguistic components (e.g. the choice of interpersonal resources) on each pathway, exploring the deeper social structural differences between digital and conventional banking, and the institutional variations, etc.

In a similar vein, a Critical Path realizes fundamentally the same social process of knowledge exchange despite the superficial differences in the interactive and navigation structures of the MIs. And there is one single critical path in each MI. Once comparability is established, the research focus can be directed into the study of the configurations of local semiotic patterning, in the case of this research, the various types of intersemiotic logogenetic patterns. Using one fixed analytical unit also provides the first step towards a more rigid and consistent account of intersemiotic relations. In essence, it is a simple method of variable control widely used in the field of sociolinguistics (Coupland & Jaworski, 1997).

Focusing on critical paths also serves the educational purpose of this research. It helps to understand the impact of ICT and digital media on literacy pedagogy. The majority of the research in ICT seems to share the assumption that the students of today are the “digital natives” (Prensky, 2001a, b), and the engagement with digital media in educational settings will better accommodate their new ways of thinking and learning. Setting aside the fact that the “digital natives” claim requires further empirical verification (Bennett, Maton, & Kervin, 2008), the focus tends to be placed primarily on the students’ access to technology. My primary concern in this thesis, however, is a student’s access to various semiotic resources in the digital media, in other words, the access to meaning. The ability to access and control various social semiotic codes, as demonstrated in the work of the SFL and the Bernsteinian tradition (Bernstein, 1971, 1974, 1975, 2000; Cloran, 1999; Hasan, 1988; Hasan & Cloran, 1990; Hasan, Martin, & Halliday, 1989; Hasan, Williams, Butt, & Cloran, 1996; Williams & Hasan, 1996), has seldom been viewed as identical among different social-economic groups. Therefore, there’s little ground for assuming that all students will have equal access to digital genres, at least those highly valued in the society and educational systems.

MIs like most ICT materials are designed to prompt the learning of a particular subject area and the Critical Path is the most efficient way to achieve this goal. In a sense the description of Critical Path is analogical to the study of a ‘model’ classroom (cf. Christie, 2002) where the most effective learning is taking place. The understanding of Critical Path in this sense allows us to gain insights into the types of literacy skills a student needs to possess in order to take full advantages of these materials. It is important to point out here that by choosing Critical Path, I am NOT privileging it over other pathways students may create and thus restricting the freedom digital learning offers them. The point is that we need to provide students with the resources, or borrowing Bourdieu’s (1991) word, “*capital*” to enjoy this freedom.

3.3.2 Data preparation: Coding Critical Path

3.3.2.1. Coding Critical Path: Issues and solutions

Once Critical Path is chosen as the basic analytical unit of the research, the next step is to code all the critical paths in the five MIs. I use the word—coding—here, to distinguish it from the concept of transcription (Baldry & Thibault, 2006; Flewit & Hampel, 2009; Norris, 2004; Thibault, 2000) or annotation (Bateman, 2008a) in multimodal discourse analysis. As Thibault (2000) has shown, multimodal transcription is more than a simple procedure of putting original texts into a written and visual record using computer software. An analyst needs to make careful decisions about the ways in which the text is segmented, and the types of semiotic modes being recorded. These decisions will invariably reflect an analyst's view on discourse and multimodality, and the purpose of his/her research (e.g. Roberts, Djonov, & Torr, 2008; Zappavigna, et al., 2010). In short, multimodal transcription should be theoretically motivated.

Most current transcription frameworks constitute the first step in the multimodal analysis. Coding, in contrast, does not. The central concern of coding is to record the 'footprints' of a meaning making process. In a sense, it is analogical to the practices in forensic science, where footprints are first moulded then measured. Based on various measurements, the expert will then be able to recover the process, e.g. height/weight of the suspects, the speed they escape, etc. To code the critical path thus is to 'mould' the 'footprints' of the ideal learner's meaning making process, while transcription is more or less the 'measuring' of the 'footprints'.

The theoretical considerations for coding are thus different from that of transcription. The key point is to preserve the original traversal as faithfully as possible. This first requires the emptying of theoretical presumptions about how the texts should be segmented or what types of semiotic modes need to be recorded. Unlike transcription, these problems will be dealt with in the second step of the analysis. Of course, it would be naïve to suggest it is possible to record the data free from any theoretical influences. As will be illustrated in detail in next section, the coding method (e.g. the selection of basic coding unit, the way in which frames are ordered)

incorporates the basic theoretical hypothesis of the time-based logogenetic model developed in the thesis. In addition, the data has been annotated for interpersonal and ideational grammar (MOOD, TRANSITIVITY) and discourse features (APPRAISAL and lexical string).


To preserve faithfully the footprints also entails that no extra layers of semiotic relations should be added during the coding. In the early stage of the research, I experimented with a few techniques. For example, I recorded the process of navigating through the critical path (recordings included in Appendix V) using software such as *Camtasia*⁶ and then transcribed and annotated it using software such as *Elan*⁷. The method was eventually abandoned, for it is not clear to me whether or not this would impose a new layer of sequencing relation to the data. In other words, I was concerned that this method might potentially alter the nature of hypertext by transferring it to a time-based text such video recording. In the following, section, I shall illustrate the coding schema that has been developed for this research, using *Gold Rush!* as an example.

3.3.2.2 Critical Path in *Gold Rush!*: An illustration of the coding scheme

The full coding scheme for *Gold Rush!* is presented in Appendix III. Table 3.6 presents two short segments from the coding sheet.

Table 3.6 Segments from the coding scheme for the critical path in *Gold Rush!*

a. Opening sequence & in the town

Frame		Visual		Audio	
Seq.	Layer	IMAGE	LANGUAGE	LANGUAGE	OTHERS
3					<i>Music</i>
		Fade in			

⁶ © 1995-2011, TechSmith Corporation <http://www.techsmith.com/camtasia>

⁷ © 2008, LAT <http://www.lat-mpi.eu/tools/elan/>

Table 3.6 (continued) Segments from the coding scheme for the critical path in *Gold Rush!*







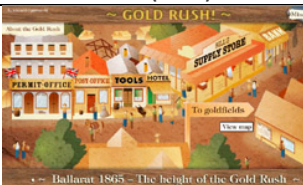
Frame		Visual		Audio	
Seq.	Layer	IMAGE	LANGUAGE	LANGUAGE	OTHERS
	^1. Place				
		Move in			
	^2. Boats				
		Move in			
	^3. Ling			<p>Hi I'm Ling. My father has come to Australia from China to find gold. Thousands of people are still rushing here from lots of different countries. That's why [[it is called the Gold Rush.]]</p> <p>Hi I'm Ling. My father has come to Australia from China to find gold. Thousands of people are still rushing here from lots of different countries. That's why [[it is called the Gold Rush.]]</p>	
		Zoom in			
4	^1. Ling				
		Zoom in			
5	^1. Ling				
		Fade Out/In			
6	^1. Ling			<p>Are you ready to join the rushing dig for gold? Let's start.</p> <p>Are you ready to join the rushing dig for gold? <Polar Interrogative> Let's start. <Imperative></p>	
		Click (Enter)			
7					Street noises
		Move in			

Table 3.6 (continued) Segments from the coding scheme for the critical path *in Gold Rush!*

Frame		Visual	Audio		
Seq.	Layer	IMAGE	LANGUAGE	LANGUAGE	OTHERS
	^1.Ling			<p>We have arrived in Ballarat. Most of the goldfields are couple days of walk away, so you need to make sure you have everything you need BEFORE setting out.</p> <p>We have arrived in Ballarat. Most of the goldfields are couple days of walk away, so you need to make sure you have everything you need before setting out.</p>	

b. In the tool shop

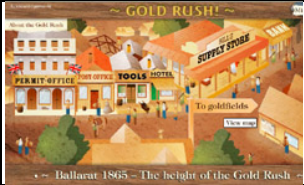
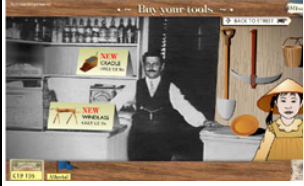



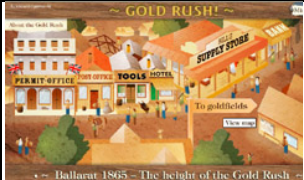
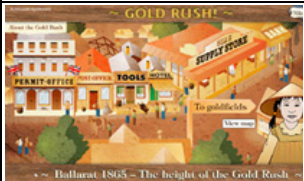

Frame		Visual	Audio		
Seq.	Layer	IMAGE	LANGUAGE	LANGUAGE	OTHERS
11=7					
		Click (tool shop)			
12	^1.Ling			<p>You will need some mining tools before you start digging. Luckily, some of the miners [from other countries] brought tools with them [[that are specially made for the job]]. They didn't exist in Australia before.</p> <p>You will need some mining tools BEFORE you start digging. Luckily, some of the miners [from other countries] brought tools with them [[that are specially made for the job]]. They didn't exist in Australia before.</p>	Sound effects of tilt being open
	^2.instruction		<p>find out about each tool AND THEN buy the tools [[you need for your mine]]. Go back to the map IF you need help.</p> <p>Find out about each tool and then buy the tools [[you need for your mine]]. Go back to the map <imperative> if you need help.</p>		
		Click (close)			
					

Table 3.6 (continued) Segments from the coding scheme for the critical path in *Gold Rush!*

Frame		Visual		Audio	
Seq.	Layer	IMAGE	LANGUAGE	LANGUAGE	OTHERS
		Click (cradle)			
	3.Cradle		<p>Cradle The cradle separates dirt, clay and gravel from gold. As the miner rocks the cradle, water washes through the dirt, separating out the gold.</p> <p>Cradle The cradle <u>separates</u> dirt, clay and gravel from gold. As the miner <u>rocks</u> the cradle, water <u>washes</u> through the dirt, separating out the gold.</p>		





The coding sheet consists of three main columns, (from left to right): frame, visual and audio. The first column on the left indicates the basic coding unit for the scheme: frame. **Frame** refers to the basic background image onto which other objects (e.g. animated figures and objects, text box, etc) can be layered. The frame column is then divided into two columns: **Sequence** and **Layer**.

Table 3.7 Example of a frame: Frame 7 & 11

Frame		Visual		Audio	
Seq.	Layer	IMAGE	LANGUAGE	LANGUAGE	OTHERS
7					Street noises
	^1. Ling			<p>We have arrived in Ballarat. Most of the goldfields are couple days of walk away, so you need to make sure you have everything you need BEFORE setting out.</p> <p>We have arrived in Ballarat. Most of the goldfields are couple days of walk away, so you need to make sure you have everything you need before setting out.</p>	
Frame 8- 10					
11=7					

The number in the ‘Sequence’ (see Table 3.7) column indicates the order in which the frame appears on the Critical Path. Some frames, for instance, Frame 7, will appear several times. This will be indicated by ‘= X’ after the first number. For instance, ‘Frame 11=7’ indicates that the frame is the 11th frame in the navigation sequence, and it is ‘physically’ identical to Frame 7. This extra numbering convention is crucial for it reflects one of the key hypotheses of the logogenetic model, namely that the sequence in which a semiotic unit (e.g. a text or an image) appears in the unfolding of a hypertext will impact on the configuration of the semiotic relations of the unit. Simply put, Frame 7 and Frame 11 are the same images with ‘different meanings’, i.e. has different semantic status in the unfolding of a text. A frame may contain hyperlinks. For example, in Frame 7, the icon for the tool shop is a hyperlinked anchor that directs the learner the next frame.

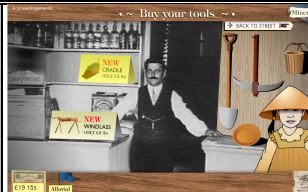

Table 3.8 Types of layers: Animated layers

Frame		Visual		Audio	
Seq.	Layer	IMAGE	LANGUAGE	LANGUAGE	OTHERS
3					<i>Music</i>
		Fade in			
	^1. place				
		Move in			
	^2. boats				
		Move in			
	^3. Ling			<p>Hi I'm Ling. My father has come to Australia from China to find gold. Thousands of people are still rushing here from lots of different countries. That's why [[it is called the Gold Rush.]]</p> <p>Hi I'm Ling. My father has come to Australia from China to find gold. Thousands of people are still rushing here from lots of different countries. That's why [[it is called the Gold Rush.]]</p>	

The second sub-column under Frame is **Layer**, which refers to the multimedia objects that appear on top of the background image. There are two basic types of layers: animated and still. An **Animated layer**, indicated by ^, is a visual object that appears automatically in the frame. For example in Frame 3 (Table 3.8), The highlighted icons for major continents (F3L1), the moving boats [F3L2] and the Chinese girl Ling [F3L3] are all animated layers. A learner has no control over the types of the animated objects and the sequence in which they appear.

A **Still layer** is a visual object that enters the frame through a learner's choice. That is, the learner needs to click on certain hyperlinked anchor in order for the layer to appear in the frame. In Frame 12 (Table 3.9), for example, the learner needs to click the icon for cradle (highlighted in yellow) in order to make the text box describing the purpose of a cradle in gold mining (F12L3) appear in the frame.

Table 3.9 Types of layers: Still layers

Frame		Visual		Audio	
Seq.	Layer	IMAGE	LANGUAGE	LANGUAGE	OTHERS
12					
	3. Cradle	<p>Click (Cradle)</p> 	<p>Cradle The cradle separates dirt, clay and gravel from gold. As the miner rocks the cradle, water washes through the dirt, separating out the gold.</p> <p>Cradle The cradle <u>separates</u> dirt, clay and gravel from gold. As the miner <u>rocks</u> the cradle, water <u>washes</u> through the dirt, separating out the gold</p>		

The coding scheme also records the ways in which one Frame transits into another and the ways in which a Layer appears. The transition types are presented in horizontal rows between each frame or each layer. **Click** (Table 3.10a) indicates that one frame transit to another through user clicking the hyperlinking anchors (for discussion of types of anchors in MIs see Chapter 2, Section 2.3.2.2). It is the only type




of manual transition. Others, such as Fade in, Move in (Table 3.10b) in are types of **auto transitions** similar to those used in film and animations.

Table 3.10 Types of Transition

a. Manual transition

Frame		Visual		Audio	
Seq.	Layer	IMAGE	LANGUAGE	LANGUAGE	OTHERS
6	^1. Ling			Are you ready to join the rushing dig for gold? Let's start. Are you ready to join the rushing dig for gold? <Polar Interrogative> Let's start. <Imperative>	
Click (Enter)					
7					Street noises

b. Auto transition



Frame		Visual		Audio		
Seq.	Layer	IMAGE	LANGUAGE	LANGUAGE	OTHERS	
3					Music	
Fade in						
	^1. place					
Move in						
	^2. boats					
Move in						

The middle and the right column indicate the channel in which a message is delivered (see Table 3.11): visual or audio. Images are presented visually, while verbal texts can be delivered through both channels. Music and sound effects are recorded in the column 'Others'. The verbal texts are divided into ranking clauses and analyzed for

basic systemic features, including ideational choices (TRANSITIVITY, lexical strings and conjunctive relations); and interpersonal systems (MOOD, MODALITY and APPRAISAL). The analysis is font and colour coded, and the legends at top of the table explain the font and colour scheme for the coding.

Table 3.11 Visual and text annotation: An example

||: Ranking Clause [[]] Embedded Clause
 SMALL CAP: CONJUNCTIVE RELATIONS
 Colour codes for lexical strings: participants, mining objects, locations, activity sequences (multimedia interactive)
 Colour codes for mood: Subject, Appraisal Finite, Modality

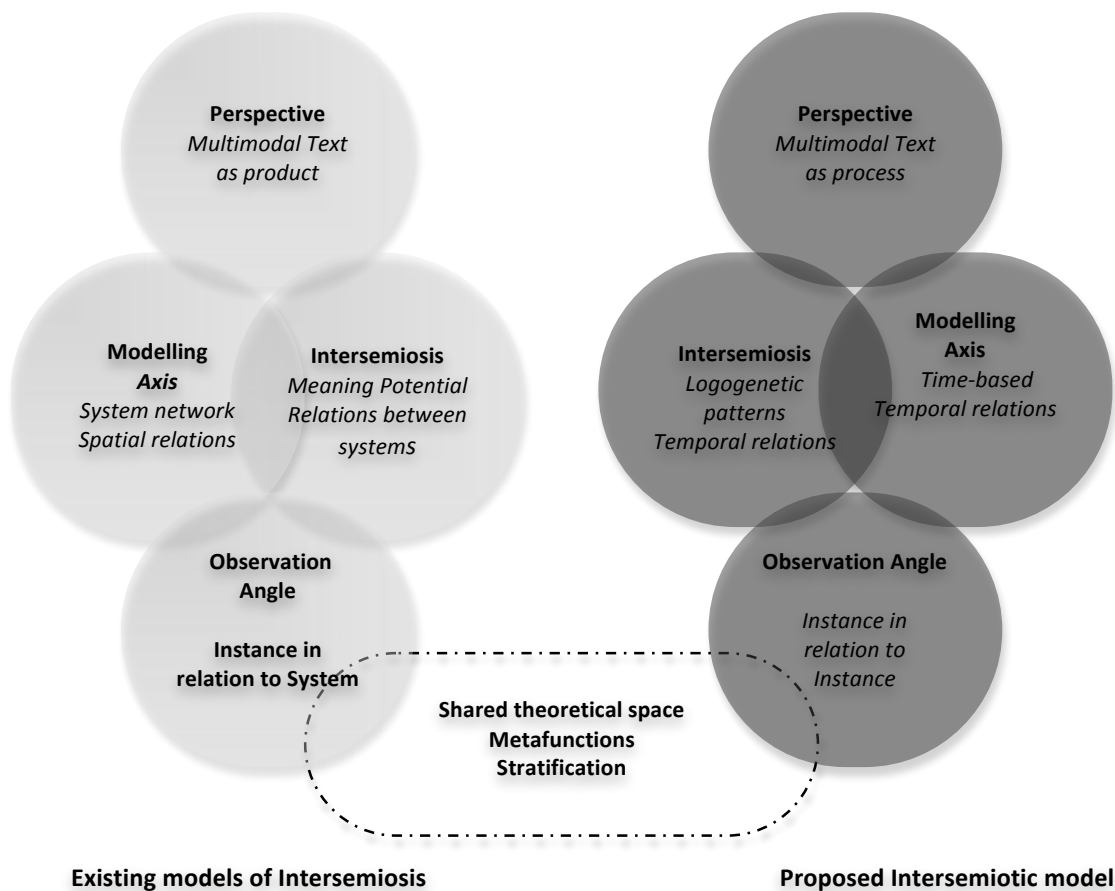
Frame		Visual		Audio	
Seq.	Layer	IMAGE	LANGUAGE	LANGUAGE	OTHERS
12	^1.Ling			<p>You will need some mining tools before you start digging. Luckily, some of the miners [from other countries] brought tools with them [[that are specially made for the job]]. They didn't exist in Australia before.</p> <p>You will need some mining tools BEFORE you start digging. Luckily, some of the miners [from other countries] brought tools with them [[that are specially made for the job]]. They didn't exist in Australia before.</p>	Sound effects of till being open
	^2.instruction	<p>Move In</p> 	<p>find out about each tool AND THEN buy the tools [[you need for your mine]]. Go back to the map IF you need help.</p> <p>Find out about each tool and then buy the tools [[you need for your mine]]. Go back to the map <imperative> if you need help.</p>		

3.4 Towards a time-based SF-MDA for intersemiosis: A Summary

In this chapter, I have proposed a time-based logogenetic model for describing intersemiotic relations. The key to this model is the time dimension—the main axis on which linguistic units and relations are defined and modelled. The introduction of the temporal axis involves two key aspects: the recognition of time-based semiotic units, and the modelling of time-based semiotic patterns. I have then introduced the basic time-based unit for this research—the logogenetic unit and proposed three

basic types of logogenetic patterns: sequencing (the overall temporal positioning of semiotic variables within the logogenetic timeframe); coupling (the forming of relations between variables at a given point in time); and clustering (the expansion of meaning through clustering of patterns). The differences between this logogenetic model and the existing models of intersemiosis are summarised as in Figure 3.19.

Figure 3.19 Existing models of intersemiosis and the logogenetic model: A summary



As shown in Figure 3.19, the proposed model involves four main shifts: 1) the **perspective** on multimodal text: from a product-oriented one to a process-oriented one; 2) foregrounded **axis**: from a spaced-based one (paradigm) to a time-based one (syntagm); 3) the nature of **intersemiotic relations**: from relations between semiotic systems to the patterns in instances; 4) **observation angle**, from the potential end of the instantiation cline to the instance end. I should emphasise here that these four shifts are not four different types of change but rather four aspects of the same shift. That is to say, in the process of theorisation, the shift of perspective

necessitates the foregrounding of a different axis, which in turn requires the change of perspective on the nature of intersemiosis, and vice versa. And the change in theoretical conceptualisation ultimately demands (or has its formalisation in) a different choice of modelling technique.

I have put forward two major arguments in this chapter. First, I have proposed a new definition of text as a logogenetic unit. I have suggested using the completion of a meaning exchange process as the criteria for determining a text unit instead of the boundary set by constituency structure or the physical boundary of the medium. Second, I have challenged the relation between multimodal data, MDA research and SFL theory. I have illustrated that in the adaptation of SFL categories in MDA research, the key lies in the adaptation of theorisation and modelling strategies rather than the concepts *per se*. I have proposed that SF-MDA research pursue a different set of research agenda and questions from the one set by grammatical description or language generation, and subsequently call for a different type of model.

In the final section of this chapter, I have applied the proposed logogenetic model in choosing a basic analytic unit for this research—Critical Path. Critical Path is defined at the contextual level as a social process in which a learner trades one set of knowledge structure for another of a higher order, and at the textual level as meaning exchange between the learner and the hypertext. Critical Path has its virtual manifestation as the shortest traversal through the MI. I have illustrated the rationale for choosing Critical Path as the basic analytical unit as well as the technique issues involved in coding Critical Paths in MIs.

In the following two Chapters, I will move onto the description of two basic types of logogenetic patterns and explore the two main topics of the research:

- Chapter 4: the construal of primary social science knowledge
- Chapter 5: the recontextualisation of the primary social science

Chapter 4 Major types of verbiage-image ideational couplings In Multimedia Interactives: Construing notions of community

4.0 Overview

In Chapter 3, I proposed a time-based logogenetic model for describing intersemiotic relations. Lying at the centre of the model are two notions: the logogenetic unit, defined as one complete process of meaning exchange, and logogenetic patterns (i.e. temporal semiotic patterns). I have also discussed the logogenetic unit that is used as the basic analytical unit in this research, termed Critical Path — the meaning exchange process between an ‘ideal’ learner and a MI, manifested as the shortest traversal through the MI.

In Chapter 4, I move on to the description of logogenetic patterns. The logogenetic pattern I focus on in this chapter is **coupling**, namely, the relation formed between two semiotic variables—verbiage and image—at the one given point on the logogenetic timeline. More specifically, I illustrate the major types of intersemiotic ideational couplings between verbiage and image generated through the Critical Path in MIs. My discussion involves three aspects of the verbiage-image couplings: 1) the underlying theoretical principle and analytical criteria, i.e. how couplings between verbiage and image are formed and how they can be recognised; 2) the major types of intersemiotic ideational patterns in MIs; I shall also explore the ways in which these coupling patterns form **local clusters** with the verbal elementary genres in which they occur; 3) and the types of primary social science knowledge construed in these coupling and local clustering patterns.

Chapter 4 is organised into four sections. Section 4.1 discusses the theoretical principle and analytical criteria for recognising intersemiotic ideational couplings. Section 4.2 exemplifies five major types of intersemiotic couplings in MIs— Naming, Identifying, Representing, Classifying-Exemplifying, and Circumstantiating, referred to as Ideational Inflation. Section 4.3 illustrates the ways in which coupling patterns

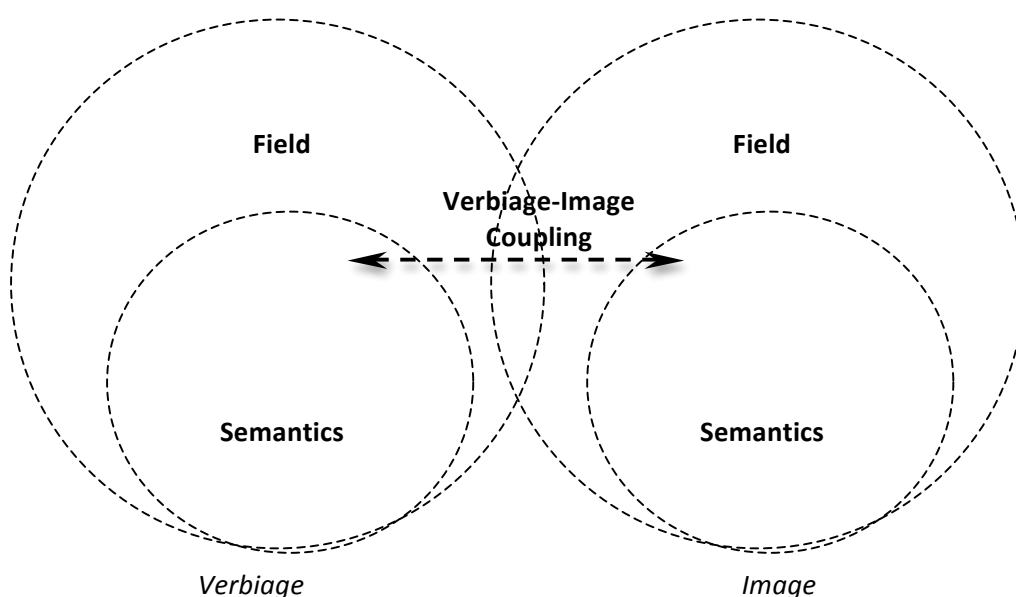
form local clusters with verbal texts, and Section 4.4 then locates the theoretical description of couplings within the broader context of primary social science and examines the types of knowledge construed in verbiage-image coupling and local clustering patterns in MIs.

4.1 Recognising verbiage-image couplings in MIs: Theoretical and analytical principles

In this section, I outline the underlying principles for recognising ideational verbiage-image couplings in MIs. There are two types of principles involved here: the theoretical ones explain the nature of verbiage-image coupling, i.e. how a coupling between verbiage and image is formed; and the analytical ones deal with the criteria for recognising these couplings in a hypertext environment where time-based (video and animation) and space-based (image and written text) data co-exist.

4.1.1 The minimum mapping hypothesis

Figure 4.1 The minimum mapping hypothesis



In this thesis, I propose **minimum mapping** as the basic principle in which verbiage and image form a coupling in multimodal text environments. The minimum-mapping hypothesis states that verbiage and image form a **coupling** if there is a *minimum* amount of mapping between the fields construed by each individual semiotic resource. In other words, if verbiage and image can co-construe one aspect of a social action, e.g. process (what is going on), participant (the participants that engage in the process), etc, they form a verbiage-image coupling (see Figure 4.1). In forming a coupling, verbiage and image create a temporarily shared meaning space in the logogenetic unfolding.

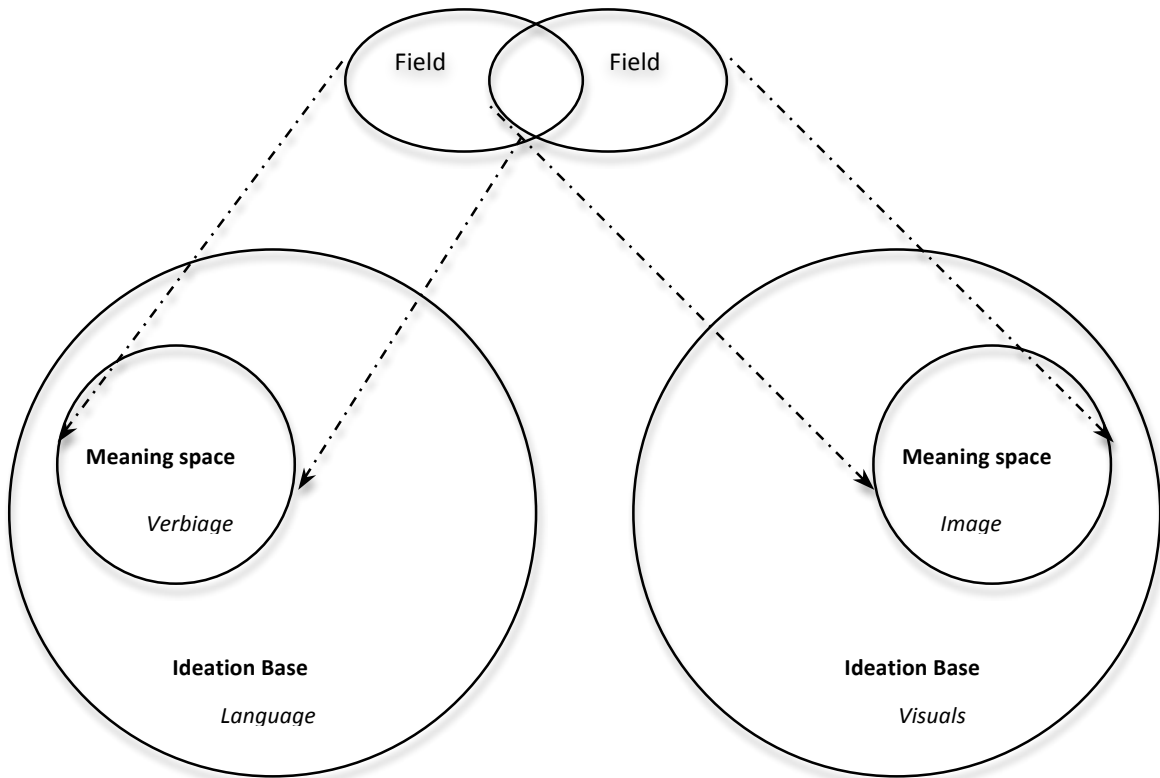
There are three basic theoretical assumptions behind the minimum mapping hypothesis:

Firstly, the minimum mapping hypothesis embraces a space metaphor for meaning, treating meaning as cartography (cf. Halliday & Matthiessen, 1999; Matthiessen, 1995). A space metaphor for modelling the hierarchical organisation of meaning is familiar to SFL. The semantic domain model proposed by Halliday and Matthiessen (1999) is one prominent example that explores such a metaphor. In the domain model, the general ideational semantic potential of language is perceived as a discrete space of meaning or semantic space, known as ideation base. A semantic space that is less than the overall meaning-potential of language but greater than the meaning space a single text occupies is a semantic domain. A given field is seen as projected onto one region of the ideation base, activating a portion of the total semantic resources.

In a similar vein, the minimum mapping hypothesis models the overall meaning potential of language and visual semiosis as two meaning spaces, or ideation bases. An instance of language (verbiage) and an instance of visuals (image) are seen as occupying respectively a small region—meaning space—within the ideational base of language and image. The field of verbiage and that of image are projected onto the meaning space within respective ideation bases (see Figure 4.2). The ideation base of language and visuals as well as the meaning space of verbiage and image do not

overlap, and this brings us to the second assumption behind the minimum mapping hypothesis.

Figure 4.2 Minimum mapping: A space metaphor

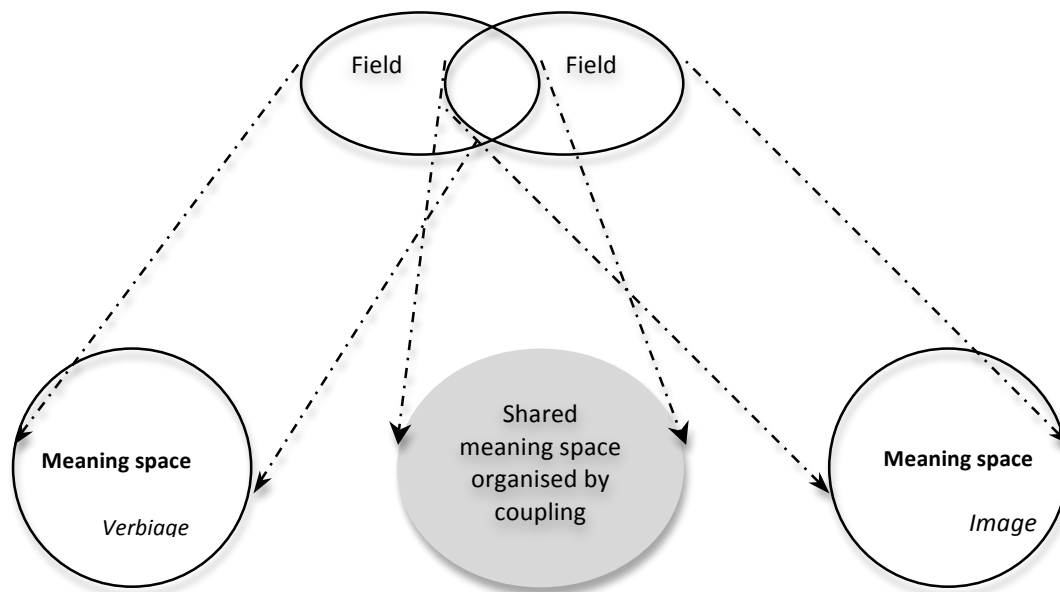


The second theoretical assumption recognises the incommensurable nature of the ways in which language and the ways in which visuals construe our experience of the world. Simply put, language and image construe the reality differently. The semantics of a verbal text will therefore not be equal to that of an image. As shown in Figure 4.2, the meaning space of verbiage and image are modelled accordingly as two independent spaces within their respective ideation base.

However, if a verbal text and an image construe a similar or the same aspect of our experience, there will be a certain degree of mapping between the two fields—that of the verbiage and that of the image. The shared field will then activate a third and shared meaning space (see Figure 4.3). In this shared meaning space, **coupling** constitutes the fundamental organising principle, coordinating the semantic integration of verbiage and image. It is, however, not clear at this stage that where the

boundary of minimum in minimum mapping lies, that is, how much/little 'overlapping' between the fields (construed by verbiage and that by image) is needed to form a verbiage-image coupling. The type of instances where image and verbiage are considered as 'mismatched' requires further investigation.

Figure 4.3 Minimum mapping: Field mapping and semantic integration

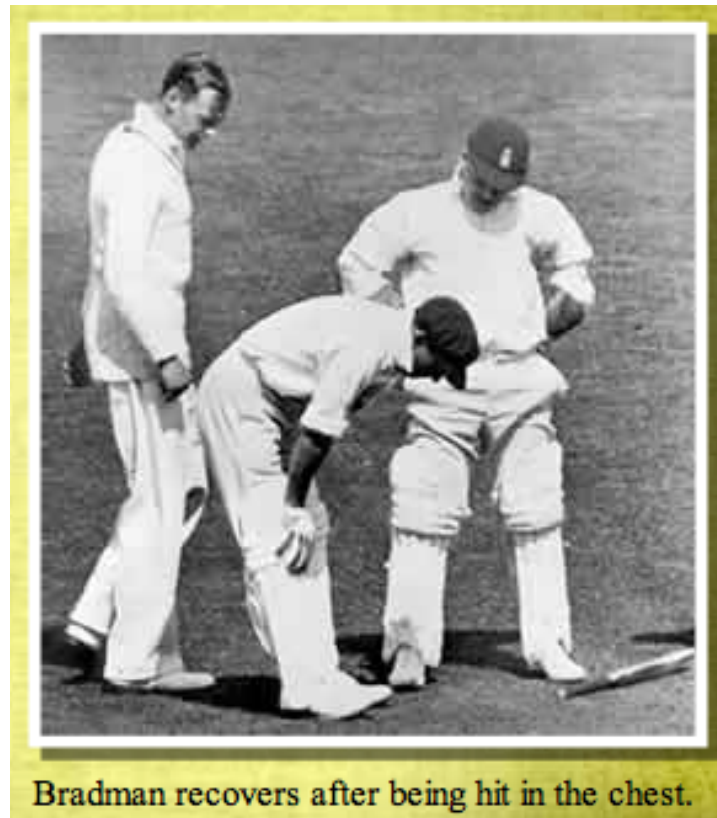


Finally, the minimum mapping hypothesis recognises the *temporary* nature of the shared meaning space coordinated by verbiage-image coupling. Coupling (see Chapter 3, Section 3.2.3.3) is essentially a temporal pattern formed at a certain point during the unfolding of a text. The meaning space organised by the coupling principle, therefore, is also logogenetically contingent. That is to say, this shared intersemiotic meaning space can be disrupted or expanded by patterns formed later in the logogenetic timeline. The stability of a shared meaning space depends on the type of coupling principle. As will be demonstrated later in Section 4.2, the couplings formed based on the principle of **abstraction** are more stable compared with those formed based on **generalisation** or **specification**.

So far, I have outlined the basic theoretical ideas behind the minimum mapping hypothesis. I shall now use an example from MIs to illustrate the mechanism of minimum mapping before moving onto the discussion of the analytical treatments of

coupling in Section 4.1.2. Plate 4.1 includes an example of coupling taken from *The First Golden Age of Cricket*.

Plate 4.1 Minimum mapping: An example

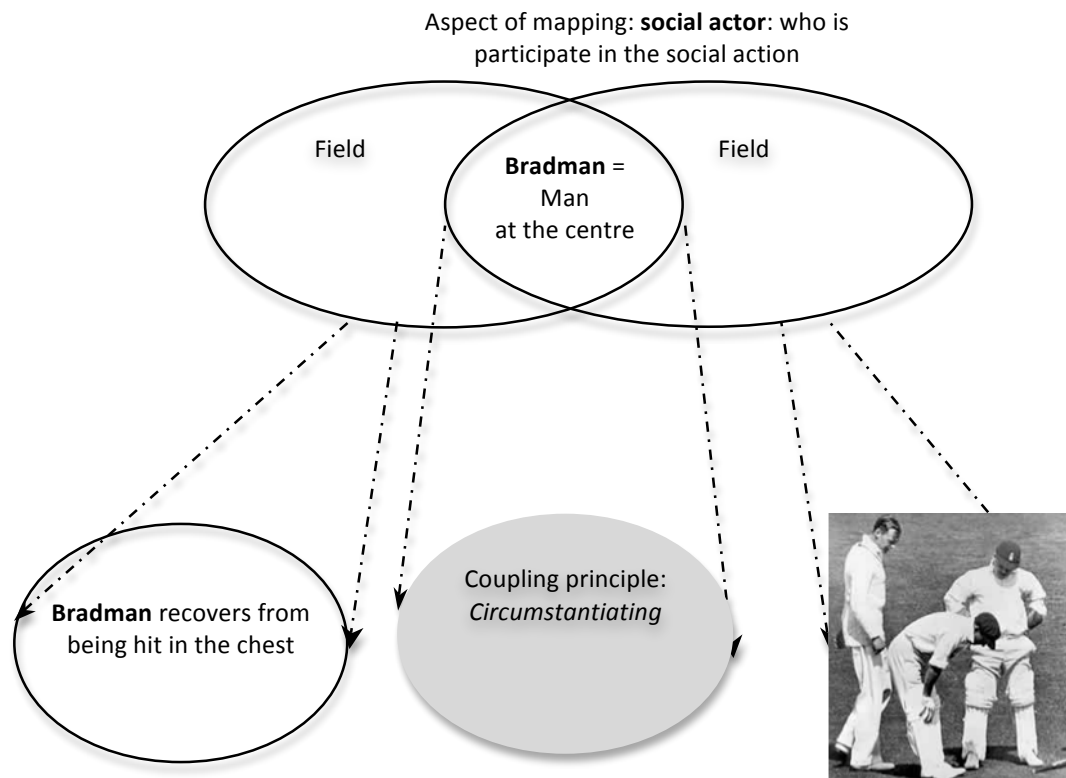


FGAOC

In this example, the grammatical structure of the verbiage construes three aspects of an experience: the social actors involved (realised by Participant, *Bradman*), the goings-on (realised by Process, *recovers*), and the circumstances in which the action takes place (realised by Circumstance, *after being hit in the chest*). On the other hand, the image construes a different experiential domain, which includes the social actors (three visually represented participants all of which are men in cricket uniforms), the goings-on (one man is bending down, the other two are attending to him), and the circumstance in which the action takes place (a grass field, possibly under sunny conditions, a cricket bat lies on the ground, etc). Between the field of verbiage and

that of the image here, there exists a degree of mapping¹—the social actor (see Figure 4.4), that is Bradman, is one of the visual participants in picture, more specifically the one at the centre (for the meaning of centre in visual composition, see Kress & Van Leeuwen 2006[1996]).

Figure 4.4 Minimum mapping in application: Bradman recovers



Since there is a shared field between the verbiage and the image, a temporary shared meaning space is activated. Within this meaning space, the two different semiotic resources integrate by forming a coupling, known as Circumstantiating (details of Circumstantiating see Section 4.2.5). The newly formed intersemiotic meaning space is larger than each individual meaning space created by the verbiage and the image, since each semiotic resource construes aspects of experience that is not included in the other. For instance, the verbiage does not specify the location of the recovery (e.g.

¹ For the convenience of discussion, I focus only the mapping of social actors between image and verbiage here and leave out the mapping of social action (i.e. the processes, for detailed discussions see Section 4.1.2.2)

where does Bradman recover?) that is represented in the image (on the cricket ground). The image on the other hand does not contain the information of the cause for the action (i.e. why Bradman is bending?), which is given in verbiage (*from being hit in the chest*). Simply put, by forming intersemiotic coupling, meaning multiplies (Lemke, 1998).

4.1.2 Analytical treatments

In the previous section, I have dealt with the theoretical principle behind the verbiage-image coupling. In this section, I address the issues concerning analytical treatments, i.e. the guidelines for recognising verbiage-image couplings in MIs. In particular, I discuss the issue of unit (the basic verbal and image units that form a coupling) and the criteria for identifying a verbiage-image coupling in hypermedia environments (i.e. how verbiage-image coupling can be recognised).

4.1.2.1 Unit

In this thesis, the basic ideational verbal and visual unit that enters an intersemiotic coupling are referred to as **message**. The notion of message has its origin in Martin's (1992) work on IDEATION —the discourse-semantic system associated with the ideational metafunction. In his analysis of lexical relations, Martin adopts message part as the basic discourse semantic unit that enters into cohesive lexical relations, or the lexical string of a text. More specifically, for a given field, the message part realises

- 1) one of the features taxonomising people, places and things
- 2) one of the actions configuring with people, places and things and entering into activity sequences
- 3) or one of the qualities associated with people, places, things and actions. (Martin, 1992, p. 293)

Martin's notion of message part (comparable to the notion of element in Halliday & Matthiessen, 1999, p. 59) is particularly valuable in the context of this research, for it approaches (discourse) semantic unit from the perspective of field, i.e. a message part realises one aspect of field. In analysing intersemiotic relations, such a top-down approach to defining semantic unit offers certain theoretical advantages. It ensures that the determination of unit is not bound by the structure of one particular semiotic resource, e.g. the lexico-grammatical structure of language or visual structure. If we were to take a bottom-up approach, on the other hand, we would start from a structure unit of a lower order (i.e. lower stratum or rank)—most likely a lexico-grammatical unit such as clause, and then consider its corresponding unit in visual structure. However, as has been discussed in various points in Chapter 3, it is far from clear that the structures of different semiotic resources are comparable. For instance, constituency structures may not be applicable to semiotic resources other than language. In a top down approach, we establish comparability between verbiage and image in field, and field is in turn realised by different types of structures, which may or may not be constituency based. In this sense, defining semantic units from the perspective of field is compatible with the minimum mapping principle, since the forming of verbiage-image coupling hinges on the mapping of field rather than the mapping of structures between verbiage and image.

Drawing on Martin's definition of message part, I define **message** in this thesis as a verbal or visual meaning unit that realises



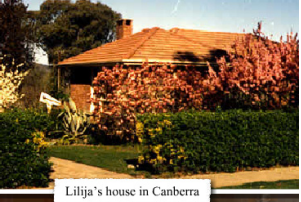

- 1) one of the features taxonomising social actors (people), objects or places
- 2) one of the actions configuring with people, objects or places

In my definition of message, I have excluded Martin's category of 'qualities' (typically realised by adverbial group and prepositional phrases in language), for little is known at this stage about the ways in which (and if) qualities are realised in visual structure.

In verbiage, a message involving social actors, objects and places is realised by one or more lexical items that typically function as Thing (e.g. *dancers*) or Classifier + Thing (e.g. *wedding +dancers*) in a nominal group. A message of social action is typically

realised by a lexical item that functions as Event in a verbal group. A lexical item that involves the nominalisation of process is also treated (from the perspective of field) as one that realises action, e.g. *the ride, the trip*. Table 4.1 exemplifies realisations of verbal messages (for description of groups and phrases, see Halliday & Matthiessen, 2004).







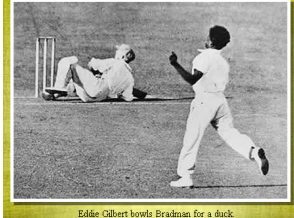
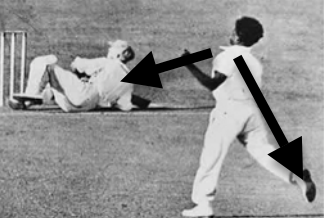
Table 4.1 Verbal messages: Lexicalisation

Instance	Message	Realisation in verbiage
 <p>Wedding dancers</p>	People	<i>Wedding + dancers</i>
 <p>Bamboo</p>	Object	<i>Bamboo</i>
 <p>Lilija's house in Canberra</p>	Place	<i>House</i>
 <p>Eddie Gilbert signing autographs.</p> <p><i>Eddie Gilbert signing autographs</i></p>	Action	<i>Signing</i>

In images, a message of social actors, objects and places is typically realised by one or more visually represented Participants, e.g. Actor, Sensor, Carrier, etc. (cf. Kress & van Leeuwen 2006[1996]). A message of social action, on the other hand, is realised by an

action or eyeline vector (cf. Kress & van Leeuwen 2006[1996]). Examples of realisations of visual messages are listed in Table 4.2.







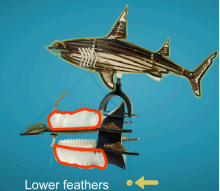
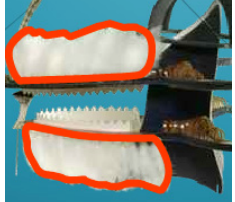
Table 4.2 Visual messages: Participant & vector

Instance	Message	Realisation in verbiage
 <p>Lilija Brakmanis</p>	People	
 <p>Spittoon</p>	Object	
 <p>Typical Latvian town in 1904</p>	Place	
 <p>Eddie Gilbert bowls Bradman for a duck</p>	Action	 <p>*vectors indicated by arrows</p>

4.1.2.2 Units in coupling and coupling complex



In MIs, the simplest form of coupling contains one verbal and one visual message, such as the examples in Table 4.3. A simple coupling essentially is one in which the verbal message is realised by a nominal group that contains Deictic and/or Classifier + Thing. The visual message in simple coupling can be realised by a visually represented participant or one part of a participant (e.g. one component of an object)

Table 4.3 Simple couplings: Examples

Coupling	Verbal message	Visual message
 <p>Plywood</p>	<p><i>Plywood</i></p> <p>Thing</p>	
 <p>Lilija's cat</p>	<p><i>Lilija's cat</i></p> <p>Deictic Thing</p>	
 <p>Frigate bird canoe ornament</p>	<p><i>Frigate bird canoe ornament</i></p> <p>Classifier Thing</p>	
 <p>Lower feathers</p>	<p><i>Lower feather</i></p> <p>Classifier Thing</p>	

When Thing in the nominal group that realises a verbal message is in plural form, a coupling can be formed between one verbal message and several visual messages, as illustrated in Table 4.4.

Table 4.4 Couplings with one verbal message and several visual messages

Coupling	Verbal message	Visual messages
 <p>Modern materials</p>	<p><i>Modern materials</i></p> <p>Classifier Thing</p>	

A unit of coupling can also be formed between two or more verbal messages and two or more visual messages, and is referred to as a **coupling complex**. In MIs, as shown in Table 4.5, there are three typical situations in which a coupling complex can be formed: 1) The first involves instances in which two or more Participants in an image correspond to two or more Things in a nominal group complex (e.g. *Dace, Lilija and her second husband*, as illustrated in the first example in Table 4.5).

Table 4.5 Coupling complexes: Examples

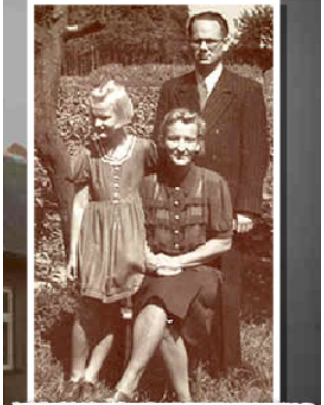











Coupling	Verbal message	Visual message
 <p>Dace, Lilija and her second husband</p>	<i>Dace</i>	
	<i>Lilija</i>	
	<i>(and) her second husband</i>	
 <p>Lilija and her family on the boat that brought her to Australia.</p>	<i>Lilija</i>	
	<i>her family</i>	
	<i>the boat that brought her to Australia</i>	

Table 4.5 (continued) Coupling complexes: Examples

Coupling	Verbal message	Visual message
 <p>Bradman being presented with the trophy.</p>	<i>Bradman</i>	
	<i>(being) presented</i>	 <p><i>vectors indicated by arrows</i></p>
	<i>(with) the trophy</i>	

In the second type (see the second example in Table 4.5), the nominal group structure of the verbiage contains Qualifier (e.g. *Lilija and her family [on the boat [[that brought her to Australia]]]*), which is typically realised by a prepositional phrase (proposition + nominal group) or an embedded clause. While Thing in the nominal group (complex) (e.g. *Lilija and her family*) couples with a Participant in the image, Thing in the nominal group within Qualifier (*the boat*) or the Participant in the embedded clause (*her*) also couples with a visual Participant in the image. In the third type of situation where a coupling complex forms, the verbiage is typically a clause or a larger unit of text. Both the Participant(s) and the Process of the clause structure couple with the visual Participant(s) and the visual process (realised by a vector). The last example included in Table 4.5 illustrates this type of coupling complex.

Although a coupling complex will contain two or more sets of coupling relations, it is treated as one intersemiotic unit. The purpose of such analytical treatment is to avoid the unnecessarily segmentation of visual structure into constituents. That is to say, if we were to treat each verbiage-image coupling within a coupling complex as a

separate unit, we needed to segment the image into units that correspond with the constituency units of a clause. As has been discussed earlier, although a visual message can couple with a verbal message, the visual structure that realises this message is not necessarily comparable to the linguistic structure. In essence, this treatment is a reflection of the top-down (from the perspective of field) approach to defining intersemiotic semantic units.

So far, I have dealt with the general issue of defining the meaning unit when analysing intersemiotic coupling. In the following section, I move onto the specific issues concerning the recognition of coupling in a hypermedia environment where intersemiotic coupling can be formed across media (i.e. time-based or space-based) and modes (i.e. visual or audio channels, following O'Halloran, 2005).

4.1.2.3 Phoricity & Adjacency

As has been discussed in Chapter 2 (see Chapter 2, Section 2.3.1.3), the medium of MIs is similar in nature to the space medium of a museum. One characteristic of such a medium is its capacity to embed a variety of multimedia artefacts and incorporate various communication channels. In other words, MIs are at the same time multimodal, multimedia as well as multisemiotic (O'Halloran, 2005)(see Table 4.6). This unique nature of MIs adds an extra layer of complication to the recognition of verbiage-image coupling. On the one hand, an ideational coupling is a unit of meaning, and operates on semiotic principles that are free from the constraint of media and mode. On the other hand, the different affordances of media (e.g. video and image) and the differing nature of modes (e.g. visual and audio) will impact the ways in which meaning is organised.

Table 4.6 Multimediality, multimodality and multisemiosis in MIs: Some examples

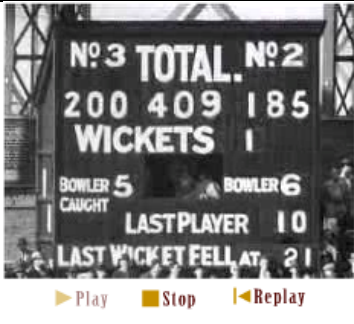
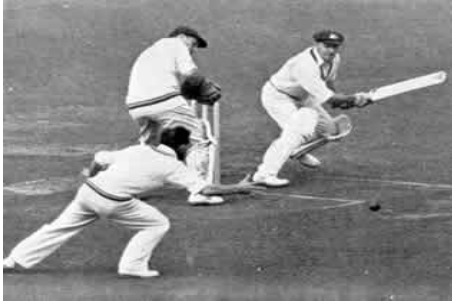


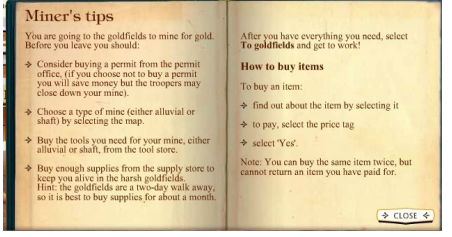


		Examples
Multimedia	Video	
	Image	
	Animation	
	Hyperlinks (Interactive Media)	
	Text Panel	
Multimodal	Visual	<p>Find out about each tool and then buy the tools you need for your mine. Go back to the map if you need help.</p>

Table 4.6 (continued) Multimediality, multimodality and multisemiosis in MIs: Some examples

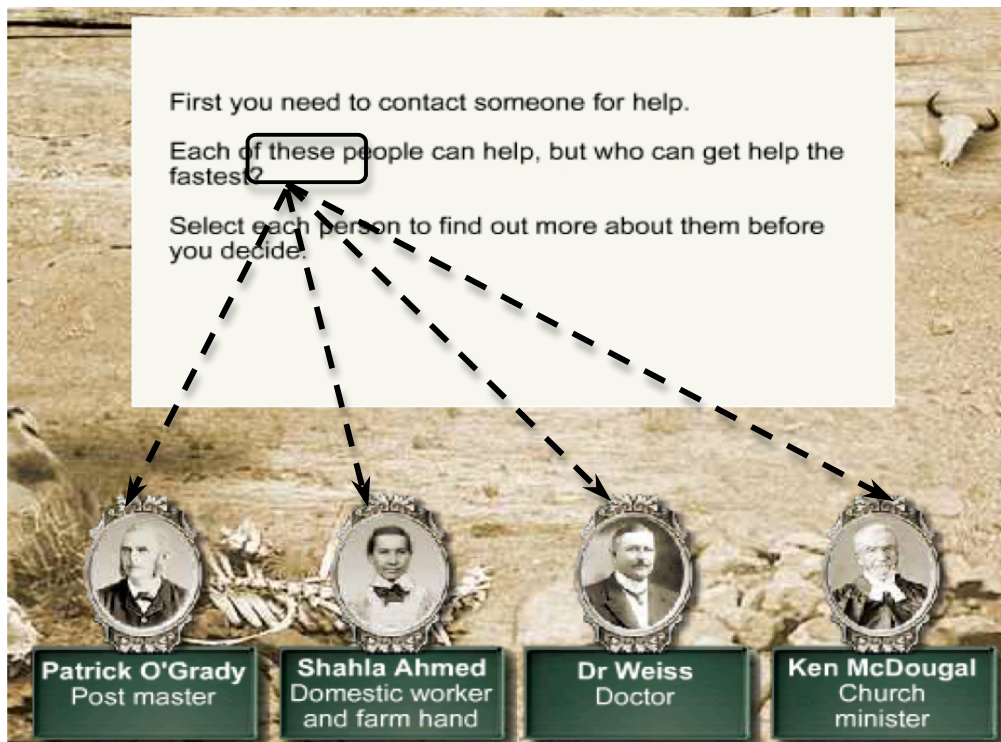
		Examples
Multimodal	<i>Audio</i>	 <p>(Transcription) These are some of the tools for alluvial mining. Miners from around the world have brought their mining skills to the Australian goldfields.</p>
Multisemiotic	<i>Language</i>	<p>Shaft mining</p> <p>Shaft mining takes place under the surface of the Earth. The shaft or hole was usually about 1 m wide and up to 10 m deep. A windlass was used to lower a man down the shaft and to lift the dirt that he dug out. The dirt would then be washed in a cradle in order to find gold.</p>
	<i>Visuals</i>	

In analysing verbiage coupling in the multimedia and multimodal environments of MIs, I adopt two basic principles: **phoricity** and **adjacency**.

Phoricity

The phoricity principle states that when the verbiage contains a phoric reference to an image or several images, the two are treated as a coupling. The reference in this type of context is essentially Exophoric (cf. Martin, 1992), since from the perspective of the verbiage, the image in the coupling is its non-verbal context. In Plate 4.2, for instance, *these* in the verbiage referred to the four visual participants at the bottom of the frame. The verbiage (*each of these people can help*), therefore, forms a coupling with the image, in which the verbiage classifies (for Classifying coupling see Section 4.2.4) the visually presented participants as those who can help.

Plate 4.2 Phoricity principle: An example



MEALC

In MIs, the verbal phoric reference to image is typically realised by determiner such as *this, these, here*. In rare instances, for example, when a game character introduces him/herself, personal pronoun (e.g. *We, I*) can also be used to refer visually to a participant (see Plate 4.3). In essence, the phoricity principle uses the textual resources of language as a guide for recognising verbiage-image coupling (for studies of phoricity in multimodal texts, see Tseng, 2009).

Plate 4.3 Phoricity in verbiage-image coupling: Personal pronoun



Hi, I am Ling.

Adjacency

Plate 4.4 Spatial adjacency: Captions



When phoric reference is absent, a verbiage-image coupling is recognised based on the principle of adjacency. That is, when a verbal message and a visual message are adjacent to each other in physical space or time, they are treated as a coupling. In essence, the adjacency principle uses textual resources that are external to language as a guide in determining intersemiotic coupling (see also Bateman, 2008a for discussion of proximity & layout in hypertext). In MIs, the most common type of spatial adjacency is that between an image and its caption. A caption can be placed outside (Plate 4.4 left) or inside an image (Plate 4.4 right).

Plate 4.5 Spatial adjacency: Within a layer or frame

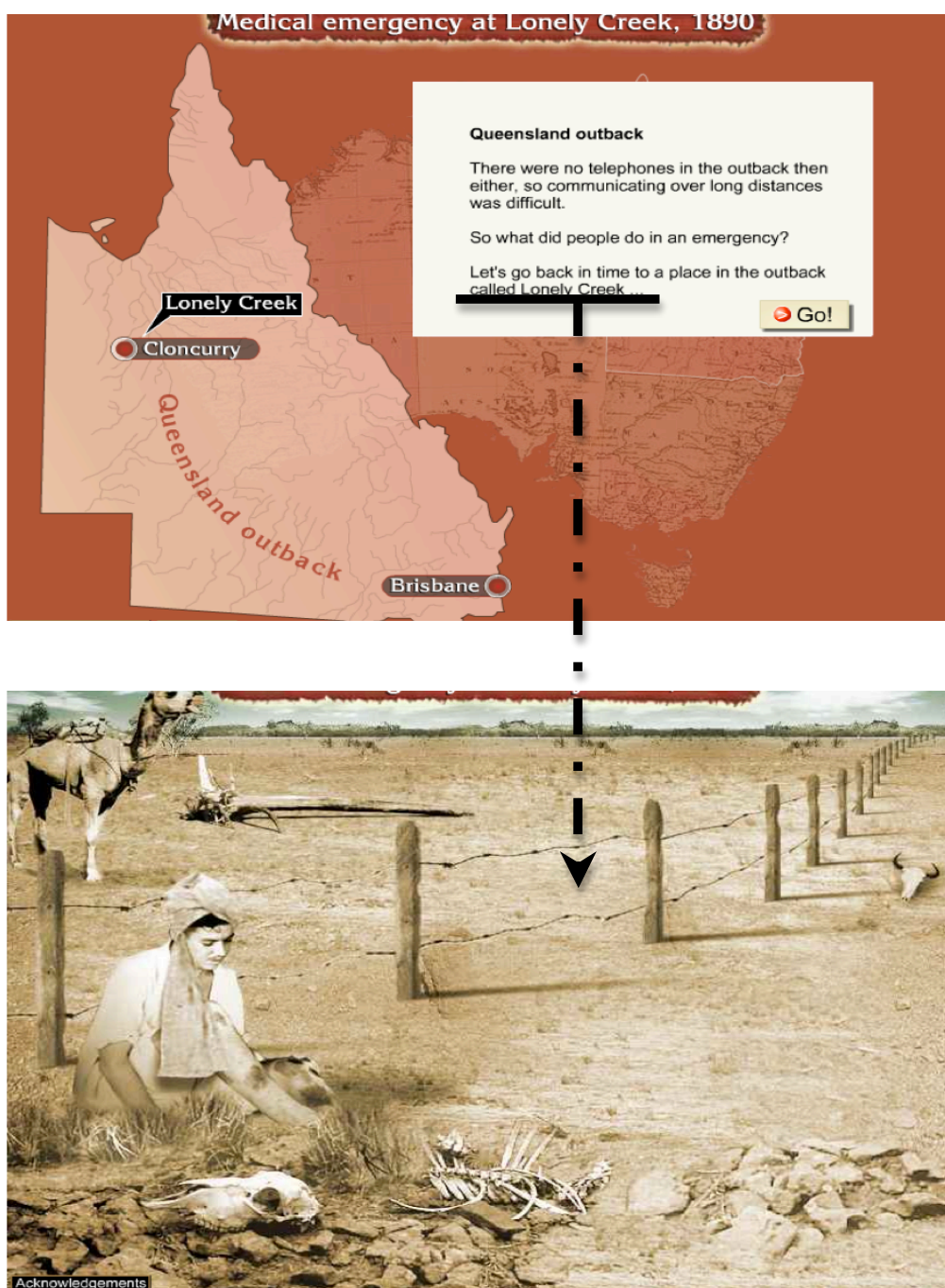
What is a telegram?

In 1890, the most common way to send a long distance message quickly was by telegraph.

- The telegraph system used signals to represent the alphabet. The signals were sent down a telegraph line by tapping a key.
- At the other end of the line, an operator translated the sounds into words.
- The telegram was then delivered by horse or on foot.

In many instances, an image is not accompanied by a caption. In these situations, a visual message and the first verbal message (in the sequence of text) that shares field with it within the same layer or frame (for definition of frame and layer, see Chapter 3, Section 3.3.2.2) are treated as a coupling. In Plate 4.5, for instance, the first verbal message that is coupled with the image is *telegraph*, the next being *an operator*. The verbiage and the image here, thus is treated as a coupling complex.

Plate 4.6 Temporal adjacency: Between frames



Temporal adjacency in MIs consists of two basic types. The first type refers to the situation where the last verbal/visual message in a frame (or layer) maps onto the first visual/verbal message in the following frame (or layer) on the Critical Path of a MI. Plate 4.6 exemplifies this type of temporal adjacency. The example includes two adjacent frames on the Critical Path of *Medical Emergency at Lonely Creek*. The last verbal message (*an outback place in Queensland called Lonely Creek*) and the image in the following frame are treated as an intersemiotic coupling, in which the verbiage identifies the image by giving it a proper name (for Naming coupling see Section 4.2.1).

The second type of temporal adjacency refers to a moving image and its voice over. In MIs, there is a small collection of embedded animation and video clips. These clips are relatively rare and each clip lasts usually around 15-40 seconds (see Appendix V). Due to these two facts as well as the focus and scope of this research, a separate technique has not been developed for segmenting (i.e. into semantic units) these time-based visual data. In these instances, verbiage is used as a baseline for searching mapped visual message(s) in the clip. More specifically, each clause in the verbiage is treated as forming a coupling complex with one corresponding segment of the video clip or animation, marked by the beginning and the end of the audio delivery of the clause. Within this coupling complex, different points of mapping (i.e. the coupling of visual and verbal message) will then be described.

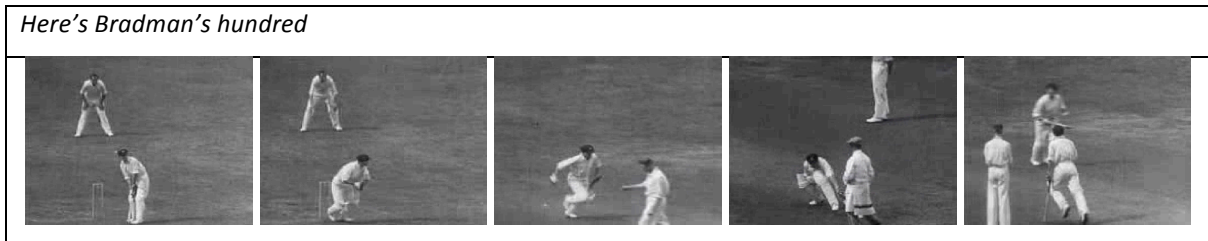
Plate 4.7 Temporal adjacency: Coupling complex in moving images



*Here's Bradman's hundred.
Bradman reaches the two hundred mark.
Don has scored so many runs that his hands'
are getting sore.
lasted (?) with 244 to his credit.*

Plate 4.7 (continued) Temporal adjacency: Coupling complex in moving images

Coupling complex



For example, Plate 4.7 contains a short video clip from *The First Golden Age of Cricket*², the transcription of the voice-over is listed next to the video. In this example, the clause *Here's Bradman's hundred* corresponds to a sequence in the video clip that shows the process of Bradman scoring hundred. The verbal message of the clause and the visual message in the video clip are treated as a coupling complex. The coupling complex includes at least two sets of coupling relations, the Naming of the visual participant (Bradman), and the verbal identification (through nominalisation) of the visual process (*Bradman's hundred*).

4.1.3 Principles for recognising verbiage-image couplings in MIs: A summary

In this section, I have elaborated on the theoretical and analytical principles used in the descriptions of couplings in MIs. The theoretical principle—minimum mapping—explains the mechanism behind the forming of a coupling; that is, the mapping of field between verbiage and image activates a temporal shared meaning space, which is in turn organised by certain coupling relations. The analytical guidelines deal with the treatment of meaning units in the multimodal and multimedia environments of MIs. In essence, analytical principles are guided by the theoretical principle and are therefore of a lower order of abstraction. In the following section, I shall illustrate the types of coupling relations found in the MIs based on these principles.

² To view the clip, see Appendix V

4.2 Ideational Inflation: Major types of verbiage-image ideational couplings in MIs³

In this section, I introduce and exemplify five major types of ideational coupling patterns in MIs, including **Naming, Identifying, Representing, Classifying-Exemplifying**, and **Circumstantiating**. These couplings are collectively referred to as **Ideational Inflation**, encapsulating the complementary and synergetic nature of multimodal meaning making. A comprehensive list of major types of coupling patterns occurred in MIs is included in Appendix IV. For each type of coupling, I shall give its definition, unpack the semantic relation realised in the intersemiotic coupling, and illustrate the subtypes of couplings using examples from the MIs. This section is planned as a *demonstration* of the basic types of couplings found in MIs, and it serves as foundation for the discussions of the construal of primary social science knowledge in later sections of the chapter.

4.2.1 Naming

4.2.1.1 Naming: A definition

The first major type of verbiage-image coupling occurred in MIs is Naming. **Naming** refers to the assigning of a proper name to a visually represented participant. In Plate 4.8, for instance, the lady in the photo is identified as *Lilija Brakmanis*. In Naming, the relation between verbiage and image can be seen as comparable to that between Value and Token in an identifying clause. That is to say, a verbal 'value' (the proper name, e.g. *Lilija Brakmanis*) is assigned to a visual 'token' (the visually represented participant, e.g. the image of a lady).

³ The content presented in this section has appeared earlier in Zhao (2010b). There have been some new developments with regard to the way in which these coupling patterns are classified. The basic principles nevertheless are the same.

Plate 4.8 Naming: An example

NH

In a Naming coupling, a proper name can be assigned to different types of visual participants, including human, animals as well as locations.

4.2.1.2 Naming: People

In MIs, the most common Naming coupling involves giving a name to a visually represented human participant. There are three different types of people that are given names in MIs (see Plate 4.9), 1) cultural heroes; 2) ordinary people; and 3) fictitious game characters. Cultural heroes refer to historic or contemporary figures that played or are playing significant roles in the social-cultural life of Australia, such as *Don Bradman* in Figure 4.9a, while ordinary people are those who are the ordinary members of the society (e.g. *Pentronella Wensing* in Figure 4.9b). In MIs, there exists a third type of named participant—the game character (e.g. *Ling* in Plate 4.9c). As have been discussed in Chapter 2, these characters serve as the ‘guide’ or ‘teacher’, assisting the learner to complete the mission.


Plate 4.9 Naming: Types of named visual participants

a. Heroes

Sir Donald Bradman (1908—2001)


Don Bradman was born in Cootamundra, NSW. His favourite game as a child was to throw a golf ball against the water tank in his backyard and then hit with his cricket bat as it rebounded.

Even then he was developing the talent that would make him Australia's best-known cricket legend.



FGAOC

b. Common people



Petronella Wensing

NH

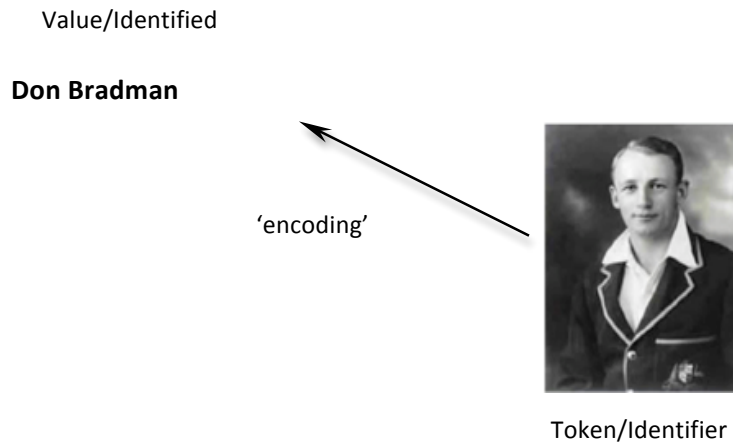
c. Game characters



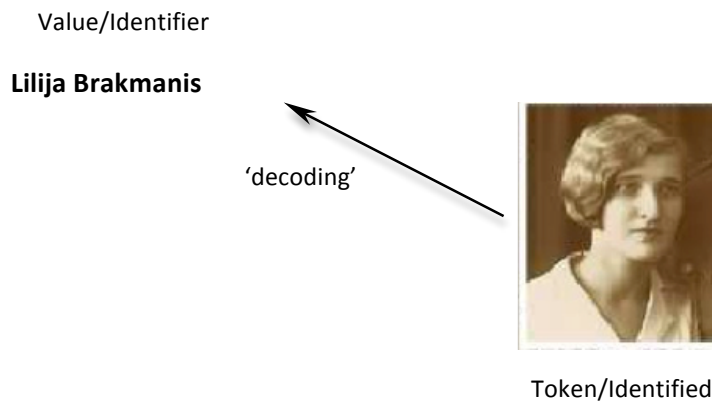
Hi, I am Ling.

GR

Although in all Naming couplings, the relation between verbiage and image is one of identifying (Value/Token), the directions of coding (i.e. encoding or decoding) are different in three different types of named human participants, as summarised in Figure 4.5.

Figure 4.5 Naming of people: Directions of coding*a. Naming hero: Encoding*

<i>Which picture</i>	shows	<i>Don Bradman?</i>
<i>This picture</i>	shows	<i>Don Bradman</i>
Token/Identifier		Value/Identified

b. Naming common people & game character: Decoding

<i>This picture</i>	represents	<i>which community member?</i>
<i>This picture</i>	is	<i>Lilija Brakmanis</i>
Token/Identifier		Value/Identifier

In naming heroes, visual Token is used to identify the verbal Value. For example (see Figure 4.5a), we identify ⁴ *Don Bradman* (Value/Identified) as the man in the photo (Token/Identifier). In contrast, in naming ordinary people and game characters (fictitious ordinary people), the visual Token is identified by the verbal Value. In Figure 4.5b, for instance, we identify the woman in the photo (Token/Identifier) as

⁴ Here, a shared knowledge of Bradman is assumed. However, it is possible that some children may not have heard of Bradman by the age of 10 (the targeted age group of these MIs) due to various social-cultural reasons (e.g. children from immigration background).

Lilija Brakmanis (Value/Identifier). Simply put, when we couple a well-known hero's name with an image, we are asking "Which picture shows Don Bradman", while in coupling the name of an ordinary people with an image, we are asking "Which community member does this picture represent?" or in the case of a game character (e.g. Ling in Plate 4.9c), "Which character is this person in the picture playing?"

The differences in identifying or coding directions between the two types of Naming are significant, for it reflects the different treatments of heroes and ordinary peoples in the (multimodal) history discourse. It concerns the ways in which a community negotiates its cultural value (through the 'mythologizing' of cultural heroes) and community identity (through the sharing of ordinary life). These points I shall elaborate on later in Section 4.4.2.

4.2.1.3 Naming: Places

Plate 4.10 Naming of places: Discrete and relational

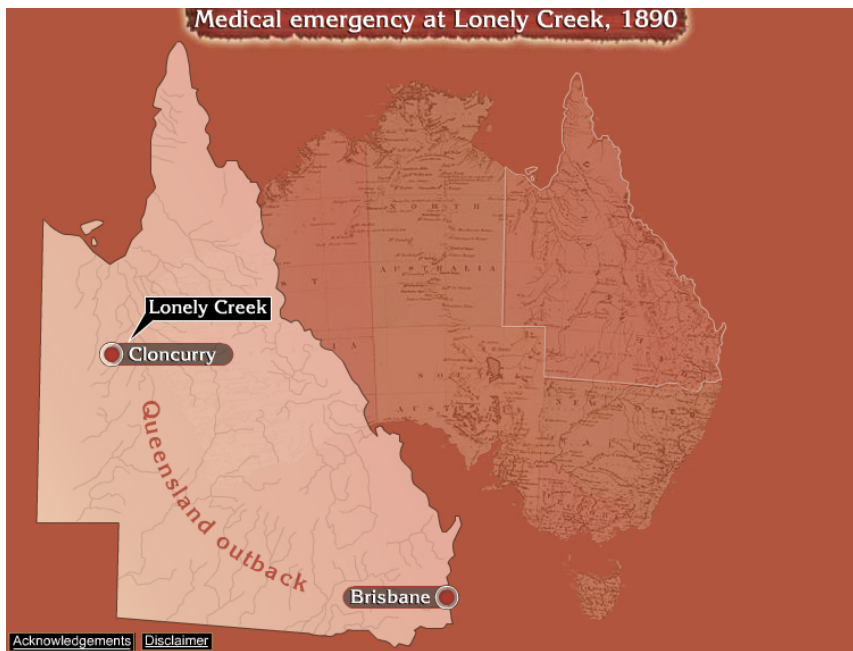
a. *Lonely Creek: Discrete Naming*



*The preceding frame states: Let's go back in time to a place in the outback called **Lonely Creek**.

Plate 4.10 (continued) Naming of places: Discrete and relational

b. Lonely Creek: Relational Naming

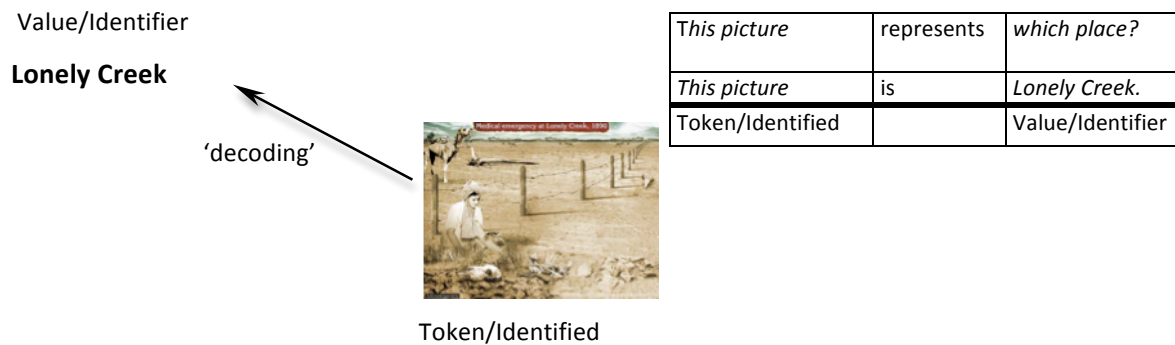


In MIs, a visually represented location can also be given a proper name through Naming. There are two sub-types in the Naming of place—**discrete** and **relational**. In discrete Naming, a proper name is given to an individually separated location, whereas in relational Naming, one spot within a larger location is given a name based on its relation to other spots in this location. In essence, relational Naming is the labelling of places on a map. Figure 4.10a is an example of discrete Naming, in which the isolated desert location presented in the image is named as *Lonely Creek*. Plate 4.10b, on the other hand, is an example of relational Naming, where the spot above Cloncurry on the map of Queensland is labelled as *Lonely Creek*.

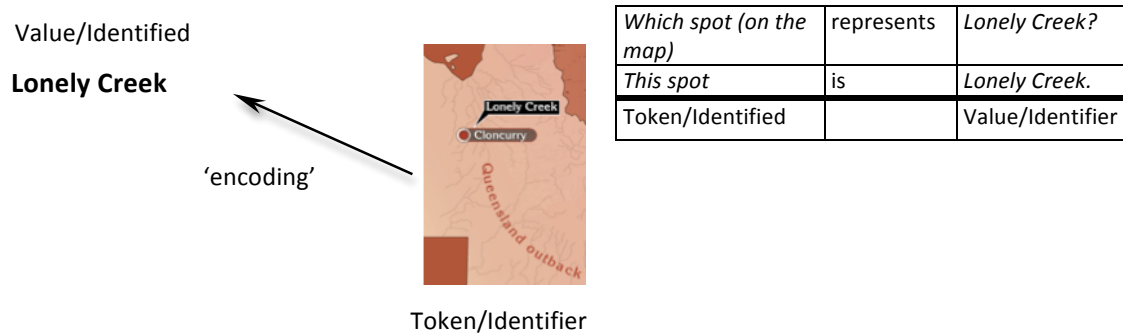
The differences between discrete and relation Naming can also be interpreted as the differences in the directions of coding (decoding and encoding) (see Figure 4.6). In discrete Naming (Figure 4.6a), we identify the deserted outback location in the image (Token/Identified) as *Lonely Creek* (Value/Identifier). In contrast, in relational Naming (Figure 4.6b), we identify *Lonely Creek* with reference to its visual Token—a certain spot in Queensland outback.

Figure 4.6 Directions of coding in discrete and relational Naming

a. Discrete Naming: Decoding



b. Relational Naming: Encoding



The labelling of places on maps through relational Naming plays a significant role in MIs. The hypermedia technological affordances allow MIs to transfer traditional static maps into animated and interactive ones. The opening sequence in *Gold Rush*⁵, for instance, involves an animated process of relational Naming. In this sequence, continents and countries that were involved in the Gold Rush are named and highlighted in yellow one after another on an old world map (Plate 4.11a). The screen then zooms into increasingly smaller locations on the map—first Australia then the states of Australia (e.g. Victoria). Individual locations within these places, such *Ballarat*, are then labelled accordingly (Plate 4.11b).

⁵ To view the clip, see Appendix V.

Plate 4.11 Maps in hypermedia environments: Animated process of relational Naming

a. Naming of continents & countries: Highlighting



b. Naming of locations in Australia: Zooming

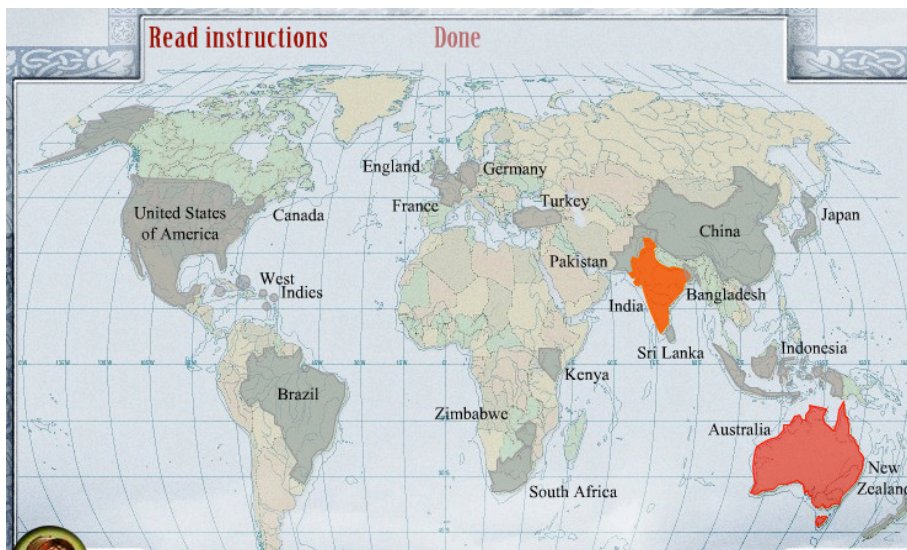


The maps used in relational Naming can also be interactive ones, that is, the learner can engage with the map through clicking action. For instance, in *The First Golden Age*

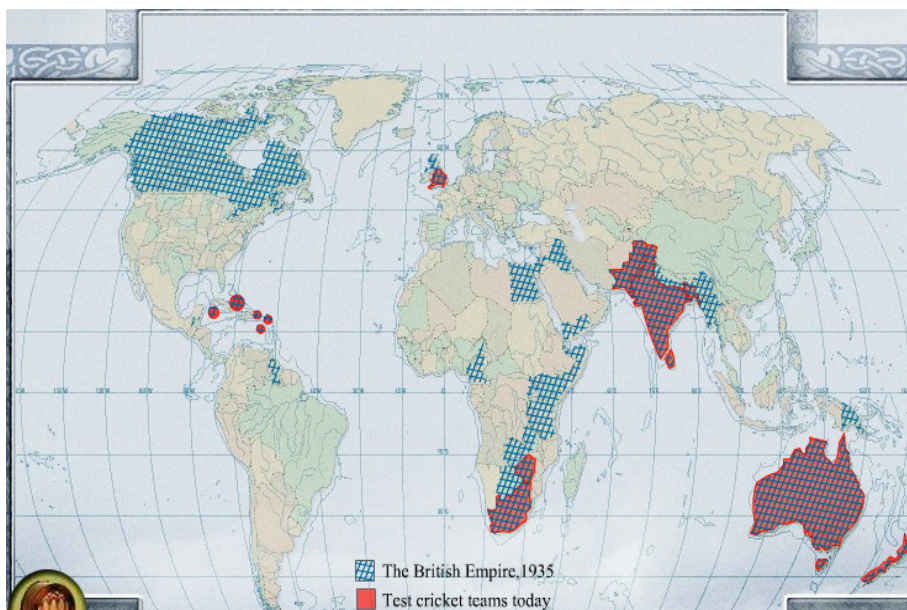
of *Cricket* (Plate 4.12a), the learner is asked to click on the regions that they consider as cricketing nations on a world map. A chosen region will be highlighted in orange on the map. Once all the countries are selected correctly, the map will change into a slightly different one (as in Plate 4.12b), where the nations that play test cricket today and the colonies of the British Empire⁶ in 1935 are being compared.

Plate 4.12 Maps in hypermedia environments: Interactive maps

a. Choose cricketing nations



b. Test cricketing nations today and British colonies in 1935



⁶ Please note in the map in 4.11b, the relation between image and verbiage is not Naming but Identifying, as will be discussed in Section 4.2.2.2.

4.2.2 Identifying

4.2.2.1 Identifying: A definition

The second major type of verbiage-image coupling is Identifying. **Identifying** is the verbal identification of a visually represented participant. In the example taken from *New Homes* in Plate 4.13, for example, the cat in the image is identified as *Lilija's cat*.

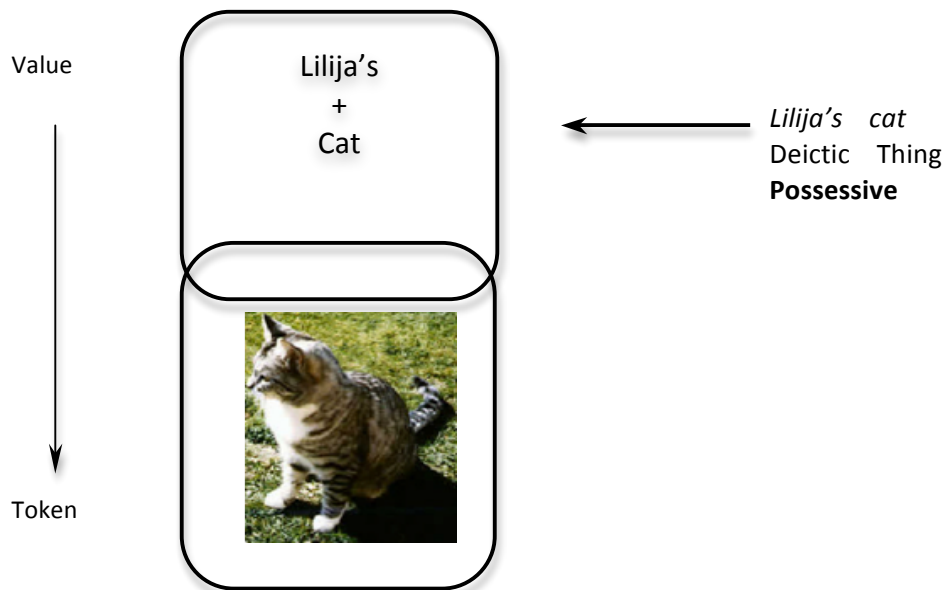
Plate 4.13 Identifying: An example



NH

Like Naming, Identifying involves the assigning of a verbal 'value' (*Lilija's cat*) to a visual 'token' (the photo of the cat). However, unlike in Naming, where the verbal Value is a proper name, the verbal Value in Identifying coupling often encodes an extra layer of relation that is realised through certain linguistic structures. For instance, in Figure 4.7, the cat in the image is identified in verbiage as *Lilija's cat*. The verbal message is realised by a nominal group, with *Lilija's* functioning as the possessive Deictic for the Thing (*cat*) (cf. Halliday & Matthiessen, 2004, p. 314). The nominal group thus realises an identifying relation, with the Deictic (*Lilija's*) identifying the Thing (*cat*) as a sub-set of cat (those that belong to Lilija).

Figure 4.7 Lilija's cat: Two layers of relation in Identifying coupling

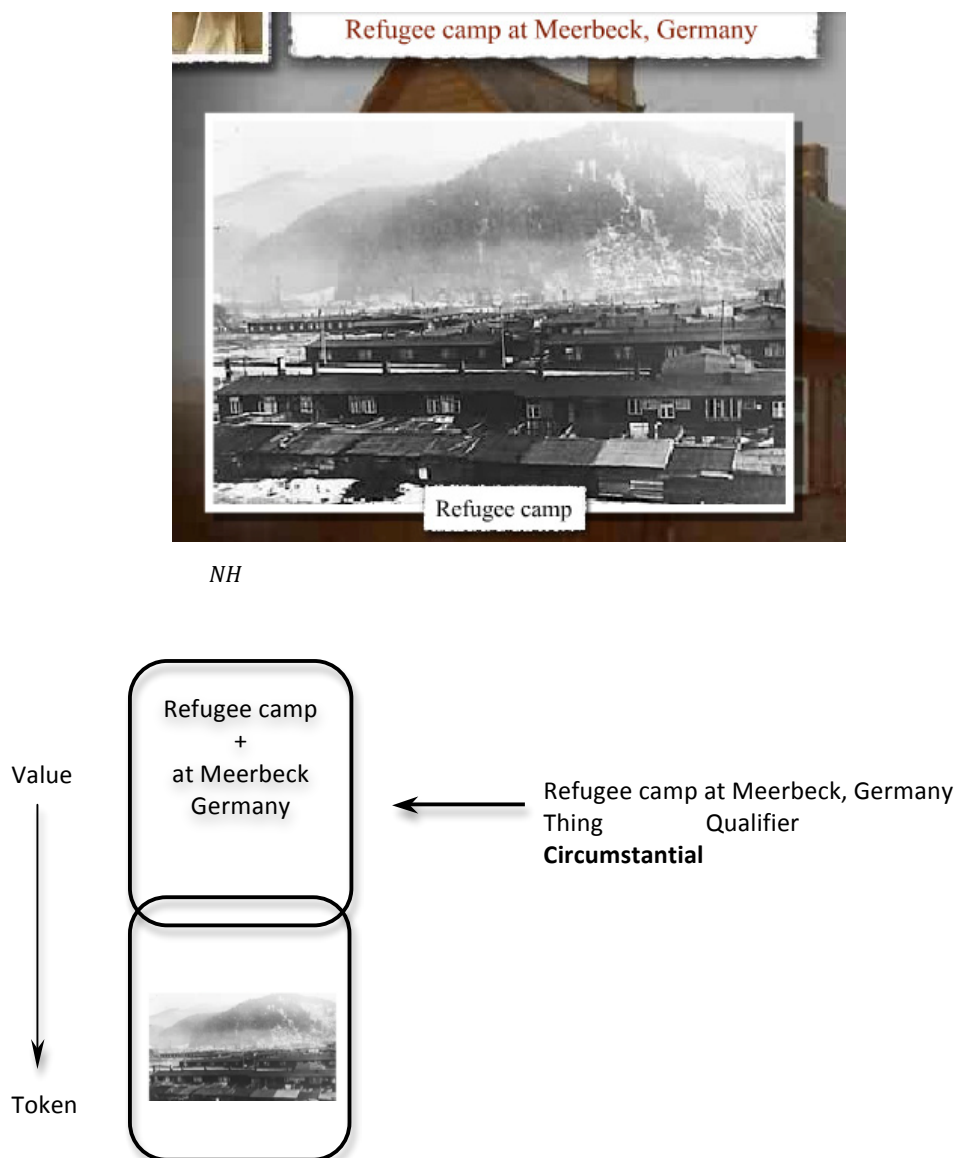


In this way, two layers of identification relations are realised in the verbiage-image coupling in Figure 4.7 — verbiage identifies image (intersemiotic relation), and Deictic identifies Thing (linguistic relation). In essence, the semantic relations realised in this particular verbiage-image coupling can be seen as analogous to those realised in the following clause complex:

<i>The cat in the photo</i>	<i>is</i>	<i>the cat</i>	<i>which</i>	<i>is owned</i>	<i>by Lilija</i>
Token	Identifying	Value	Value	Possessive	Token
$\alpha = \text{verbiage-image relation}$			$\beta = \text{linguistic relation}$		

In the verbiage-image Identifying couplings found in MIs, the second layer of relation (the linguistic relation) is often **possessive** one, as the example in Figure 4.7. Another common type of relation realised by the verbiage in a verbiage-image Identifying coupling is that of **circumstantial**. Figure 4.8 includes an example of circumstantial relation.

Figure 4.8 The second layer of relation in a Identifying coupling: Circumstantial



In this Identifying coupling, the verbiage identifies location in the photo as the *refugee camp at Meerbeck, Germany*⁷. The verbiage contains a nominal group, with *refugee camp* as Thing and *at Meerbeck Germany* as its Qualifier (cf. Halliday & Matthiessen, 2004, 323-324). The Qualifier is realised by a down-ranked prepositional phrase (*at Meerbeck, Germany*), which prototypically realises *circumstantial* element in a

⁷ The camp in this photo is the refugee camp where Pentronella Wensing (see *New Homes*, Chapter 2, Section 2.1.1.2) stayed during WW II. It is therefore the refugee camp *at Meerbeck*, rather than a refugee camp Meerbeck. The difference between the two will be elaborated on when Classifying-Exemplifying relation is discussed in section 4.2.4.

ranking clause. Here in the nominal group, it construes the Circumstance of location, i.e. where the camp is. The semantic relations realised in the Identifying coupling in Figure 4.8, therefore, can be seen as similar to those realised in following clause complex:

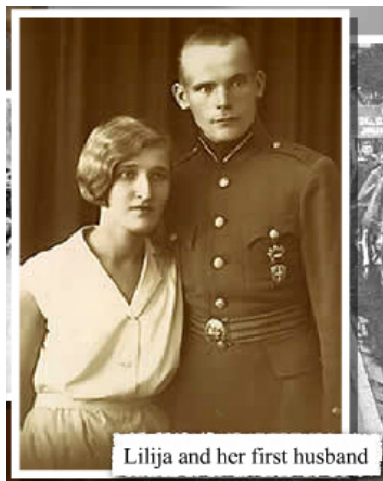
<i>The place in the photo</i>	<i>is</i>	<i>the refugee camp</i>	<i>which</i>	<i>is</i>	<i>at Meerbeck, Germany</i>
Token	Identifying	Value	Carrier	Circums.	Attribute
α = intersemiotic relation			β =linguistic relation		

To sum up, in Identifying coupling, verbal Value identifies visual Token by specifying its **possessive** relations or **circumstances**. As in Naming, the verbiage in an Identifying coupling can be used to identify different types of visual participants, including people, places and objects.

4.2.2.2 Identifying: People

Plate 4.14 Identifying: People

a. *Individuals*



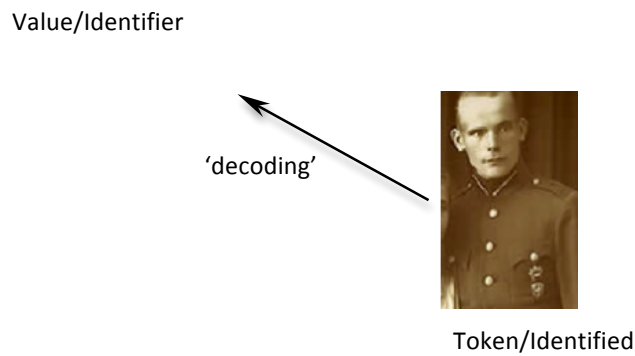
b. *Groups*



NH

In MIs, both an individual and a group of people can be identified through verbiage-image Identifying coupling. In Plate 4.14a, the young man in the photo is identified as *her* (Lilija's) *first husband*, while the group of young people in photo in Plate 4.14b is identified as *the dentistry class* (that Lilija attended), *University of Latvia*, in the 1930s.

Figure 4.9 Identifying people: Decoding



In Identifying people, the indentifying relation between verbiage and image is always that of decoding. That is, the visual Token of a human participant is 'decoded' by its verbal Value. In Figure, 4.9, for instance, the young man in the image (Token/Identified) is identified as *her first husband* (Value/Identifier).

Plate 4.15 Identifying people: Social relations and roles

a. People identified by social relations



NH

b. People identified by roles in the community



MEALC

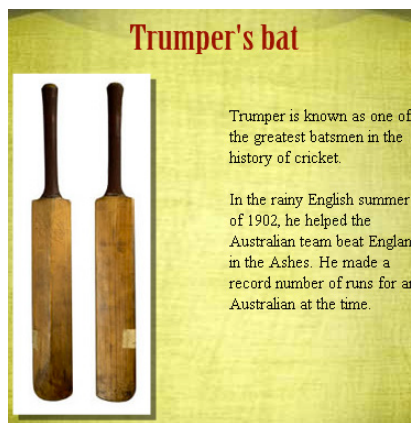
In Identifying couplings found in the MIs, a visually represented individual or group is often identified by either their social or interpersonal relation with other participants or their roles in the community. In Plate 4.15a, for instance, the group of people is identified based on their relation to Pentronella (Wensing) as *Petronella's family*. The four individuals in Plate 4.15b, on the other hand, are identified by their respective roles in the community. For instance, Patrick O'Grady is identified as the post-master (at lonely creek), and Ken McDougal as the church master⁸.

4.2.2.3 Identifying: Objects & places

In the MIs, Identifying coupling can also be formed between verbiage and visually represented objects (unanimated or animated) and locations. The two images in Plate 4.16 exemplify respectively the verbal identification of objects (4.16a) and locations (4.16b).

Plate 4.16 Identifying objects and locations

a. Objects: Trumper's bat



FGAOC

b. Places: Lilija's House in Canberra



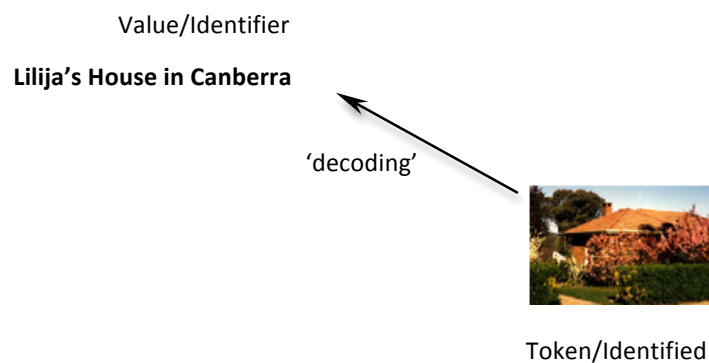
NH

As in the Naming of places, the Identifying of objects and places in the MIs can also be divided into two sub-types: discrete and relational. The examples in Plate 4.16 are

⁸ The coupling here involves two sets of verbiage message and one visual message, the proper name and the occupation of each participant. Here, the Identifying relation refers to the relation formed between the verbiage that specifies the occupation and the visual participant.

both discrete Identifying, in which the verbiage is used to identify (a) object(s) as a whole (*Trumper's bat*) or an individual location (*Lilija's house in Canberra*). In this type of Identifying, therefore, the visual Token is decoded by the verbal Value (see Figure 4.10). That is to say, we identify the two long objects in the photo (Token/Identified) in Plate 4.16a as *Trumper's bat* (Value/Identifier), while the visually represented location (Token/Identified) in Plate 4.16b as *Lilija's house in Canberra* (Token/Identifier).

Figure 4.10 Discrete Identifying of places: Decoding



The relational Identifying of objects and places, in contrast, involve the verbal identification of a part of an object or a spot within a larger location. In other words, relational Identifying identifies the parts in relation to the whole. For example, in Plate 4.17a, we identify *Lower feathers* as the bottom left part of the mysterious object, while in Figure 4.17b, we identify *Permit office* as the building, which is located at the far left on the high street of Ballarat and has two British flags on it.

Plate 4.17 Relational Identifying of objects and places

a. Objects: Lower feathers

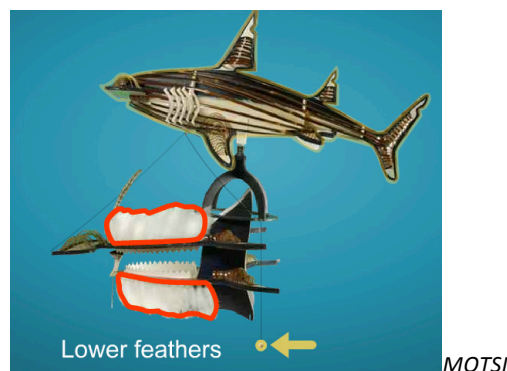


Plate 4.17 (continued) Relational Identifying of objects and places

b. Places: types of shops



GR

The identifying relation between the verbiage and the image in a relational Identifying coupling, like that in a relational Naming coupling, is also one of ‘encoding’ (see Figure 4.11), with verbiage Value (*Permit Office*) being encoded by the visual Token (the building with two flags on it).

Figure 4.11 Relational Identifying: Encoding

Value/Identified

Permit Office

‘encoding’



Token/Identifier

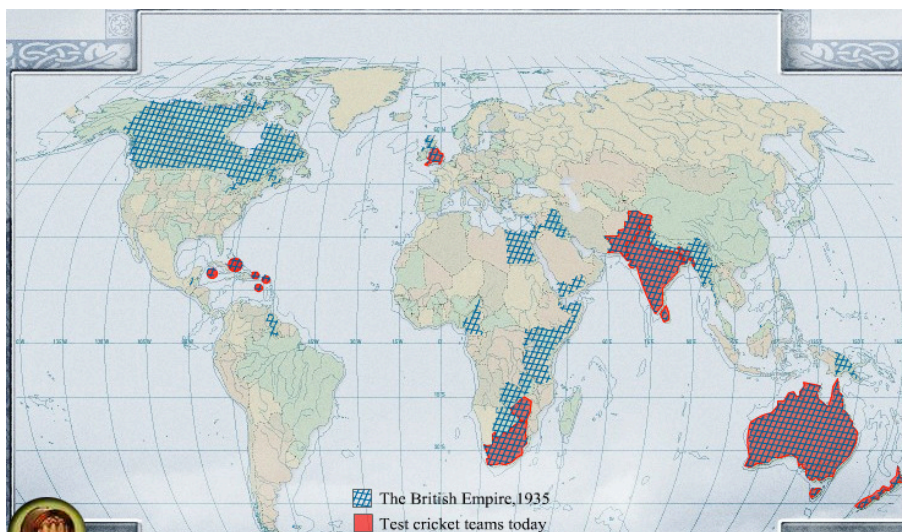
The relational Identifying of places, like the relational Naming of places, is essentially the labelling of locations on a map. However, the two different types of verbiage-image couplings can lead to different social construal of the same physical space (cf. Harvey, 1989). Take the two maps in Plate 4.18 as examples; both maps are the visual representation of the geographic regions of the world. In the first map, the verbiage *names* each region as individual countries, e.g. *Australia*, *Brazil*, whereas in the second map, the verbiage *identifies* regions on the map as those belong to *the British Empire in 1935* (highlighted in blue) and those containing *testing cricket teams today* (highlighted in red).

Plate 4.18 Relational Naming and relational Identifying of places: A comparison

a. Map: Relational Naming



b. Map: Relational Identifying



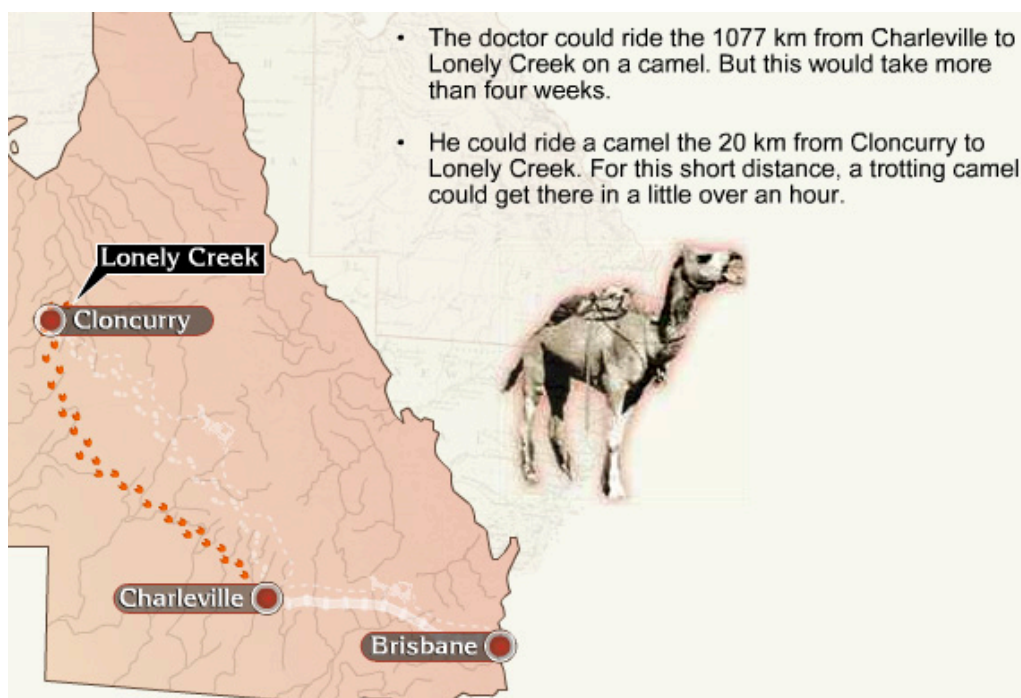
In essence, these two types of coupling patterns *encode* two different sets of social relations. The first map, in Naming each individual state, highlights the geopolitical boundaries between nation states, whereas the second map, in identifying regions of British colonies and contemporary cricketing nations, foregrounds the relation between colonisation and its impact on modern sports (cf. Bale, 2003). In other words, the two maps in Plate 4.18 represent two different ways in which spatial ordering can be re-constructed socially. The significance of Identifying and Naming places in primary social science will be further explored in Section 4.4.3.

4.2.3 Representing

4.2.3.1 Representing: A definition

A third and less common type of verbiage-image coupling found in MIs is Representing. Representing is similar to Naming and Identifying in the sense that the verbiage and the image in this type of coupling also form a Value-Token relation. However, in Representing couplings, the semantic relation between the verbiage and the image is not one of identifying. That is, the visual Token neither identifies nor is identified by the verbal Value (either through a proper name as in Naming or through a second layer of semantic relation as in Identifying). Rather, the visual element in Representing coupling typically 'stands for' (e.g. symbolising, signing or signifying) the meaning construed in language. Plate 4.19 is an example of a Representing coupling.

Plate 4.19 Representing: An example

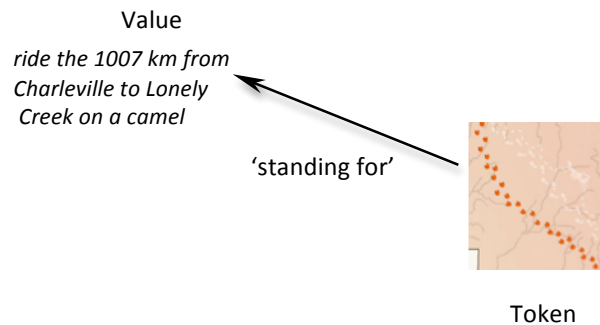


*note In original data, the prints of camel hooves are not static but animated. The footpad spread gradually from Charleville to Cloncurry.

In this example, the animated visual element (i.e. spreading camel footpads) 'signifies' the Material Processes construed in verbiage *ride the 1007 km from Charleville to*

Lonely Creek on a camel. The relation between the verbiage and the image in this Representing coupling is expressed as the following Figure 4.12.

Figure 4.12 Verbiage-image relation in Representing coupling



There are two basic types of Representing couplings found in MIs, including **metonymising** and **metaphoring**.

4.2.3.2 Metonymising

Metonymising refers to the forming of a semantic relation between verbiage and image similar to that of 'metonymy' (i.e. a part is used to stand for the whole, or other contiguity relations exist between items)(cf. Lakoff & Johnson, 2003, Saeed, 2003). In the example in Plate 4.20a, the drawing of the train tracks stands for the concept of 'train' represented in the verbiage. In the Plate 4.20b, on the other hand, the photo of the post for a cricket match stands for *the first match ever played by women at the famous London cricket ground, the Oval*. In both cases, the concept construed in the image does not equal that in the verbiage, i.e. train tracks are not trains, and cricket posters are not cricket matches. However, there is a contiguity relation existing between the verbiage and the image—train tracks are part of a train transportation system, cricket posters are one aspect of a cricket match, which allows the formation of an intersemiotic coupling.

Plate 4.20 Metonymising: Examples

a. Train



EMALC

b. Cricket match



FGAOF

In MIs, Metonymising coupling can also be formed between image (or verbiage) and sound effects. For instance, in *Gold Rush!* (Plate 4.21), the frame that contains the image of the high street of Ballarat is accompanied by sound effects of street noises (e.g. traffic, people chatting). The street noises here ‘symbolise’ what is represented in the image—the main street in Ballarat.

Plate 4.21 Metonymising: Sound effects and image



Street noises

4.2.3.3 Metaphoring

Metaphoring refers to a coupling in which verbiage message is the ‘incongruent’ form of, or ‘metaphor’ for the visual message. The term metaphor here derives from the

notion of ideational metaphor (Halliday & Martin, 1993; Halliday & Matthiessen, 2004), referring mainly to the phenomenon of nominalisation, where grammar is able to turn a range of non-participant components into participant-like ones. For instance, *the doctor could ride* can be alternatively realised in a nominalised form as *the doctor's ride*, which can function as Participant in the clause structure. The former is considered as a congruent grammatical realisation of the semantic message or element (i.e. Process), while the later is considered as an incongruent form. Grammatical metaphor is considered as a characteristic of written English, in particular in science, social science and humanities (cf. Korner, et al, 2007; Martin & Veel, 1998).

Similarly, in a Metaphoring coupling, the verbiage construes a social action as an entity, while the image construes it as a process (by vector or through moving images). In Plate 4.22a, for instance, the flash animation shows two small boats coming out of Europe, travelling across the sea and reaching the east coast of Australia. The accompanying audio text states, *find out the stories of two women who made the trip*. Here, the image renders the move from Europe to Australia as a process (through animation), while the verbiage construct this process as an entity *the trip* (Range).

Plate 4.22 Metaphoring: Examples

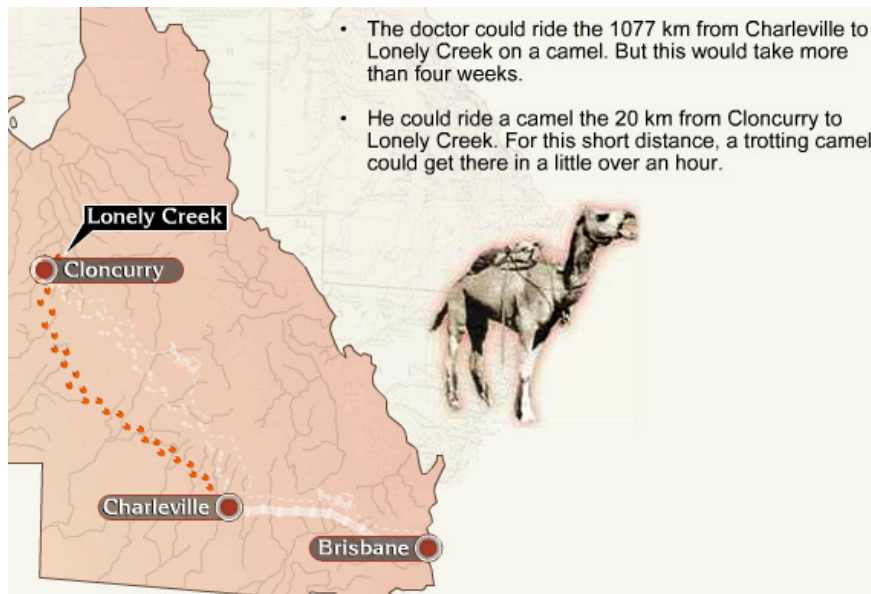
a. Process



Find out the stories of two of the women who made the trip.

Plate 4.22 (continued) Metaphoring: Examples

b. Topological information



MEALC

*note that the camel hooves are actually animated

Metaphoring also includes the coupling in which the verbiage construes the topologically presented information in an image as an entity. For example, in Plate 4.22b, the process of the doctor travelling from Charleville to Lonely Creek is realised in verbiage by the following TRANSITIVITY structure (cf. Halliday & Matthiessen, 2004) :

<i>The doctor</i>	<i>could ride</i>	<i>the 1007 km from Charleville to Lonely Creek</i>	<i>on a camel.</i>
Participant	Process: Material	Range: Scope	Range: Scope

The Range (*the 1007 km from Charleville to Lonely Creek*) in the clause can be seen as the ‘incongruent’ form of the topologically presented information in map—two spots (one indicating Charleville, the other Lonely Creek) with a certain distance between them.

In essence, in a Metaphoring coupling, the verbiage construes the same phenomenon at a higher order of abstraction than image. The Metaphoring coupling reflects the incongruent way in which language and image construe human experiences. Language’s potential for nominalisation and tendency towards typological

organisation of meaning (cf. Halliday & Matthiessen, 1999) entails that it is able to turn experiences into a form that is more classifiable than image is able to. For instance, once we abstract the moving action of the boat in the image (Plate 4.22a) as *the trip*, we can start classifying types of trips, e.g. long trip, hard trip. Verbal classification or taxonomising plays a key role in the forming and expanding of scientific knowledge (cf. Martin & Rose, 2008), a point I shall return to shortly.

4.2.4 Classifying-Exemplifying

4.2.4.1 Classifying-Exemplifying: A definition

In the three types of couplings introduced so far—Naming, Identifying and Representing, the verbiage and the image relate to each other through abstraction. In the fourth type of coupling—Classifying-Exemplifying, the verbiage and the image form certain semantic relations through the principle of generalisation. The naming of this coupling as Classifying-Exemplifying reflects the bi-directional nature of the coupling relation. From the perspective of image, the verbiage classifies the visually represented participant as a member of a class, while from the perspective of verbiage; the image exemplifies the characteristics of the members of this class.

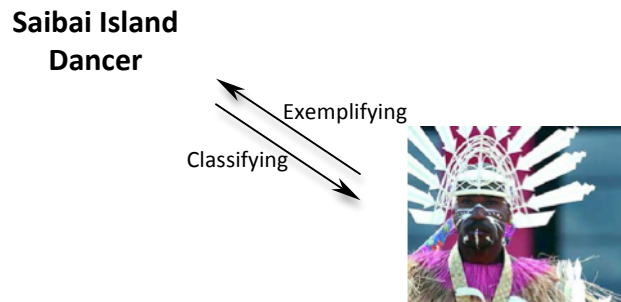
Plate 4.23 Classifying-Exemplifying: An example



Saibai Island dancer

Take Plate 4.23 as an example, the verbal text assigns a membership to the man in the photo by classifying him as a *Saibai Island dancer*. The image, on the other hand, exemplifies the key characteristics of this class membership, which possibly include big head decorations, face paint, etc. Figure 4.13 summarizes the relation between the verbiage and image in a Classifying-Exemplifying.

Figure 4.13 Classifying-Exemplifying: Semantic relations



In MIs, Classifying-Exemplifying coupling can be formed between one unit of verbal message and one visual message, i.e. one visual participant is being classified, as in the example in Plate 4.23. It can also be formed between one unit of verbal message and several images, i.e. several visual participants are classified as belonging to the same class, and this type of coupling is referred to as CoClassifying-Exemplifying. Plate 4.24 includes an example of this type of coupling, where the verbiage is used to classify a group of objects as those that belong to modern materials.

Plate 4.24 CoClassifying-Exemplifying: An Example



In many instances in MIs, a Classifying-Exemplifying and a CoClassifying-Exemplifying coupling can form a small cluster (for definition of clustering see Chapter 3, Section 3.2.3.4). That is, a visual participant is classified twice, first on its own as belonging to one member of a class, and then with some other objects as members of a different (usually more general) class of things. For example in Plate 4.25, each individual object is verbally classified as a type of object (e.g. *bucket*, *windlass*, *cradle*, *pick*), while all objects in the frame are classified as belonging to the family of *shaft mining tools*.

Plate 4.25 Classifying-Exemplifying clusters



4.2.4.2 Classifying-Exemplifying: Objects and people

In MIs, Classifying-Exemplifying couplings are used to classify both entities and processes. The classification of entity deals with both objects (e.g. Plate 4.26a) and people (e.g. Plate 4.26b).

Plate 4.26 Classifying-Exemplifying: Objects and people

a. Objects



Traditional outrigger canoe

b. People



Pearl diver

A visually represented human participant in a Classifying-Exemplifying coupling is in one way similar to those in Naming and Identifying, that is, it is 'identified' by a verbal label. However, there are two fundamental differences between these two ways through abstraction—Naming and Identifying, and through generalisation—Classifying-Exemplifying of labelling visual participants. First, semantically, in a Classifying-Exemplifying coupling, verbiage assigns a visually represented participant a class membership (e.g. *The man in the photo is a pearl diver*); while in Naming and Identifying couplings, verbiage identifies the participants by giving them a name or specifying their social roles (e.g. *The man in the photo is the postmaster at lonely creek*) or relations (e.g. *the girl in the photo is Lilija's daughter*). Second, in a Classifying-Exemplifying coupling, the visual processes, attributes, circumstances associated with the human participant usually indicate the classification criteria of the membership. In short, these visual structures exemplify the verbal class membership (hence the Exemplifying). In Plate 4.26b, for instance, the visual participant is classified in verbiage as a *pearl diver*, whilst the image exemplifies the type of activities (emptying the basket), tools (the basket, the boat), etc associated with a pearl diver. In Naming and Identifying coupling, in contrast, the social roles and relations of the visual participant are realised through linguistic structures (proper name, possessive or circumstantial Qualifier in a nominal group). In MIs, therefore, the images in Classifying-Exemplifying couplings are typically Narrative ones while those in Naming and Identifying couplings are usually Conceptual ones (cf. Kress & van Leeuwen, 2006[1996]).

It is important to note that in a Classifying-Exemplifying coupling, the image only *exemplifies* but does not *specify* or *exhaust* the classification criteria of the membership realised in verbiage. Simply put, we cannot generalise from just one instance what type of person can be classified as a pearl diver, or a boat as a traditional outrigger canoe (see Plate 4.26). Classification criteria can only be clarified (to various extents) through the presence of more instances of image or being specified in verbiage. In MIs, the forming of a classification cluster is one important way to clarify classification criteria. A classification cluster occurs when a few Classifying-Exemplifying couplings form an ideation cluster without or with extra verbal text.

Plate 4.27 Classifying-Exemplifying: Classification cluster

Ceremonies and dancing
Ceremonies and dances have many functions on the Torres Strait Islands.

- Each clan has ceremonial dances with their own style of singing and dancing.
- Different dances with elaborate costumes are used to celebrate a wedding, mark an event or mourn death at a funeral.
- Ceremonial dances often include totem objects, to encourage a positive relationship with the supernatural.
- Knowledge is passed down through dance, singing, storytelling and art.

Young Saibai Island dancer

Ceremonies and dancing

Ceremonies and dances have many functions on the Torres Strait Islands.

- **Each** clan has **ceremonial dances** [with their own style of singing and dancing].
- **Different dances** with elaborate costumes are used to celebrate a wedding, mark an event or mourn death at a funeral.
- **Ceremonial dances** often include totem objects, to encourage a positive relationship with the supernatural.
- Knowledge is passed on through **dance**, singing, storytelling and art.



Young Saibai Island dancer



Saibai Island dancer



Wedding dancers

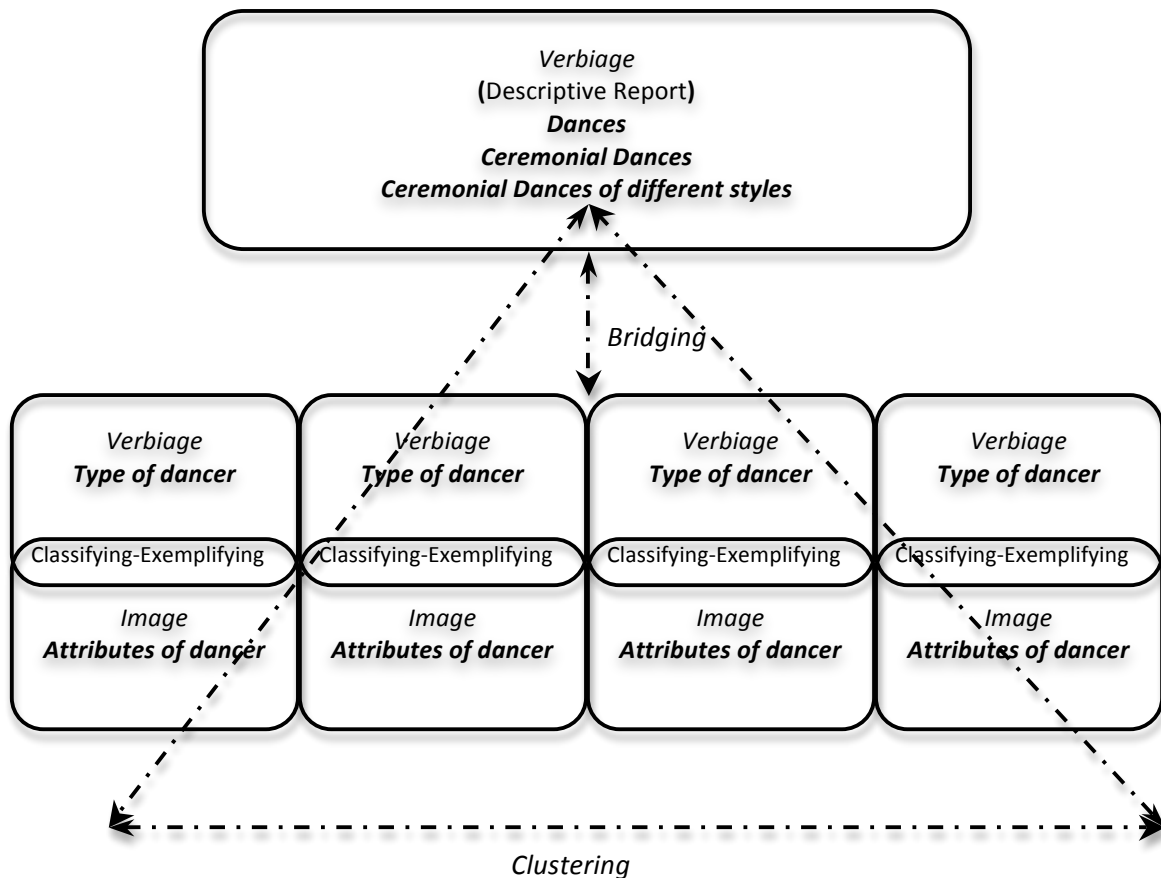


A dancer performs the fan dance

For example, Plate 4.27 consists of a frame taken from *Mysterious Object: Torres Strait Islands*. On the left side of the frame, there's a blue text box, which includes a short Descriptive Report. On the right side of the box is a picture frame, which allows different layers of images to appear. By clicking on the arrow sign at the bottom, the learner can view in turn the four individual images and their captions. In explaining the example here, I shall focus only on the classification/exemplification relation as realised in this local cluster. In this example, each individual image forms a Classifying-Exemplifying coupling with its captions, in which the visual participants are classified as *a dancer(s)* or a subclass of dancer (e.g. *young Saibai Islander dancer, Wedding dancers*). When four couplings are clustered, the characteristics of the dancer (i.e. the classification criteria) can be generalised from the visual structures common to all four images, e.g. Attributes (the big feather headpiece, the grass skirt, the totem objects as well as the ethnicity of the dancers), and Process (i.e. the holding out of the arms, the bending of knees)(cf. Kress & van Leeuwen, 2006 [1996]).

These four couplings also enter a **local cluster** (details of local clustering will be discussed in Section 4.3) with the accompanying text, a Descriptive Report. The cluster here is formed through the lexical relation of bridging (i.e. indirect reference that may depend on experiential relationships of various kinds, cf. Martin, 1992)—between dance and dancer. That is, the main lexical string in the Descriptive Report is *dances*, while the message construed in four verbiage-image couplings is that of dancer. Through the forming of a local cluster with the Descriptive Report, a further layer of classification relation is added onto these visually presented participants, i.e. they (e.g. *Saibai dancers, wedding dancers*) are all Torres Islands *ceremonial dancers*. The semantic relations construed in this classification cluster is summarised in the following Figure 4.14.

Figure 4.14 A summary of semiotic relations in the classification cluster: Torres Strait Islands dancers



4.2.4.3 Classifying-Exemplifying: Process

Classifying-Exemplifying coupling can also be formed between verbiage and visual processes (realised by vectors), i.e. the verbal message classifies the types of social actions realised in the image. In MIs, this type of coupling usually occurs within a coupling complex (see Section 4.1.2.2), where the verbiage and image co-construe both the social actor (Participant) and social action (Process). For instance, in Plate 4.28, the participant in the white robe is classified as a *priest*, while the activity the priest (i.e. holding a paper and reading from it) is engaged in is classified as *blessing*⁹.

⁹ Of course, this type of relation can occur in a simple coupling, for instance, if we change the caption to *blessing*. Simple coupling that contains Classifying-Exemplifying of visual process has not been found in MIs, possibly due to the constraint of the

Plate 4.28 Classifying-Exemplifying: Process



The classification of visual process through verbiage in a Classifying-Exemplifying coupling is different from the use of verbiage as an ideational metaphor for visual process in a Metaphoring coupling. In the former, the verbal message can be seen as a congruent form of the visual message (i.e. social action is realised as Process both in verbal and visual structure). In the latter, in contrast, the verbiage is in an incongruent form (i.e. the verbal message realises social action is in a nominalised form).

4.2.5 Circumstantiating

The final type of coupling is Circumstantiating, i.e. verbiage and image specify different aspects of circumstances in which a social process takes place. Since circumstantiating involves the specification of circumstantial elements of a process, it always occurs in a coupling complex. That is to say, a coupling needs to be formed first between verbiage and a visual Process (through Metaphoring or Classifying-Exemplifying). They can then complement each other in construing the circumstantial elements associated with this Process. This type of coupling complex often involves a

genre. In certain types of genre, for instance, sport illustrations, many images are only labelled for the processes (e.g. *bowl*, *duck*, *run*).

third set of coupling relation, in which the verbiage also names, identifies, or classifies the visual Participants and/or some aspects of the Circumstances.

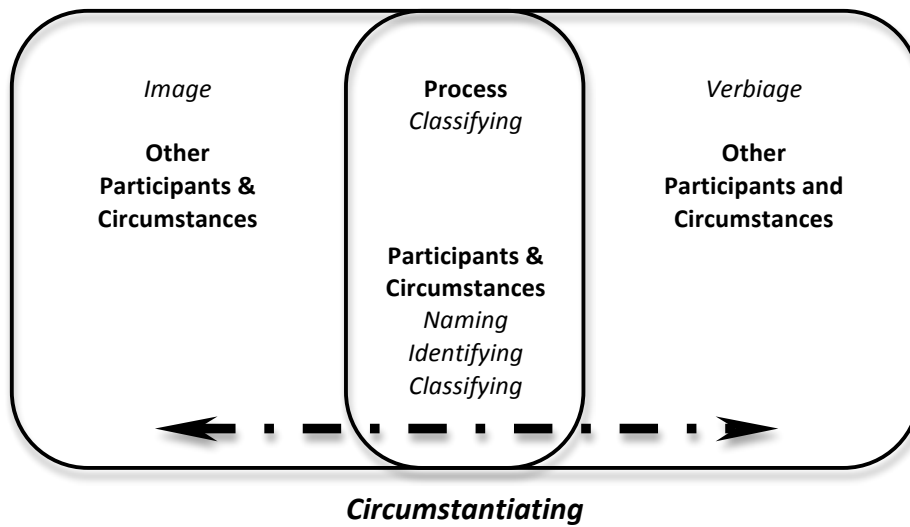
In Plate 4.29, for instance, the verbiage and image construe together two aspects of experiences—Process and Participant. The verbiage classifies the main visual process in the image as *signing*, and names the central participant as *Eddie Gilbert*. The verbiage also construes the scope in which the process is taking place through the grammatical structure of Range, *autographs*. The image, on the other hand, specifies various aspects in which the process takes place, for instance, Means (on a note pad), Location (in front of a building), Condition (possibly in a sunny afternoon judging from the shadows on the ground), Accompaniment or Beneficiary (the girls), etc. (for more examples, see also the example in Plate 4.1 discussed earlier in Section 4.1.1)

Plate 4.29 Circumstantiating: An example



In essence, in a Circumstantiating coupling, verbiage and image complement each other in meaning making, and the relation between the two is expressed in the following Figure 4.15.

Figure 4.15 Semiotic relations in Circumstantiating














One interesting topic concerns Circumstantiating coupling would be the ways in which verbiage and image complement each other in construing the field of experience, i.e. whether verbiage and image tend to construe different aspects of experiences (e.g. verbiage tends to specifies Causes) and if so what these aspects are. However, due to the limited numbers of the instances of this type of coupling in MIs and the field-specific nature of MIs (primary social science), this line of inquiry cannot be taken up in this research.

4.2.6 Major types of verbiage-image couplings in MIs: A summary

In this section, I have discussed five major types of verbiage-image couplings in MIs, including Naming, Identifying, Metaphoring Classifying-Exemplifying and Circumstantiating. Table 4.7 provides a summary of these couplings in terms of their semantic relations and basic organisation principles.

Table 4.7 Major types of verbiage-image ideational couplings

Types	Semantic relation	Organising Principle	Examples
Naming	<i>is</i>	Abstraction	People  Petronella Wensing
			Places: discrete 
			Places: relational 
Identifying	<i>is</i>		People 
			Places & Objects discrete 
			Places & Objects: relational 
Representing	<i>stands for</i>		Metonymising (contiguity) 
			Metaphoring (incongruence) 
Classifying-Exemplifying	<i>(co)classifies exemplifies</i>	Generalisation	Entity 
			Process 
Circumstantiating	<i>specifying circumstances</i>	Specification	

In summary, the five major types of couplings coordinate the temporary meaning space formed between verbiage and image through different types of semantic relation, including *is* (Naming and Identifying), *standing for* (Representing), *classifying* and *exemplifying*, and *specifying* circumstances. These semantic relations in turn organise reality through three basic types of principles. In Naming, Identifying and Representing, verbiage and image construe experiences as two different orders

of abstraction (they are to some degree comparable to the principles of intersemiosis described in Unsworth & Cléirigh, 2009). In *Classifying-Exemplifying*, verbiage and image construe experiences at different levels of generalisation, while in *Circumstantiating*, they complement each other by provide different types of specification.

4.3 Ideational couplings and local clustering: The multimodal construal of field

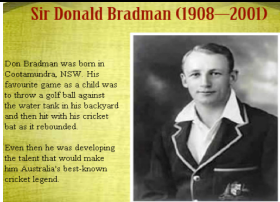

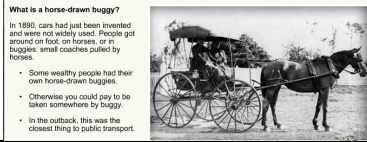
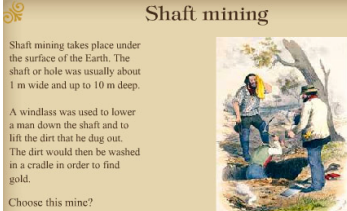
In this brief section, I place the ideational verbiage-image couplings discussed in the previous section within the broader context of MIs, examining the ways in which ideational verbiage-image couplings interact with elementary verbal genres (see Chapter 2, Section 2.1.1.2). To achieve this goal, I first provide an overview of the types of verbiage-image couplings and the types of verbal elementary genres the couplings tend to occur in/with. I then use one of the key genres in MIs—Biographical Recount (see Appendix II for a full list of verbal elementary genre in MIs)—to illustrate how ideational couplings form local clusters with the verbal text, and how these local ideational clusters expand the field of the verbal genre. The discussion in this section, together with that in Section 4.2, will provide the basis for Section 4.3 where the multimodal construal of primary social science knowledge in MIs will be explored.

4.3.1 Types of couplings and types of elementary verbal genres: An overview

In the five MIs being investigated in this thesis, there is an observable correlation between the types of ideational verbiage-image couplings and the types of elementary verbal genres they occur in. At this stage, I focus on the verbal elementary genres that realise the instructional register of the pedagogic discourse (see Chapter 2, Section 2.1.2.2), including Report, Explanation and history genres (Biographical Recount, Historical Recount and Historical Account). The interaction between

verbiage-image couplings and verbal elementary genres in the regulative register will be explored later Chapter 5. Table 4.8 summaries the major types of elementary verbal genres found in MIs and their typical corresponding coupling types.

Table 4.8 Types of verbal elementary genre & types of verbiage-image couplings: A summary

Typical Ideational Couplings	Verbal elementary genre	Examples
<i>Naming, Identifying & Circumstantiating</i>	Biographical Recount	 <p>Sir Donald Bradman (1908–2001)</p> <p>Don Bradman was born in Cootamundra, NSW. His favourite game as a child was to throw a golf ball against the wicker fence in his backyard and then hit with his cricket bat as it rebounded.</p> <p>From there he was developing the talent that would make him Australia's best-known cricket legend.</p>
<i>Naming & Identifying (places)</i>	Historical Recount/Account	 <p>Where did cricket come from?</p> <p>Read instructions Here</p>
<i>Classifying-Exemplifying, Circumstantiating</i>	Descriptive/Taxonomy Report	 <p>What is a horse-drawn buggy?</p> <p>In 1890, cars had just been invented and were not widely used. People got around on foot, on horses, or in buggies: small coaches pulled by horses.</p> <ul style="list-style-type: none"> Some wealthy people had their own horse-drawn buggies. Otherwise you could pay to be taken somewhere by buggy. In the outback, this was the closest thing to public transport.
<i>Classifying-Exemplifying, Circumstantiating</i>	Explanation	 <p>Shaft mining</p> <p>Shaft mining takes place under the surface of the Earth. The shaft or hole was usually about 1 m wide and up to 10 m deep.</p> <p>A windlass was used to lower a man down the shaft and to lift the dirt that he dug out. The dirt would then be washed in a cradle in order to find gold.</p> <p>Choose this mine?</p>

As shown in the table, in MIs, Naming and Identifying patterns tend to occur in history genres—Biographical Recount, Historical Recount and Account, while Classifying -Exemplifying couplings are often found in Report and Explanation genres. Circumstantiating coupling, on the other hand, is common to all types of verbal genres.

When a verbiage-image coupling occurs in a certain type of verbal genre, the verbiage in the intersemiotic coupling often forms a certain lexical relation with one of the verbal messages in the verbal text, as has been discussed briefly in Section 4.2.4.2 through the example of dances and dancers in Torres Strait Islands. By forming a lexical relation with a verbal message and subsequently entering one or more lexical strings of the verbal text, the intersemiotic coupling forms a **local cluster** with the

text. From the perspective of the verbiage, its lexical strings now contain more messages (or message parts) and the lexical relations of the text have been expanded. Simply put, when images are present, meaning “multiplies” (Lemke, 1998). In the following section, I shall illustrate in detail, by using one of the elementary verbal genres, *how* the lexical relations of a verbal genre expand through forming clusters with various types of verbiage-image couplings. In doing so, I shall also be able to demonstrate the ways in which verbiage and images co-construe the field of a multimodal text.

4.3.2 Verbiage-image coupling and local clustering: The multimodal construal of field in Biographical Recount

4.3.2.1 Lexical relations in Biographical Recount: Realisations in verbiage

To illustrate the expansion of lexical relations through ideational coupling and local clustering and the multimodal construal of field, I shall use one major type of verbal genre found in MIs—Biographical Recount. A Biographical Recount in essence is a chronicle recording of personal history. The field of this genre typically centres on the life events of an individual social actor, and these events unfold in field time (text external time, i.e. physical time). Text 4.1 taken from *New Homes* is one such example.

Text 4.1 Biographical Recount: Lilija Brakmanis

Lilija Brakmanis was born **in 1904** in Sloka, a town in Latvia, which is a country boarded by the Baltic sea on one side and Russia on the other. **At university**, Lilija trained to be a dentist and married an army officer Edwards Bro. **When she graduated** she started her own dental practice and gave birth to her only daughter Dace. **At the beginning of World War II, in 1939**, Russian troops occupied Latvia. Thousands of Latvians fled the oppressive rule of the Soviet government. The war continued. Lilija’s husband was killed by the Soviet army **in 1941**. **And soon after**, Latvia was occupied by German troops. Lilija and her daughter fled for Germany in a small ship kept by one of her patients. Lilija had lost her business, her home and her husband. She lived in Berlin and then moved to Leipzig where she worked as a dentist **until the war ended in 1945**. **After the war ended**, the Russians occupied eastern Germany. Lilija and Dace fled to western Germany, which was occupied by the Americans. Lilija then lived in a displaced persons camp **for about two years**. She remarried **in 1946** and (shown here with her daughter and second husband). In the camp, the United Nation’s refugee organization helped Lilija translate important documents into English to make it easier for her to start a new life in a safe country. (This one states she was a professional dentist). Lilija heard that Australia welcomed refugees and that she could use her

dentist skills there. **In 1949**, she decided to take her equipment and her family to Australia to start a new life. But **when she arrived in Australia**, Liliija found out she was not allowed to work as a dentist. She had to earn a living by cleaning instead. **Eventually**, her qualifications were partly recognized and Liliija became a practicing dentist in Canberra.

The lexical relations in Text 4.1 are summarised in Table 4.9. In this text, the field evolves around the significant personal events in Liliija Brakmanis' life, from her birth in Latvia to her resettlement in Australia. Here, Liliija forms the centre participant string and her actions constitute the main activities sequence (e.g. *born, married, gave birth, fled, remarried*). These events unfold in episodic time (e.g. *in 1904, in 1939, after the war*) and the locations where the events took place are also described (e.g. *in Sloka, in the camp*). A separate lexical string is formed in the text concerning Liliija's career in dentistry (e.g. *a dentist, dental practice*). The activities Liliija engaged in often involved her close family members (e.g. *her only daughter Dace, her husband*), and these participants form the first minor participant string, Liliija's family. The events and participants discussed so far constitute Liliija's personal sphere.

Table 4.9 Lexical strings in Biographical Recount: Liliija Brakmanis

Timeline	Liliija	Activities (Personal events)	Dentistry	People related to Liliija		Activities (Historic Events)	Locations
				<i>Liliija's Family</i>	<i>Groups</i>		
<i>in 1904</i>	<i>Liliija Brakmanis</i>	<i>was born</i>					<i>Sloka, a town in Latvia</i>
<i>At university</i>	<i>she</i>	<i>trained</i>	<i>a dentist</i>				
		<i>married</i>		<i>an army officer Edwards Bro</i>			
<i>when she graduated</i>	<i>she she</i>	<i>graduated started</i>	<i>dental practice</i>				
		<i>gave birth</i>		<i>her only daughter Dace</i>			
<i>At the beginning of World War II, in 1939,</i>					<i>Russian troops</i>	<i>occupied</i>	<i>Latvia</i>
						<i>Thousands of Latvian</i>	<i>fled</i>
<i>1941</i>				<i>Liliija's husband</i>	<i>Soviet army</i>	<i>killed</i>	

Table 4.9 (continued) Lexical strings in Biographical Recount: Lilija Brakmanis

Timeline	Lilija	Activities (Personal events)	Dentistry	People related to Lilija		Activities (Historic Events)	Locations	
				Lilija's Family	Groups			
soon after						German troops	occupied	Latvia
	Lilija	fled		her daughter				Germany
	Lilija	lost	her business	her husband				her home
	She	lived						Berlin
		moved to	dentist					Leipzig
until the war ended in 1945	she	worked as a dentist						
after the war ended,						the Russians	occupied	eastern Germany
	Lilija	fled		Dace				western Germany
						Americans	occupied	(western Germany)
Then...for two years	Lilija	lived						a displaced persons camp
in 1946	Lilija	remarried				United Nation's refugee	helped translate	In the camp
	Lilija	heard				refugees	welcome	Australia there
In 1949	she	use	dentist skills					
	she	decided take	her equipment	her family				Australia
when she arrived in Australia	Lilija	found out						
	she	was not allowed to work	dentist					
	She	had to earn=a living cleaning						
Eventually	Her= qualificat ions	were recognized						
	Lilija	Became	a practicing dentist					Canberra

In the text, Lilija's personal events are interrupted periodically by events, which took place in public sphere (historic events string), e.g. *Russian troops occupied Latvia, Latvia was occupied by German troops*. The participants in these events are cultural and political groups that Lilija may or may not belong to (e.g. *the Russians, Thousands of Latvians, refugees*), and they form the second minor participant string—Groups. The historic time of these events often interweaves with Lilija's personal timeline

(e.g. *Lilija's husband was killed by the Soviet army in 1941. And soon after, Latvia was occupied by German troops*), the two different types of time thus are treated as forming the same and continuous lexical string of Timeline. In short, the Biographical Recount of Lilija Brakmanis is a story of a person's life against the grand backdrop of WWII, and it construes the private history of an individual in relation to the shared history of a community.

4.3.2.2 Types of couplings: Re-locating Biographical Recount in multimodal environments

In *New Homes*, Text 4.1 is delivered as an audio voice over, spanning nine sequences of a frame, and these sequences are listed in Table 4.10. As shown in the table, the voice-over text, i.e. the Biographical Recount accompanies a total of 20 images, 18 captioned and 2 uncaptioned (a photo of the Latvian Army in sequence 4 and a black-white photo of a hoover in sequence 8).

Table 4.10 Multimodal environments of Biographical Recount: Lilija Brakmanis



	Frame: Sequence	Audio Text Transcriptions
1		<p><i>Lilija Brakmanis was born in 1904 in Sloka, a town in Latvia, which is a country bordered by the Baltic sea on one side and Russia on the other.</i></p>
2		<p><i>At university, Lilija trained to be a dentist and married an army officer Edwards Bro. When she graduated she started her own dental practice and gave birth to her only daughter Dace.</i></p>

Table 4.10 (continued) Multimodal environments of Biographical Recount: Lilija Brakmanis


	Frame.: Sequence	Audio Text Transcriptions
3		<p><i>At the beginning of World War II, in 1939, Russian troops occupied Latvia. Thousands of Latvians fled the oppressive rule of the Soviet government.</i></p>
4		<p><i>The war continued. Lilija's husband was killed by the Soviet army in 1941. And soon after, Latvia was occupied by German troops. Lilija and her daughter fled for Germany in a small ship kept by one of her patients. Lilija had lost her business, her home and her husband. She lived in Berlin and then moved to Leipzig where she worked as a dentist until the war ended in 1945.</i></p>
5		<p><i>After the war ended, the Russians occupied eastern Germany. Lilija and Dace fled to western Germany, which was occupied by the Americans. Lilija then lived in a displaced persons camp for about two years. She remarried in 1946 (shown here with her daughter and second husband).</i></p>
6		<p><i>In the camp, the United Nation's refugee organisation helped Lilija translate important documents into English to make it easier for her to start a new life in a safe country. This one states she was a professional dentist.</i></p>
7		<p><i>Lilija heard that Australia welcomed refugees and that she could use her dentist skills there. In 1949, she decided to take her equipment and her family to Australia to start a new life.</i></p>

Table 4.10 (continued) Multimodal environments of Biographical Recount: Lilija Brakmanis







	Frame.: Sequence	Audio Text Transcriptions
8		<p><i>But when she arrived in Australia, Lilija found out she was not allowed to work as a dentist. She had to earn a living by cleaning instead.</i></p>
9		<p><i>Eventually, her qualifications were partly recognized and Lilija became a practicing dentist in Canberra.</i></p>

In total, there are 17 couplings entering an ideational cluster with the Biographical Recount. The couplings are listed in Table 4.11, based on the sequence they appear in the frame.

Table 4.11 Verbiage-image couplings in Biographical Recount: Lilija Brakmanis

Seq	Ideational Verbiage-Image Couplings	Biographical Recount
1	<div style="border: 1px solid black; border-radius: 15px; padding: 5px; margin-bottom: 5px;"> <p><i>Typical Latvian town in 1904</i></p> </div> <div style="border: 1px solid black; border-radius: 15px; padding: 5px; margin-bottom: 5px;"> <p>Classifying-Exemplifying</p> </div> <div style="border: 1px solid black; border-radius: 15px; padding: 5px; margin-bottom: 5px;"> </div> <div style="border: 1px solid black; border-radius: 15px; padding: 5px; margin-bottom: 5px;"> <p><i>Lilija as a child</i></p> </div> <div style="border: 1px solid black; border-radius: 15px; padding: 5px; margin-bottom: 5px;"> <p>Identifying</p> </div> <div style="border: 1px solid black; border-radius: 15px; padding: 5px;"> </div>	<p><i>Lilija Brakmanis was born in 1904 in Sloka, a town in Latvia, which is a country boarded by the Baltic sea on one side and Russia on the other.</i></p>
2	<div style="border: 1px solid black; border-radius: 15px; padding: 5px; margin-bottom: 5px;"> <p><i>Dentistry class, University of Latvia, 1930s</i></p> </div> <div style="border: 1px solid black; border-radius: 15px; padding: 5px; margin-bottom: 5px;"> <p>Identifying</p> </div> <div style="border: 1px solid black; border-radius: 15px; padding: 5px;"> </div>	<p>At university, Lilija trained to be a dentist and married an army officer Edwards Bro. When she graduated she started her own dental practice and gave birth to her only daughter Dace.</p>









Table 4.11 (continued) Verbiage-image couplings in Biographical Recount: Lilija Brakmanis

Seq	Ideational Verbiage-Image Couplings	Biographical Recount
3	<p><i>Soviet Occupied Latvia</i></p> <p>Representing</p> 	<p>At the beginning of World War II, in 1939, Russian troops occupied Latvia. Thousands of Latvian fled the oppressive rule of the Soviet government.</p>
4	<div style="display: flex; justify-content: space-around;"> <div> <p><i>Lilija and her first husband</i></p> <p>Identifying</p>  </div> <div> <p><i>Latvian Army*</i></p> <p>Identifying</p>  </div> </div>	<p>The war continued. Lilija's husband was killed by the Soviet army in 1941. And soon after, Latvia was occupied by German troops. Lilija and her daughter fled for Germany in a small ship kept by one of her patients. Lilija had lost her business, her home and her husband. She lived in Berlin and then moved to Leipzig where she worked as a dentist until the war ended in 1945.</p>
5	<div style="display: flex; justify-content: space-around;"> <div> <p><i>Refugee camp (at Meerbeck, Germany)</i></p> <p>Identifying</p>  </div> <div> <p><i>Dace, Lilija and her second husband</i></p> <p>Naming & Identifying</p>  </div> </div>	<p>After the war ended, the Russians occupied eastern Germany. Lilija and Dace fled to western Germany, which was occupied by the Americans. Lilija then lived in a displaced persons camp for about two years. She remarried in 1946 (shown here with her daughter and second husband).</p>
6	<p><i>Lilija's dental documents</i></p> <p>Identifying</p> 	<p>In the camp, the United Nation's refugee organization helped Lilija translate important documents into English to make it easier for her to start a new life in a safe country. This one states she was a professional dentist.</p>

*in these two instances, only one image is captioned; the uncaptioned image enters the coupling through the visual 'lexical relation', e.g. men in two photos are wearing similar uniforms and the two objects look alike.

** Here, the relation is treated as Identifying, for at this stage of the text, the caption is not naming the participant as Lilija. Rather, it is indicated that this is Lilija when she is in Canberra.

Table 4.11 (continued) Verbiage-image couplings in Biographical Recount: Lilija Brakmanis

Seq	Ideational Verbiage-Image Couplings	Biographical Recount
7	<div style="border: 1px solid black; border-radius: 10px; padding: 5px; text-align: center;"><i>Pedal-driven dentist's drill</i></div> <div style="border: 1px solid black; border-radius: 10px; padding: 5px; text-align: center;">Classifying-Exemplifying</div> <div style="text-align: center;"></div> <div style="border: 1px solid black; border-radius: 10px; padding: 5px; text-align: center;"><i>Drill bit</i></div> <div style="border: 1px solid black; border-radius: 10px; padding: 5px; text-align: center;">Classifying-Exemplifying</div> <div style="text-align: center;"></div> <div style="border: 1px solid black; border-radius: 10px; padding: 5px; text-align: center;"><i>Spittoon</i></div> <div style="border: 1px solid black; border-radius: 10px; padding: 5px; text-align: center;">Classifying-Exemplifying</div> <div style="text-align: center;"></div>	<p><i>Lilija heard that Australia welcome refugees and that she could use her dentist skills there. In 1949, she decided to take her equipment and her family to Australia to start a new life.</i></p>
8	<div style="border: 1px solid black; border-radius: 10px; padding: 5px; text-align: center;"><i>Hoover*</i></div> <div style="border: 1px solid black; border-radius: 10px; padding: 5px; text-align: center;">Classifying-Exemplifying</div> <div style="text-align: center;"></div> <div style="border: 1px solid black; border-radius: 10px; padding: 5px; text-align: center;"><i>Lilija and her family on the boat that brought her to Australia</i></div> <div style="border: 1px solid black; border-radius: 10px; padding: 5px; text-align: center;">Identifying</div> <div style="text-align: center;"></div>	<p><i>But when she arrived in Australia, Lilija found out she was not allowed to work as a dentist. She had to earn a living by cleaning instead.</i></p>
9	<div style="border: 1px solid black; border-radius: 10px; padding: 5px; text-align: center;"><i>Lilija's cat</i></div> <div style="border: 1px solid black; border-radius: 10px; padding: 5px; text-align: center;">Identifying</div> <div style="text-align: center;"></div> <div style="border: 1px solid black; border-radius: 10px; padding: 5px; text-align: center;"><i>Lilija's house in Canberra</i></div> <div style="border: 1px solid black; border-radius: 10px; padding: 5px; text-align: center;">Identifying</div> <div style="text-align: center;"></div> <div style="border: 1px solid black; border-radius: 10px; padding: 5px; text-align: center;"><i>Lilija**</i></div> <div style="border: 1px solid black; border-radius: 10px; padding: 5px; text-align: center;">Identifying</div> <div style="text-align: center;"></div>	<p><i>Eventually, her qualifications were partly recognized and Lilija became a practicing dentist in Canberra.</i></p>

In *New Homes*, the 17 verbiage-image couplings evolve around three main themes: 1) the identifying of individuals (e.g. *her husband*), group participants (e.g. *Dentistry class, Latvian Army*), as well as individuals at different stages of their lives (e.g. *Lilija as a child*); 2) the identifying or exemplifying of objects that are related to Lilija, including both those concerning her career as a dentist (e.g. *drill bit*) and later as a cleaner (e.g. *hoover*) and those belonging to her private life (e.g. *Lilija's cat*); 3) places that played a significant role in Lilija's life are also presented through various types of couplings (e.g. *typical town in Latvia*). These verbiage-image coupling units in turn form local clusters with lexical items on various participant and location strings listed earlier in Table 4.9, and the ways in which these clusters are formed and the ways in which the field of Biographical Recount is expanded through verbiage-image clustering will be the topic for discussion in the following section.

4.3.2.3 Local clustering and the multimodal construal of field in Biographical Recount

To illustrate how the Biographical Recount interact with these images and how the field of the verbal text expands through such interactions, I shall use a short segment from the text (i.e. the verbiage in the first four sequences of the frame). The text segment and the lexical strings it contains are presented in Figure 4.16.

Figure 4.16 Lexical strings: Opening sequence in Lilija Brakmanis

Lilija Brakmanis was born **in 1904** in Sloka, a town in Latvia, which is a country bordered by the Baltic sea on one side and Russia on the other. **At university**, Lilija trained to be a dentist and married an army officer Edwards Bro. **When she graduated** she started her own dental practice and gave birth to her only daughter Dace. **At the beginning of World War II, in 1939**, Russian troops occupied Latvia. Thousands of Latvians fled the oppressive rule of the Soviet government. The war continued. Lilija's husband was killed by the Soviet army **in 1941**¹⁰.

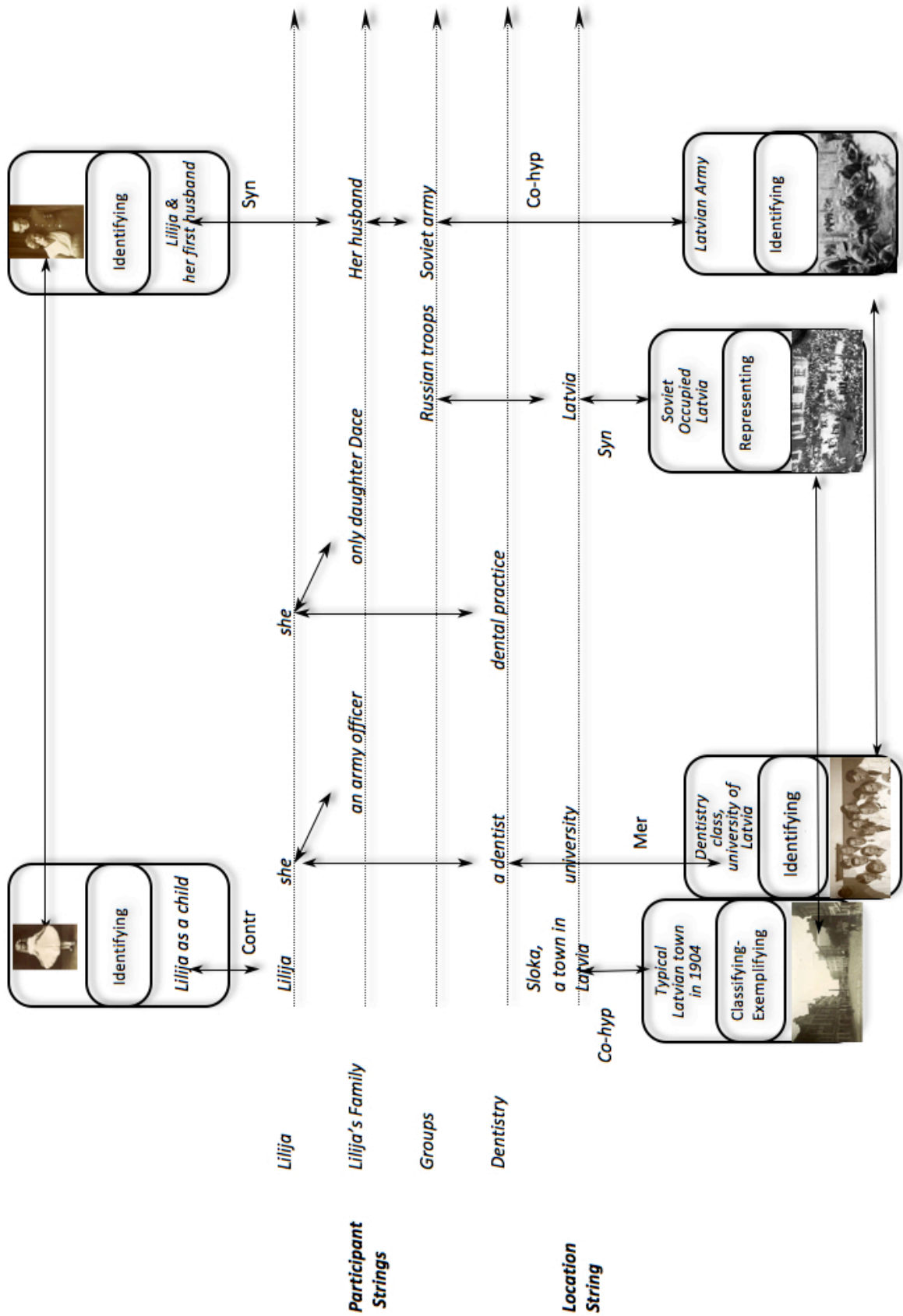
¹⁰ Please note, for the convenience of the discussion, only the first two clauses in sequence 4 are considered. However, it will not impact on the integrity of the analysis shown here, for the text is segmented according to the boundary of the genre rather than the boundary of the medium. That is, generically speaking, each different phase/stage in Biographical Recount is marked by a different Circumstance of time. 'In 1941' thus can be seen as a marker of a generic phase/stage. To some extent, this instance here is a good illustration of a point discussed in various points

Timeline	Lilija s	Activities (Personal events)	Dentistry	People related to Lilija	Activities (Historic Events)	Locations
				<i>Lilija's Family</i>	<i>Groups</i>	
<i>in 1904</i>	<i>Lilija Brakmanis</i>	<i>was born</i>				<i>Sloka, a town in Latvia</i>
<i>At university</i>	<i>she</i>	<i>trained married</i>	<i>A dentist</i>	<i>an army officer Edwards Bro</i>		<i>University</i>
<i>when she graduated</i>	<i>she she</i>	<i>graduated started</i>				
		<i>gave birth</i>		<i>her only daughter Dace</i>		
<i>At the beginning of World War II, in 1939,</i>					<i>Russian troops</i>	<i>occupied</i>
						<i>Latvia</i>
<i>1941</i>				<i>Lilija's husband</i>	<i>Thousands of Latvian Soviet army</i>	<i>fled killed</i>

As shown earlier in Table 4.11, there are six verbiage-image couplings occurring in these four sequences, including: 1) typical Latvian town in 1904, 2) Lilija as a child, 3) Dentistry class, 4) Soviet occupied Latvia, 5) Lilija and her second husband, and 6) Latvian Army. The ways in which these ideational couplings interact with verbal messages on the lexical strings are presented in Figure 4.17. The representational technique is similar to the one that has been discussed earlier in Chapter 3, Section 3.2.3.4. In the figure, each line constitutes a verbal lexical string, with the arrows indicating the direction of unfolding. The lexical tokens (verbal messages) are listed above the string. The interactions between lexical tokens on different strings, and between tokens and verbiage-image couplings are indicated by double arrows.

throughout Chapter 2 and 3, that is, the boundary imposed by the hypertext medium does not necessarily conflate with that of the boundary between units of meaning.

Figure 4.17 Clustering of participants and locations in Lilija's Biographical Recount



As shown in Figure 4.17, there are five major lexical strings at this stage of the Biographical Recount, that of Lilija, her family, groups (*the Russians*), Lilija's dentistry career, and location (the places in which the events took place). There are two to three tokens in each string. The verbal message units (i.e. tokens) in different strings interact (see discussions in Chapter 3, Section, 3.2.3.4, see also Hasan, 1984) with each other frequently by being participants (e.g. Actor, Goal, etc) of the same process, for example, *Lilija's husband was killed by the Soviet army*). In other words, these lexical tokens form a participant cluster.

Of all the tokens on the five strings, six of them form further semantic relations with the verbal messages in the six couplings (e.g. the captions). There are four different types of lexical relations involved: Contrast (*Lilija=Lilija's as a child*); Synonym (*her husband=her first husband; Latvia=Soviet occupied Latvia*); Cohyponymy (*a town in Latvia= [a] typical Latvian town; Soviet Army=Latvian Army*); and Meronymy (*a dentist=dentistry class*) (cf. Martin, 1992). Through these lexical relations, the verbiage-image coupling units are introduced into the participant and location cluster of the Biographical Recount. In other words, an intersemiotic cluster is formed, encompassing a larger and more complicated set of semantic units and relations.

The elaboration of the semantic relations through intersemiotic clustering in turn leads to the expansion of field, and such expansion can be observed in two main aspects:

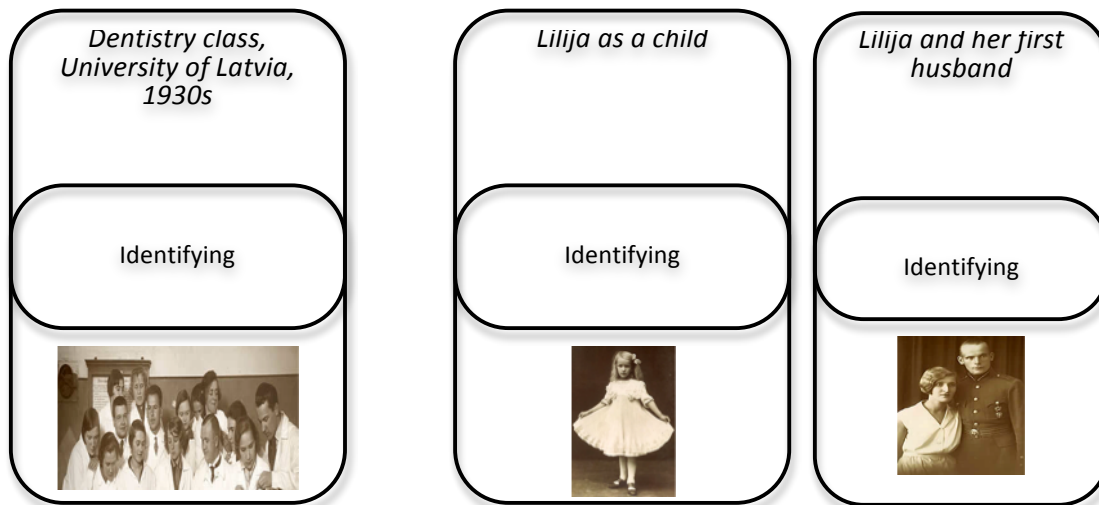
1) *social relations* Whereas in the Biographical Recount, Lilija forms relation with various people through processes and events (e.g. *[Lilija] married an army officer Edwards Bro*), the image relates her with other people through 'space' proximity (i.e. dwelling within the same 'social space') or shared attributes. For instance, in the cluster in Figure 4.18a, the grammar construes dentist as a role in which Lilija performed (*Lilija was trained as a dentist*), the visual message construes dentist as a state of belonging, i.e. Lilija being among a group of future dentists and wearing similar surgical gowns. The cluster thus construes two aspects of the same social relations in two different ways—community membership as performance (verbiage) and as belonging (image).

Figure 4.18 Intersemiotic clustering and field expansion: Examples

a. social relations

b. social processes: Change of attributes

Lilija was trained a dentist.



2) *social processes* The Biographical Recount construes Lilija Brakmanis' life as a sequence of events unfolding in time, e.g. **At university**, *Lilija trained to be a dentist and married an army officer Edwards Bro. **When she graduated** she started her own dental practice and gave birth to her only daughter Dace. In short, the verbiage construes personal history as ongoing processes. Through intersemiotic clustering, images of Lilija at different stages of her life are introduced into the ideational cluster, as shown in Figure 4.17. These visual messages (see Figure 4.18b) realise the attributes and qualities of Lilija that are not represented in verbiage (e.g. her hair, her smile, her dress style, etc). In a way, the images of Lilija at different stages of her life can be modelled as a separate lexical string. In contrast to activity sequence, this visual 'lexical' string construes the life of Lilija as moving from one status to another, i.e. changes in appearance, dress, and surroundings (e.g. Latvia before and during the war), etc. In other words, the verbiage-image cluster here allows the construal of two aspects of the same social process—individual life as a chain of actions (verbiage) and as changes of status (image).*

To sum up, in a multimodal text like the one illustrated above, verbiage and image interact with each other through certain types of couplings relations, these couplings in turn enter different sets of lexical relations with units of message in the verbal text. In this way, verbiage and images form an intersemiotic cluster. The forming of an

intersemiotic cluster may also generate new sets of semantic relations, such as those between images. The meaning space created by an ideational cluster is larger than the meaning space of a monomodal text. Within this shared meaning space, verbiage and image co-construe different aspects of human experiences. Verbiage tends to organise experiences through nuclear structures as sequences of activities, and participants relate to each other through actions and events. Image, on the other hand, tends to organise experiences as the changes of status, highlighting qualities and attributes of the participants and spatial relations between different participants. In short, in multimodal environments, image and verbiage complement each other in construing human experiences, with verbiage inclining towards typological meaning and image favouring topological meaning.

So far in this chapter, I have illustrated how verbiage and image form ideational couplings and how these couplings in turn form local clusters with verbal genres. In a way, I have more or less answered the question of how—how do image and verbiage interact with each other in the multimodal environment of MIs. In following section, I shall move onto the question of what— what are the fields of primary social science being construed in MIs. In other words, I shall move from textual analysis to the contextual interpretation.

4.4 People and places: Construing notions of community in MIs

4.4.1 Overview

The NSW Human Society & Its Environment (K-6) Syllabus identify the knowledge base for the key learning area in primary social science as constituted of four main strands:

Change and continuity: ...learn that human societies and environments are affected by change and continuity. Emphasis is placed upon the importance knowing about the past in order to understand the present and hypothesises about the future. They also learn about sites and places and the significance of these for their own and Australia's heritage.

Cultures: ... understandings of themselves, both as individuals and as members of groups. They identify and appreciate human similarities and differences. Understanding cultures helps students to relate to others in appropriate and socially just ways and to recognise the fact that, in democratic and culturally diverse societies, there are a variety of viewpoints that different people hold, and that these can influence behaviours.

Environments: ... understand that the environment is the aggregate of all conditions that influence the life of an individual or population. The state of the environment ultimately determines both the quality and the survival of life. Responsible environmental management is an investment in our future. Students learn to identify features, places, sites and environments and develop knowledge of relationships between them.

Social Systems and Structures: ... People develop social systems and structures in order to achieve a range of purposes. Students learn about their needs and wants, and how interacting with other people in social and economic systems contributes to society. Students also develop understandings about roles, rights and responsibilities within social systems and structures. Students explore how social systems and structures — in particular the democratic political and legal systems of Australia — are constructed to incorporate changing values and practices. (NSW Board of Study, 2006, p 10-11)

Designed for the SOSE and HSIE curriculum (see Chapter 1, Section, 1.3.1), the content of the five MIs used in this research evolves closely around the learning areas as prescribed in the syllabus. Each MI, however, focuses on one or two different areas of learning, due to varied subject matter and themes. For instance, *New Homes* focuses on exploring the ways in which the history of European immigration post WWII has shaped the contemporary Australian community. *Mysterious Objects: Torres Strait Islands*, on the other hand, places emphasis on identifying culturally significant objects and places.

Despite their differences in focus, there is a shared theme underpinning all five MIs — construing notions of a community, i.e. 'our' Australian community. In MIs, this community is seen as consisting of two key aspects, people and the places to which

the people belong. The community construed in MIs is also one that is deeply shaped by the past and is constantly evolving. The discussion in the remainder of this section thus will be organised around these two main themes in the multimodal construal of community in MIs: 1) community members, i.e. people who make up the community 2) places associated with the community.

4.4.2 Building community: Heroes and ordinary people

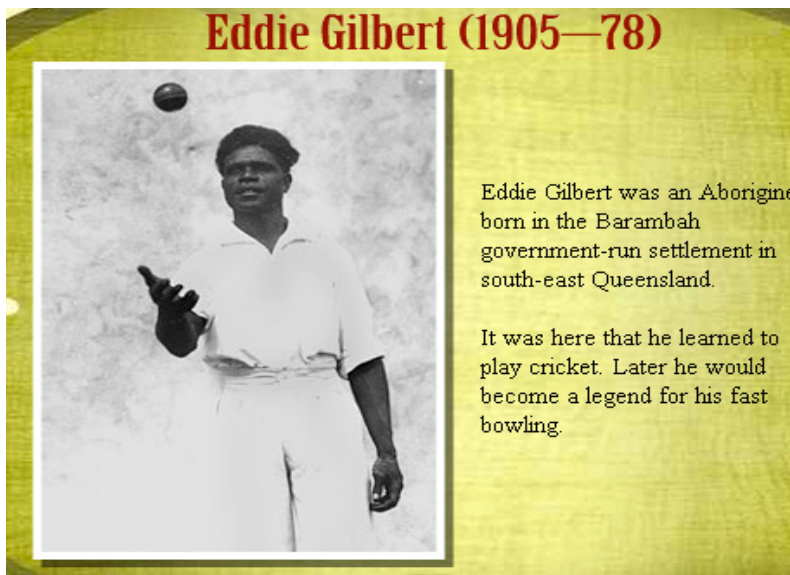
The first aspect in the construal of notions of community in MIs concerns the members that make up the community. As mentioned briefly in Section, 4.2.1.2, there are two basic types of people represented in MIs, heroes and ordinary people. The two types of individuals are associated with different types of coupling and local clustering patterns in MIs. And these different multimodal treatments of heroes and ordinary people can be observed both in 1) the ways in which they are identified or named in MIs (coupling patterns), and 2) the different multimodal construal of their lives and their roles in society (local clustering patterns).

4.4.2.1 Naming and Identifying community members: Differences in coupling

As illustrated in Plate 4.30, the first difference between heroes and ordinary members of the community lies in the way in which they are identified or named. Heroes in MIs are always named visual participants (e.g. *Eddie Gilbert* in 4.30a), whereas ordinary people can be named (e.g. *Lilija Brakmanis*), identified by their relation to other visual participants (e.g. *Dace, Lilija and her second husband*) or remain unnamed or unidentified (e.g. *pearl diver*). When a community member is not given a proper name or identified by their social roles and interpersonal relations, they are seen as *exemplifying* a particular group of people in the community.

Plate 4.30 Types of community members

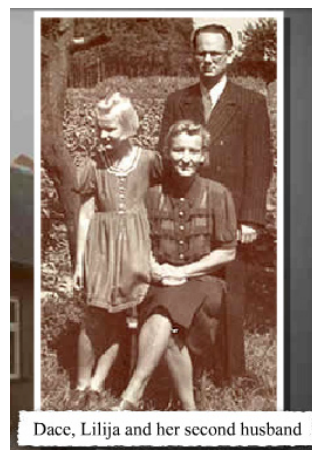
a. Heroes



b. Named ordinary people



c. Identified ordinary people



d. Nameless members of the community



Pearl diver

In MIs, named and/or identified heroes and ordinary people usually occur in Biographical Recount, while unnamed members of the community typically occur in factual genres such as Report or Explanation (please refer to Table 4.8 in Section 4.3.1). I shall first deal with heroes and named/identified ordinary people in the next section.

4.4.2.2 Biographical Recounts of heroes and ordinary people: Differences in local clustering

In MIs, both the lives of heroes and ordinary people are recorded through Biographical Recounts. However, there are significant differences regarding the ways in which the life stories of these two types of individuals are constructed. The first major difference concerns the use of evaluative resources in the verbal genre, while the second has to do with the types of coupling and local clustering patterns associated with the Biographical Recount. In short, the lives of heroes and ordinary people are construed differently in MIs both in terms of verbiage and multimodally.

Differences in verbiage: APPRAISAL

Text 4.2 Biographical Recount of a hero: Eddie Gilbert

Eddie Gilbert was an Aborigine born in the Barambah government run settlement in south-east Queensland. It was here that he learned to play cricket. Later he would become a **legend** [+Jud: Normality] for his fast bowling. This bowling **hero** [+Jud: Normality] became a **sports star** [+Jud: Normality] in the 1930s, drawing thousands of fans [+Aff: Happiness] to watch his **SIZZLING SPEED** [+Appr: Quality]. People joked [+Aff: Happiness] that he **bowled so fast, you could see puffs of smoke from his patch** [T+Jud: Capacity]. But despite his **huge popularity** [+Jud: Normality] and **SKILL** [+Appr: Quality], Gilbert was never selected for the Australian team. At this time, **discrimination** [-Jud: Propriety] against Indigenous Australians meant that Gilbert was blocked from rising too high in his sport. Though in the end, cricket officials **succeeded in destroying** [-Jud: Propriety] Gilbert's career because of the colour of his skin, Australian fans loved [+Aff: Happiness] him. He was very popular [+Jud: Normality] and Australians took national pride [+Aff: inclination] in **his talent** [+Jud: Capacity].
[Judgment, Affect, APPRECIATION]

A hero's Biographical Recount in MIs, such as the one for Eddie Gilbert in Text 4.2, is often rich in APPRAISAL (Martin & White, 2005). The evaluation of a hero typically

focuses on the APPRECIATION of his/her skills (e.g. *SIZZLING SPEED, HUGE SKILL*), the JUDGMENT of his/her normality—how special he/she is (e.g. *a legend, hero, star*) and capacity—how capable he/she is (e.g. *bowled so fast, you could see puffs of smoke from his patch*). The Biographical Recount also highlights the AFFECT of the community towards the hero, e.g. fans loved him, Australians took national pride of his talent.

In contrast, in the Biographical Recount of an ordinary member of the community, such as the one for Lilija Brakmanis we have encountered earlier (Text 4.1), there is very little explicit APPRAISAL evolved. However, the text often invokes emotional reaction—AFFECT—by focusing on the ‘ordinariness’ of the events these individual engaged in. For instance, when Lilija married an army officer Edwards Bro, started her own dental practice and gave birth to her only daughter Dace, a sense of happiness is invoked, whilst when Lilija had lost her business, her home and her husband, a feeling of unhappiness is invoked. In other words, the evocation of Affect in this type of Biographical Recount hinges on the *presumed* natural responses to these shared ordinary human experiences.

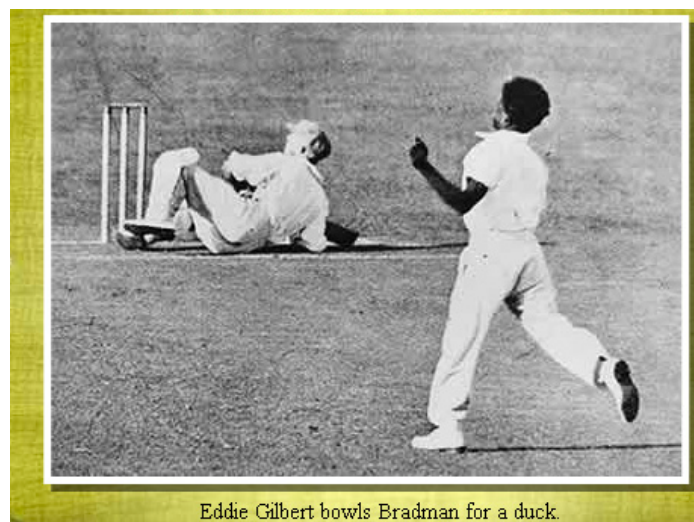
Text 4.1 Biographical Recount: Lilija Brakmanis

Lilija Brakmanis was born in 1904 in Sloka, a town in Latvia, which is a country boarded by the Baltic sea on one side and Russia on the other. At university, Lilija trained to be a dentist and married an army officer Edwards Bro. When she graduated she started her own dental practice and gave birth to her only daughter Dace. At the beginning of World War II, in 1939, Russian troops occupied Latvia. Thousands of Latvian fled the oppressive rule of the Soviet government. The war continued. Lilija’s husband was killed by the Soviet army in 1941. And soon after, Latvia was occupied by German troops. Lilija and her daughter fled for Germany in a small ship kept by one of her patients. Lilija had lost her business, her home and her husband. She lived in Berlin and then moved to Leipzig where she worked as a dentist until the war ended in 1945. After the war ended, the Russians occupied eastern Germany. Lilija and Dace fled to western Germany, which was occupied by the Americans. Lilija then lived in a displaced persons camp for about two years. She remarried in 1946 and (shown here with her daughter and second husband). In the camp, the United Nation’s refugee organization helped Lilija translate important documents into English to make it easier for her to start a new life in a safe country. (This one states she was a professional dentist). Lilija heard that Australia welcomed refugees and that she could use her dentist skills there. In 1949, she decided to take her equipment and her family to Australia to start a new life. But when she arrived in Australia, Lilija found out she was not allowed to work as a dentist. She had to earn a living by cleaning instead. Eventually, her qualifications were partly recognized and Lilija became a practicing dentist in Canberra.

Multimodal differences: Coupling and local clustering

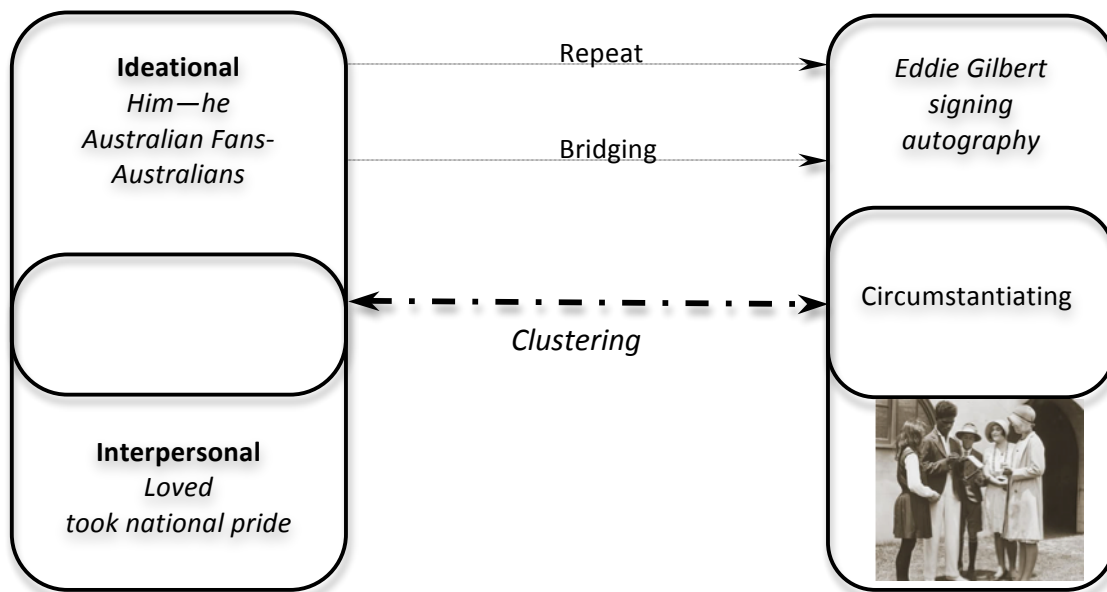
These two types of Biographical Recounts also differ from each other in terms of types of images used. To use a more technical expression here, each type of Biographical Recount clusters with different types of verbiage-image couplings. In the Biographical Recount of a hero, the most common verbiage-image couplings, besides the ones naming the hero, are Circumstantiating. The images (see Plate 4.31 and Figure 4.19) in these Circumstantiating couplings are often the ones that demonstrate the skills of the hero (e.g. *Eddie Gilbert bowls Bradman for a duck*), or those involve heroes being recognised by the public in one way or another (e.g. *Eddie Gilbert signing autographs*).

Plate 4.31 Images in Biographical Recount: Heroes



Since in the Biographical Recount, the skills of the hero and his/her recognition by public are explicitly evaluated, these images now enter a cluster with the interpersonal messages (APPRAISAL) as well as ideational ones (lexical strings). The ways in which these verbiage-image & ideational-interpersonal clusters are formed are illustrated in Figure 4.19. In short, these images are now charged with evaluative meanings. For instance, the image in Figure 4.19, is not only an image of Eddie Gilbert signing autograph, but also an illustration of love and pride the Australians feel for him. The forming of this type of verbiage-image & ideational-interpersonal cluster can be seen as the first step in the iconisation (e.g. Martin & Stenglin, 2007) of a particular image in a given cultural community.

Figure 4.19 Verbiage-image & ideational-interpersonal cluster

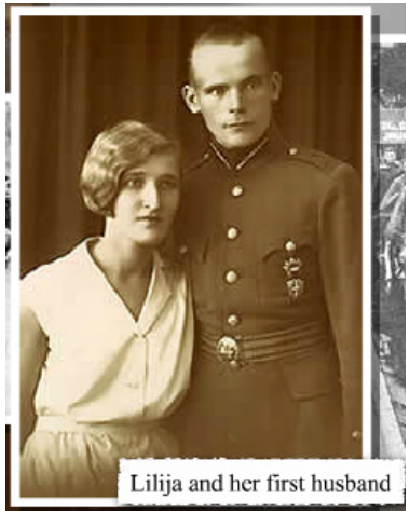


In contrast, the most typical verbiage-image couplings in the Biographical Recount of ordinary community member include Naming and Identifying (people, objects and places), as illustrated in Plate 4.32. Unlike in the Biographical Recount of a hero, the verbiage-image couplings here only enter clustering with the ideational messages in the verbal text, and they have two main functions in the Biographical Recount.

Plate 4.32 Images in Biographical Recount: Ordinary people

a. Identifying people

b. Identifying places

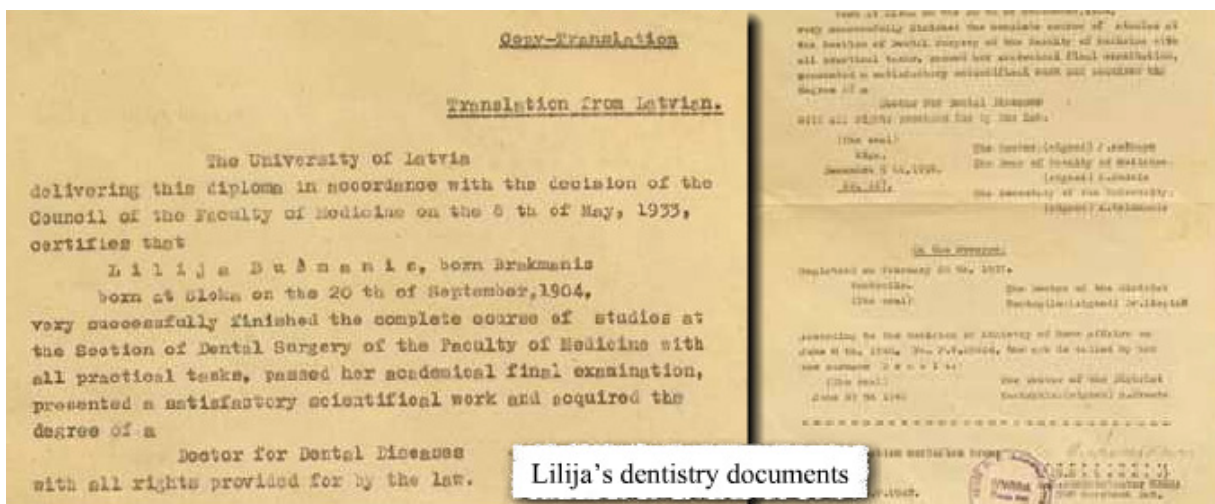


Lilija and her first husband



Lilija's house in Canberra

d. Identifying objects

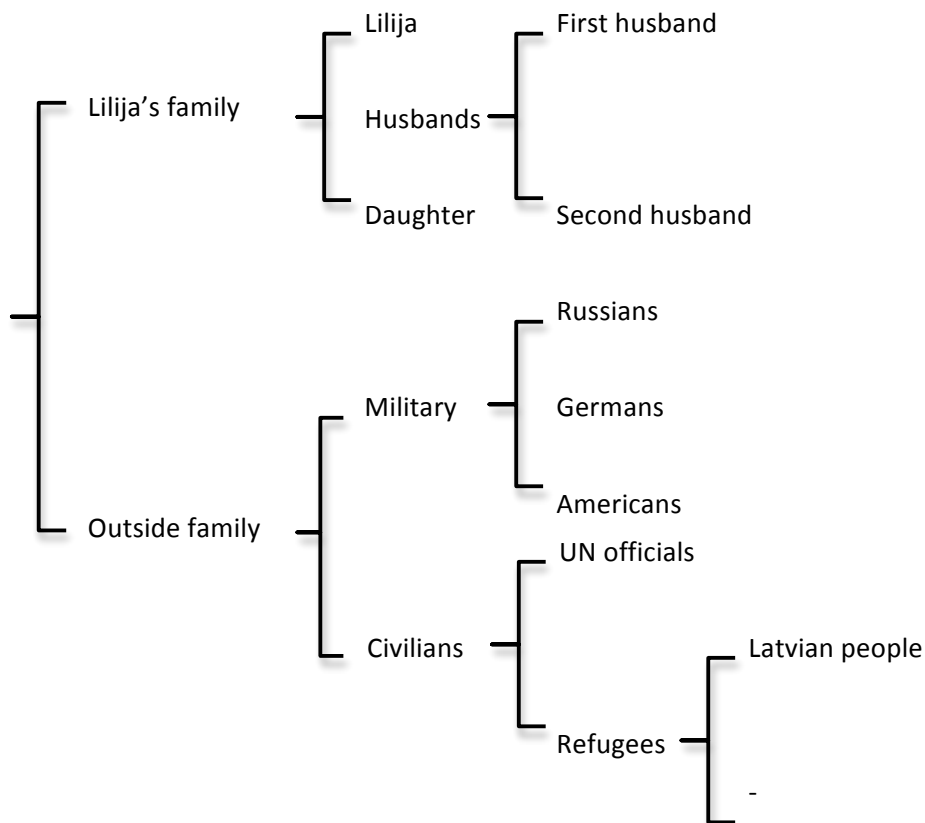


Lilija's dentistry documents

The first function of images in Biographical Recount of ordinary people is to construe together with the verbiage taxonomies of people, places and objects that are important to the individual. For example, In Text 4.1— the Biographical Recount of Lilija, the verbiage established taxonomy of people in Lilija's life as presented in Figure 4.20, while the multimodal text construes through verbiage-image clustering a slightly different taxonomy, as presented in Figure 4.20. In Figure 4.21 (on p. 250), items co-construed by image and verbiage are indicated by a small image next to it, while * indicates items that are not presented in the taxonomy relations realised in

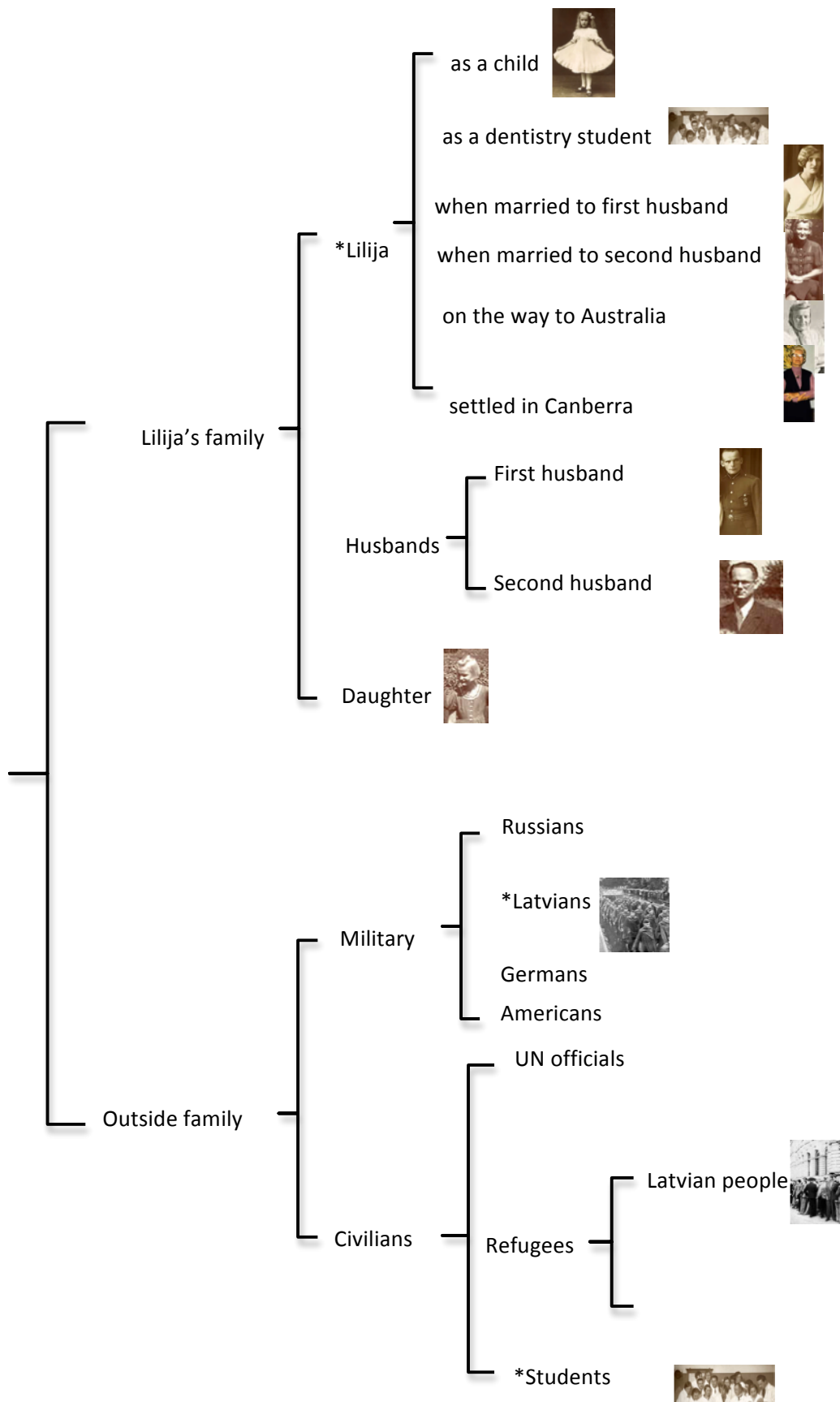
the verbal text (for the images in a bigger size please refer back to Table 4.10 in Section 4.3.2.2)

Figure 4.20 Taxonomy of people in Liliya Brakmanis' Biographical Recount: Verbal realisation



The comparison between Figure 4.20 and Figure 4.21 (see the following page) suggests that on the one hand the images co-construe with the verbiage the taxonomical relations of people. On the other hand, the introduction of images leads to the expansion of taxonomy in two ways: 1) new items are introduced into the taxonomical relations through clustering (e.g. *Dentistry class* or *Latvia army*); 2) the depth of taxonomy deepens (i.e. increased delicacy in classification). For example, in the Biographical Recount, Liliya is presented as one unit of message in the classification taxonomy. In the multimodal environment, in contrast, the images of Liliya at different stages of her life are presented and form a new set of taxonomic relations.

Figure 4.21 Taxonomy of people in Lilija Brakmanis' Biographical Recount: Multimodal realisation



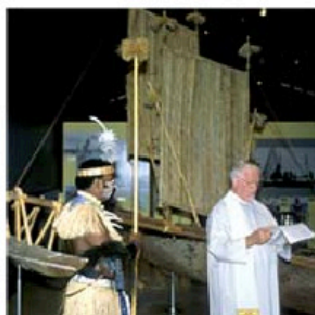
The second function of images in Biographical Recount of ordinary people is to construe a 'visual' Biographical Recount running parallel to the verbal one. This visual recount of an individual's history focuses on the shift of attributes in a person (e.g. Liliya's changing appearances during the years), his/her evolving social relations (e.g. presented with different husbands) and changing circumstances (e.g. birth town in Latvia and house in Canberra) rather than a chain of events (e.g. *married, gave birth, etc.*). This point has been discussed in detail previously in Section 4.3.2.1, and I shall not revisit the arguments here.

In summary, although in MIs both the Biographical Recount of hero and that of ordinary people utilise a range of images, the verbiage-image coupling and clustering relations involved and consequently the functions of these images are different in the two types of verbal genres.

4.4.2.3 The 'nameless' members of the community and game characters

Plate 4.33 Unidentified and unnamed ordinary people

1871: London missionaries



Priest blessing a canoe



Church on Moa Island



Torres Strait Islanders in Christian robes

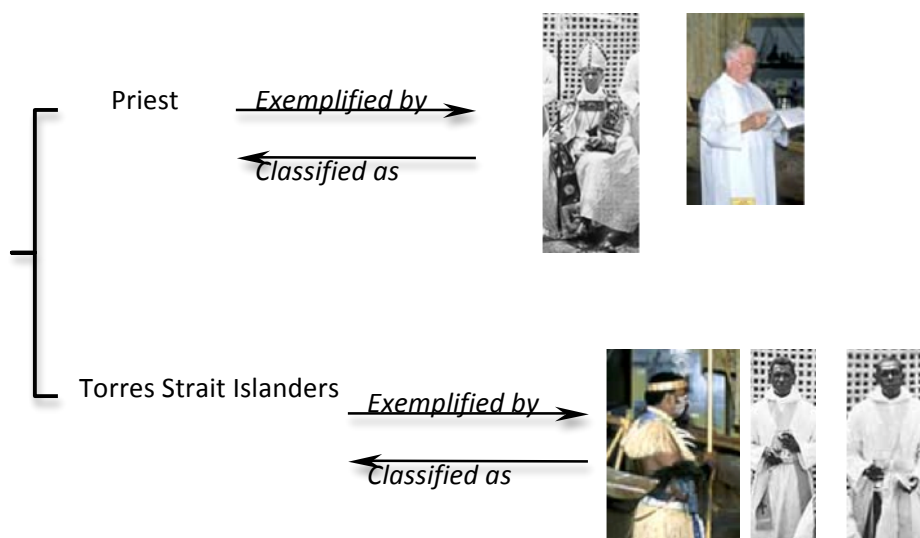
- In 1871, the London Missionary Society introduced Christianity to the Torres Strait Islands.
- Torres Strait Islander people developed a unique way of blending traditional and Christian rituals.
- Christianity is an important part of Torres Strait Islander life today, alongside traditional beliefs.

In MIs, many ordinary members of the community are unnamed or unidentified visual participants. This type of community member often occurs in a Historical

Recount, Report or Explanation. Examples of unnamed/unidentified ordinary people are listed in Plate 4.33, including the priest and the Islander in the photo on the left, and the priest and the two Islanders in Christian robes in the photo on the right.

In these instances, visually represented ordinary people are recognised verbally through Classifying-Exemplifying relations. Each person *exemplifies* a particular subclass or group of people within the community, e.g. missionary or Islander people. The verbiage-image couplings then form a local ideation cluster with the verbiage¹¹, and the taxonomy relations construed in the multimodal text is listed in Figure 4.22.

Figure 4.22 Taxonomy of people in *London Missionaries*: Multimodal realisation



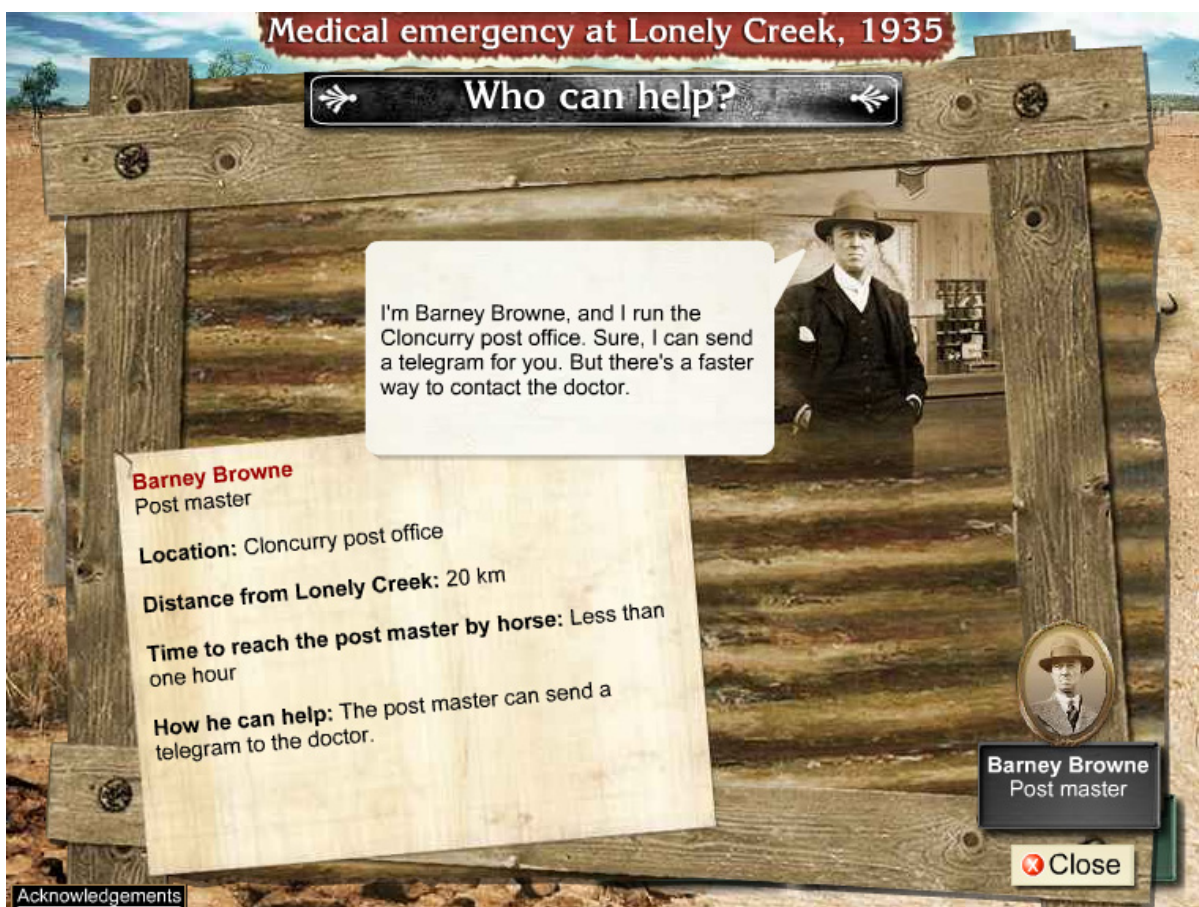
If we compare this multimodal taxonomy with that of Lilija's Biographical Recount shown earlier in Figure 4.21, we will notice that in the former (Lilija), each named or identified visual participant consists an item in the classification taxonomy of the text. In this type of multimodal genre, in contrast, an unnamed or unidentified individual does not in fact enter the taxonomical relation directly, since a visual participant here is merely an example of a given class of people. It is reasonable to suggest that while the main purpose of a Biographical Recount is to construe the 'individuality' of ordinary people (who we are), this type of multimodal genre highlights the

¹¹ This verbal text consists one stage in a Historical Recount (see Appendix II), and it is treated here as an embedded multimodal Descriptive Report.

community membership (what we are). In other words, it focuses on the position of a person (e.g. as a priest or as a parishioner) within a community and in the social structure. In a community, therefore, ordinary people can be defined simultaneously by their individuality (e.g. Lilija Brakmanis), their social relations (e.g. the mother of Dace), and roles they perform in the community (e.g. a cleaner and a dentist).

There is a further type of ordinary community member in MIs—the ‘fictitious’ game character. They are often named and/or identified visual participants, such as Barney Browne, the Post Master in Plate 4.34. As has been discussed in Chapter 2 (see Chapter 2, Section 2.3.1.3), the function of a game character is to guide the learner through a mission-oriented MI, it concerns the issue of framing (recontextualisation), I shall therefore leave the discussion until Chapter 5.




Plate 4.34 Ordinary community members act as game characters



4.4.2.4 The roles of heroes and ordinary people in the community

In this section so far, I have discussed the different multimodal treatments of heroes and ordinary people in MIs, and Table 4.12 provides a summary of the discussions.

Table 4.12 Multimodal construal of heroes and ordinary people in MIs

Types of people	Coupling	Verbal genre	Other couplings in the cluster	Key function of the images	Examples
<i>Hero</i>	Naming	Biographical Recount	Circumstantiating	Exemplifying APPRAISAL 'Iconisation'	 A Queensland hero. Through to the end of the 19th century, Queensland was a part of the colony of New South Wales. It was not until 1859 that Queensland became a separate colony. The first Queensland hero was Eddie Gilbert.
<i>Ordinary people</i>	Naming /Identifying	Biographical Recount	Naming Identifying	Co-construing taxonomy	 Lilija Brakmanis. A woman who was born in Latvia and came to Australia in 1901. She was a pioneer in the field of dentistry.
	Classifying- Exemplifying	Report + Explanation + Historical Recount	Various	Exemplifying taxonomy	 1871: London missionaries. A group of missionaries who came to Australia in 1871. They were the first of many who came to Australia to spread the Christian faith.

In essence, the different multimodal construal of heroes and ordinary people can be seen as reflecting hybrid notions of community in MIs. The community emerging from MIs is one that built both on diversity and communality. The diversity of the community originates from the unique experiences and histories of each individual member (e.g. *Eddie Gilbert*, *Lilija Brakmanis*), and the different range of skills members bring into the community (e.g. cricketing or dentistry skills). The communality, in contrast, relies on a shared set of values and a shared emotional history. In MIs, the negotiation of shared community values relies on the recognition and iconisation of cultural heroes¹². For example, in recognising Eddie Gilbert as a hero, the community shows that it values individual skills and condemns discrimination based on ethnic background. The building of emotional 'bonds' (cf. Stenglin, 2004) between the members, on the other hand, is achieved through the celebration of cultural heroes (e.g. *Australians took national pride in Eddie Gilbert*) as well as the sharing of personal stories of ordinary people. For instance, the pain of the war and the promises a new life in Australia brings is not unique to Lilija Brakmanis

¹² Here, a compliant reading (cf. Martin & White, 2005) from the young learner is assumed, although a resistant position is possible though less likely since MIs are essentially curriculum materials.

but shared by a large section of the Australian community who have experienced similar life events.

The notion of community in MIs also highlights the relation of an individual with the community and society he/she resides in. On the one hand, an individual is seen as occupying a certain position in a given social-cultural structure, in other words, possessing one or more community memberships (e.g. dentist, priest, post master). On the other hand, an individual's personal history is constructed as one interweaving with the grand history of community. For example, Lilija's private life was disrupted by the world war, while Eddie Gilbert's promising career was damaged by historical racism in Australia.

4.4.3 Making sense of places: The social construal of space

The second aspect in the construal of notions of community in MIs involves making sense of the places to which the community belongs. In essence, it concerns the social construal of physical spaces. In MIs, the multimodal construal of places centres on two key issues: 1) the identification of culturally, socially or historically significant sites and locations in Australia (Plate 4.35a); and 2) the mapping of various social relations onto physical spaces (Plate 4.35b). In other words, it has to do with the different functions of maps (see also discussion in Section 4.2.2.3). The former is often realised through discrete Naming and Identifying couplings, while the later is typically realised through relational Naming and Identifying couplings.

Plate 4.35 Construing places in MIs

a. Identification of significant sites



Melbourne Cricket Ground (MCG)

Plate 4.35 (continued) Construing places in MIs

b. Social-cultural construal of physical space



4.4.3.1 Iconic sites and key social institutions

In MIs, there are two types of sites and locations in Australia constantly (i.e. in various verbal genres) being named or identified. The first type includes sites that are of particular cultural significance, such as Melbourne Cricket Ground (MCG) in Plate 4.35a, and geographic landscapes that are unique to Australia, such as the outback (Plate 4.36a) or Torres Strait Islands (Plate 4.36b). In other words, these are places considered as 'iconic' by the community.

Plate 4.36 Significant sites and locations in Australia

a. Outback



Verbiage: a place in outback called lonely creek

b. Torres Strait Islands

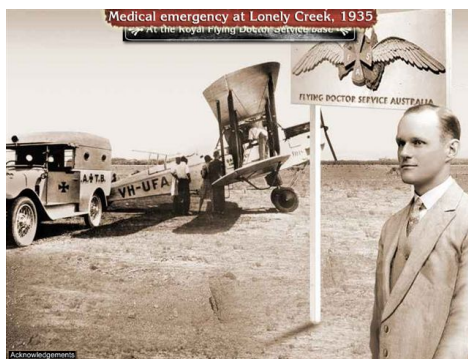


Verbiage: welcome to Torres Strait Islands

The second type of site and location being named or identified in MIs are those symbolise particular social, cultural or political institutions, including public institutions, such as Royal Flying Doctor Service Base in Plate 4.37a and private institutions such as family homes in Plate 4.37b. Whereas places like MCG or the outback are significant to the community due to their uniqueness and/or iconic status, these types of sites are important for they are the places where the community functions (or once functioned, in case of historic institutions, such as permit office in *Gold Rush!*) on a day-to-day base. To put it in another way, the significance of these places arises from the fact that they symbolise the key social institutions that underpin the community.

Plate 4.37 Places representing important social cultural institutions of Australia

a. Public institution Royal Flying Doctor Service Base b. private institution: Family homes



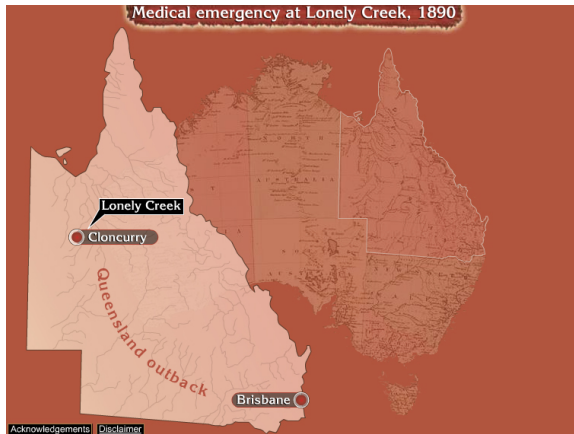
4.4.3.2 Social remapping of physical spaces: Maps in MIs

The naming and identifying of places on a map also plays a significant role in MIs, in particular in history genres such as Historical Recounts and Accounts. The process of adding verbiage to a map essentially is the process of encoding various social relations onto a visually represented physical space. In a sense, maps can be considered as a multimodal genre on its own, for maps “employ a system of symbols within their own syntax, they function as a form of writing (inscription), and that they are discursively embedded within broader contexts of social action and power” (Pickles, 1992, p. 193)

In MIs, the simplest and the most common type of map is political map, which encodes the contemporary or historical geopolitical relations within Australia and between Australia and other nation-states. In this type of map, the regions within (Plate 4.38a) or surrounding Australia (Plate 4.38b) are named.

Plate 4.38 Maps in MIs: Geopolitical boundaries

a. Regions within Australia

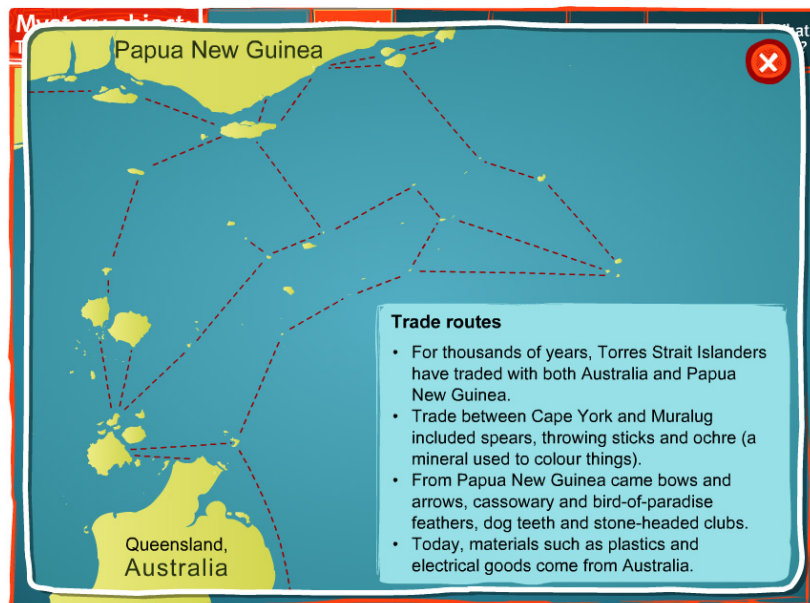
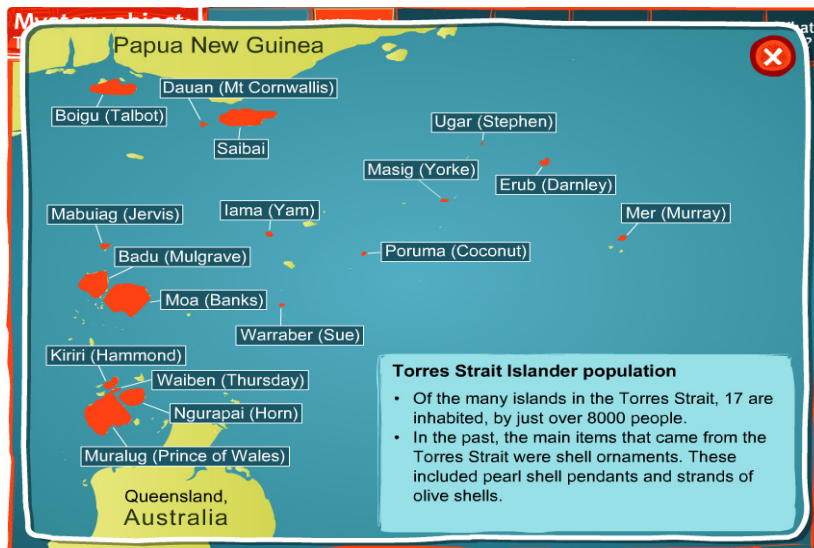


b. Regions surrounding Australia



In MIs, the 'same' map can be labelled differently and thus allowing the encoding of different social relations onto the same physical space. For instance, Plate 4.39 includes three maps occurring in sequence in the opening frame of *Mysterious Objects: Torres Strait Islands*. In the first map, each region is labelled according to contemporary geopolitical boundaries (e.g. Papua New Guinea, Australia). The second map names the regions according to the distribution of population, whilst the third one identifies the trade routes between Torres Strait Islands, Australia and Papua New Guinea throughout the history. Although the visual representation of the region remains more or less the same, the social relations realised in the maps are completely different. The first map signifies the geopolitical relation between three political entities in the region—Torres Strait Islands, Australia and Papua New Guinea. The second map and the third map, on the other hand, encode respectively the demographic profiles and the economic relations of the region.

Plate 4.39 Three different maps of Torres Strait Islands



As mentioned previously in Section 4.2.1.3, the hypermedia technology also allows the creation of animated maps (see Plate 4.40) in MIs. Not only does an animated map encode various social political relations (such as countries named and highlighted in yellow) as a static map does, it also enables the re-enactment of historical processes and movements. For example, in the animated map in Plate 4.40 (for full animation see Appendix V), the voice over states *Thousands of people are still rushing here from lots of different countries*. The animation at the same time shows small boats coming out of various regions heading towards Australia.

Plate 4.40 Reconstructing historical process: Animated maps

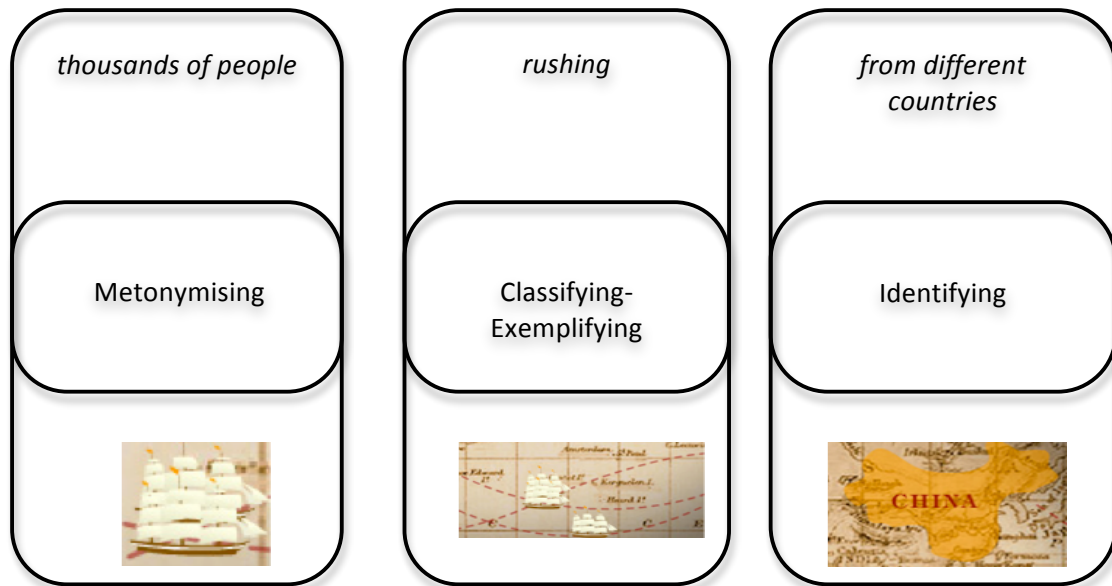


Verbiage (Audio): Thousands of people are still rushing here from lots of different countries.

An animated map is often a coupling complex, consisting of a few sets of coupling relations. In the example given here, coupling relations are formed between verbal and visual Processes (i.e. Classifying *rushing*=boats moving), Participants (i.e. Metonymising *Thousands of people*=many ships), and Circumstance (Identifying *many countries*=countries on the maps). The semantic relations formed in the map are shown in Figure 4.22. In this way, the animated map construes various aspects of the *Gold Rush!*, including the transportation method (ship) the miners used, the countries where the miners came from (regions and countries of the world highlighted in yellow), and the routes people from different regions took (e.g. miners from UK

travelled across the southern end of African, etc). In short, an animated map allows the encoding of social processes as well as social relations.

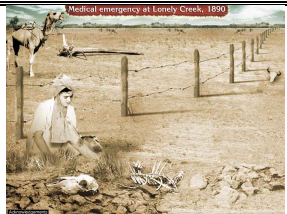
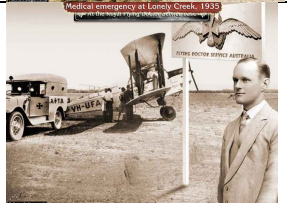


Figure 4.23 Verbiage-image couplings in animated maps: *Gold Rush!*



4.4.3.3 The social construal of places in MIs: A summary

In this section, I have looked at the ways in which places are construed multimodally in MIs, and Table 4.13 provides a summary of the discussions. In essence, the multimodal construal of places in MIs allows the transform of physical landscapes in which a community resides into social spaces to which the community belongs. On the one hand, locations and sites are named and identified for their cultural significance (e.g. MCG) and the key role they play in maintaining social institutions (e.g. Flying Doctor Base). In a sense, iconic landmarks are similar to heroes in that they are icons with which the community bonds (or bound icons, see Stenglin, 2004). On the other hand, the labelling of regions and areas on various maps allows the mapping and remapping of various social relations onto physical spaces. In this way, a large quantity of cultural, political and economical information about the community is encoded into a relatively limited visual space.

Table 4.13 Multimodal construal of places in MIs

Types of Places	Coupling	Verbal genre	Key function of the images/maps	Examples
<i>Iconic sites</i>	Discrete Naming	Various	Representing iconic places	
<i>Social institutions</i>	Discrete Identifying	Various	Symbolising social institutions	
Geopolitical map	Relational Naming	Historical Account	Illustrating state/nation boundary	
Other types of maps	Relational Identifying	Historical Recount/Account Descriptive Report	Mapping various types of social relations	

4.4.4 Notions of community in MIs: A short summary

In this section, I have investigated the multimodal construal of people and places in MIs. It is important to point out that these are not two separate phenomena but interrelated aspects in the building of notions of community. The people of a community shape the landscape in which it dwells by assigning it various social values. At the same time, the places provide the backdrop in which members of the community perform their day-to-day activities and create a sense of belonging. In MIs, the identification of people is therefore always closely associated with the identification of places, either by being present in the same coupling complex (e.g. the doctor in the Royal Doctor Base) or the same ideational cluster (e.g. places and people in Biographical Recount).

The discussion in this section has also demonstrated the different ways in which verbiage and image interact in different multimodal genres. On the one hand, different types of couplings tend to occur in different verbal genres (e.g. Identifying of visual participants in Biographical Recount, and Classifying-Exemplifying of visual participants in Report). On the other hand, the same type of verbal genre can cluster with different types of couplings (e.g. Biographical Recount of heroes and ordinary people) and subsequently creates different types of multimodal genres. Moreover, the same image can encode different types of verbal values and social relations (e.g. maps).

4.5 Verbiage-image couplings and the multimodal construal of field: A summary

In this chapter, I have focused on the logogenetic pattern of coupling, the relation formed between verbiage and image at a given point in the unfolding of a multimodal text. I have started the chapter by elucidating the theoretical principles and analytical criteria used for the describing ideational verbiage-image couplings on the Critical Paths in MIs. The theoretical principle—the minimum mapping hypothesis—establishes the basic mechanism for the forming of a verbiage-image coupling. That is, when the fields of verbiage and image map onto each other, a temporary shared meaning space is activated. In this shared meaning, coupling principles coordinate the semantic integration between verbiage and image. The analytical criteria, on the other hand, provide the guidelines for recognising basic units of meaning, such as message, coupling and coupling complex. I have then introduced and exemplified five major types of coupling patterns found in the five MIs—Naming, Identifying, Representing, Classifying-Exemplifying and Circumstantiating. I have also discussed how these couplings form local clusters with elementary verbal genres through various types of lexical relations. In the final part of the chapter, I have contextualised the multimodal analysis by showing the ways in which hybrid notions of community are construed multimodally in Ms through verbiage-image couplings and local clusters.

Through the discussion in this chapter, I endeavour to provide insight into the basic ways in which verbiage and image co-constitute field in the multimodal environments. In the first place, I have shown at various points of the chapter that verbiage and image are different in the ways in which they constitute our experiences—while the former relies on constituency and typological meaning, the latter inclines towards attributive and topological information. Secondly, these two ways of organising field can be co-ordinated through three basic types of principles—abstraction, generalisation and specification. Finally, different verbal genres tend to cluster with different types of verbiage-image couplings. The clustering of ideational messages often leads to the expansion of semantic relations and subsequently the expansion of field.

My focus in this chapter has been on the couplings and local clusters that realise the instructional register. In other words, I have addressed in this chapter the first research topic of the thesis—the multimodal construal of primary social science knowledge in MIs, and in the following Chapter 5, I shall move onto the second topic—the recontextualisation of the field of primary social science in MIs.

Chapter 5 Classification and framing: The recontextualisation of primary social science knowledge in Multimedia Interactives

5.0 Overview

In Chapter 4, I explored the first research topic of the thesis, the construal of primary social science knowledge in Multimedia Interactives through the examination of verbiage-image coupling and local clustering. In Chapter 5, I investigate the second research topic—the recontextualisation of primary social science knowledge in the hypermedia environments of MIs. The discussion in this chapter revolves around Bernstein’s notions of classification and framing (cf. Bernstein, 1971, 2000). As the discussions in Chapter 2 have suggested, MIs can be described as a type of pedagogic discourse, which enables the projection of an instructional register (the field of primary social science) through a regulative register (the field of MIs). Classification in essence is concerned with the nature of this pedagogic discourse and its relation to other types of discourses. Framing, on the other hand, deals with the *recontextualising rules* that constitute the pedagogic discourse, that is, the controls on the two embedded registers. In short, in this chapter I am interested in two issues: 1) the relations between various fields within MIs and between the field of MIs and fields of other types of discourses (classification); 2) the ways in which the control over the sequencing, pacing and evaluation is achieved through the manipulation of various multimodal and hypermedia resources in MIs (framing). In exploring these two issues, I endeavour to contextualise the analysis conducted in previous chapters of the thesis.

The discussion in Chapter 5 is organised into four sections. Section 5.1 introduces Bernstein’s notion of classification and framing and reviews the ways in which they have been explored in SFL-oriented research. Section 5.2 examines the classification relations between fields of knowledge and fields of activities in MIs. In Section 5.3, the different ways in which different degrees of framings are achieved in the five MIs are illustrated. The final section 5.4 wraps up the discussions conducted in this chapter

and discusses the implications of the analysis of classification and framing in MIs for the understanding of digital learning.

5.1 Classification and framing

5.1.1 Classification and framing: An overview

In Bernstein's sociological theory of pedagogy (cf. 1971, 1974, 1975, 1990, 2000), the concepts of classification and framing occupy an important position. In essence, classification and framing capture the realisation of two sets of relations in the pedagogic context. Classification is concerned with the translation of power relations, which create, legitimise and reproduce boundaries between social categories (e.g. gender, race, and class), between agencies (e.g. schools and communities), and between agents (e.g. teachers and students), and between different categories of discourse. An example of categories instantly familiar in the SFL context is the categorisation of discourse in schools, that is, different school subjects. Human Society and its Environment (HSIE) or Studies of Society and Environment (SOSE), for instance, is one category of discourse of the primary curriculum in Australia, the other categories including English, Mathematics, Science and Technology, Creative Arts and PE. For Bernstein (cf. 2000), classification can also be applied in examining the relations within the same category, for example, the relations between four strands of learning in HSIE (see Chapter 4, Section 4.4.1).

Classification can be either strong or weak. Strong classification creates clear boundaries between the categories, while weak classification creates blurred boundaries. The primary school curriculum, for instance, can be seen as weakly classified, for the boundaries between categories, such as that between family and school, between community experiences and school learning, and between various subjects are often not clearly defined (cf. Bernstein, 1974; Christie, 2002). The HSIE curriculum in primary years (K-6) is also an example of weak classification, in which the boundaries between various 'subjects' such as history or geography are not clearly defined (i.e. they are under the same subject, e.g. HSIE). Clearer boundaries between areas of learning will emerge in later years of schooling, i.e. middle school.

The secondary HSIE (7-10), for instance, involves six individual subjects, including for example history, geography, and aboriginal studies¹.

Framing, on the other hand, deals with control relations, “which establish legitimate forms of communication appropriate to the different categories. In other words, it (i.e. framing) carries the boundary relations of power and socialises individuals into these relationships” (Bernstein, 2000, p.5). Simply put, whilst classification creates boundaries between categories, framing controls the pedagogic communication that transmits a category of discourse. More precisely, framing regulates “the control over the selection, sequencing, pacing, and criteria of the knowledge to be acquired” (Bernstein, 2000, p. 99) in the pedagogic practices. Like classification, framing can be strong or weak. With strong framing, the control (of sequence, pace, etc) lies with the teacher, and the rules of regulative and instructional registers are explicit and known to the students. With weak framing, on the other hand, control lies apparently² with the student and the rules are often implicit and unknown to the students. According to Bernstein (cf. 2000), strong framing is often viewed as visible ‘conservative’ pedagogy, whereas weak framing is associated with invisible ‘progressive’ (Bernstein, 1990) pedagogy.

In short, classification principles control *what* discourse is to be transmitted and its relation to other discourses (e.g. the relation between history and geography in HSIE curriculum). Framing principles, in contrast, regulate *how* the discourse is to be taught and learned in the pedagogic context. Classification and framing can be strong or weak and the variations in strength of classification and framing will generate

¹ See

<http://www.curriculumsupport.education.nsw.gov.au/secondary/hsie/index.htm>

² Bernstein emphasises the word ‘apparent’ while discussing control relations in weak framing. Based on his body of work, it is reasonable to suggest that the word *apparent* can be read in at least two ways here. First, control principles are always present in pedagogic practices, whether they are visible or not. Second, not all students have control over in a weakly framed curriculum. For Bernstein, the ability to recognise ‘implicit rules’ in school are largely associated with the semantic codes the students have acquired in family and community. Students from certain social economic backgrounds, therefore, may fail to understand these rules if they have acquired a different semantic code prior to schooling (cf. Bernstein, 1971, see also, Hasan, 1988, Hasan, 2009; Hasan & Cloran, 1990).

different modalities of pedagogic codes (cf. Bernstein, 2000). By exploring these two notions, therefore, different modalities of symbolic control, and cultural transmission and acquisition can be examined.

5.1.2 A review of SFL studies on classification and framing

In its ongoing engagement with Bernstein's theory of pedagogy and symbolic control, SFL research has explored the notions of classification and framing among many other Bernsteinian concepts (see, Christie & Martin, 2007 for an overview of SFL research that engages with areas in Bernstein's theory such as knowledge structure). While Bernstein's account of classification, and in particular framing has been designed with "an eye more to official pedagogic practice" (Hasan, 2001, p. 62), SFL research has been able to offer detailed linguistic analysis of local practices, i.e. the face-to-face pedagogic interactions. The most notable SFL work in this area includes Hasan and Cloran's work on mother-child interactions (e.g. Cloran, 1994, 1999; Hasan & Cloran, 1990, Hasan, 2001, 2009; Williams, 1995) and Christie's work (e.g. 2002) on primary and lower secondary classroom discourse (see also discussions in Chapter 2, Section 2.1.2.1).

In their research on mother-child interaction, Hasan and Cloran (e.g. Cloran, 1994, 1999, Hasan & Cloran, 1990) analysed grammatical and semantic features of conversations between mothers and children between age 3 ½ to 4 conducted in the privacy of their homes. Central to their study is the notion of *decontextualised language*, seen as a characteristic feature of pedagogy discourse. More specifically, it refers to language that is decontextualised from immediate shared physical environments of the interaction. The immediate physical environment is known as the *actual context*, while context brought into existence by constitutive verbal action, i.e. through the decontextualised language, is referred to as the *virtual context* (Hasan, 1999, 2001). Hasan (2001) suggests that a young child who is yet to apprentice to a given culture has far less access to virtual contexts than actual ones. The mastery of decontextualised language thus becomes one important pathway to higher order (both in terms of generalisation and abstraction) knowledge.

Hasan and Cloran's research shows that decontextualised language is one of characteristics of mother-child interaction in particular in families with higher social and economic status. In this type of interaction, the field of conversation shifts between those related to the material action the mother and the child are engaging in (typically providing food, dressing, playing games, etc) and those that are independent of the action itself. For instance, in one of the examples given by Hasan (2001, p. 58-59), a mother had a conversation with her daughter in the process of dressing her for day-care. The dialogue started with the negotiation of the type of clothing the daughter was going to wear for the day, and as the dialogue went on, the field started to shift away from the immediate material action of dressing and turned to the discussion of weather in different seasons. Here, a switch between two different types of contexts—actual (dressing) and virtual (seasons and weather)—can be clearly observed. Linguistically, the switch between the two contexts is often marked by the different choices of semantic resources. Cloran (1994, 1999), for instance, considers action Rhetorical Units (RU) as the most context dependent semantic choice, and generalisation Rhetorical Units as the most context independent (for discussions of Rhetorical Units see also Chapter 3, Section 3.2.2). An example of an action RU would be *it is raining today/it is cold today* and of a generalisation RU would be *it rains in spring/it is cold in winter*.

In mother-child interactions, the strength of the classification and the framing varied between different mothers (e.g. Cloran, 1999; Hasan, 2000; Williams, 1995). When a mother-child interaction is strongly classified, the mother tends to have a strong notion of what constitutes an appropriate context in a given situation. Cloran (1999) has observed instances of mother-child interactions in which the mothers discouraged the children's imaginary talk, which are considered irrelevant to the immediate material context (e.g. meal time). Hasan (2000) has noted a similar incident in which a mother reiterated the same Command ("*eat your tea*") a few times during a 20-minute long conversation in order to maintain the boundary of the ongoing context (tea eating). In a weakly classified interaction, in contrast, different types of context are interwoven, with one providing the context for the construal of another. For instance, the talk of clothing and temperature of the day can lead to the discussion of weather patterns of the seasons.

The strength of framing in mother-child interaction, Cloran (1999) proposes, is manifested in different patterns of interpersonal meaning. Strong framing is associated with the use of congruent forms, while weak framing with non-congruent forms (i.e. the use of grammatical metaphor). For instance, to prevent certain undesirable behaviour from a child, the mother can choose a Command that is realised congruently by an imperative clause (e.g. *Eat your tea!*), she can also use one that is realised incongruently by a different grammatical structure, e.g. interrogative (*Do you think you can eat your tea?*). While the former is considered as a sign of visible control, the latter is seen as invisible control.

Christie's research on classification and framing, on the other hand, is based on her study of various primary and lower secondary classroom discourses in Australian contexts. More specifically, she investigated four types of curriculum, including morning news (literacy program) in lower primary, science and social science subjects in upper primary, and geography in lower secondary. As has been discussed in Chapter 2, Section 2.1.2.1, her research has focused largely on mapping out the differences and similarities between macrogenres across school curriculum and illustrating the linguistic realisations of regulative and instructional registers in the classroom discourse.

In her analysis of the morning news program³, for instance, Christie (2002) observes that this type of curriculum is often weakly classified and framed. It is weakly classified for there are no clear boundaries between areas of knowledge. Based on her discussions and examples, it is reasonable to suggest that Christie here refers to the classification relations between school knowledge ('official' knowledge) and family/community experiences ('private' knowledge). The framing of the morning news curriculum is also weak. Children often have the control over (though constrained) the selection of the field (i.e. which private experience to discuss) and the type of genre (e.g. recount or anecdote) if they have already had the access to a variety of genres at this stage. In addition, Christie notes the lack of explicit

³ A session in which a child reports to the class his/her personal experiences outside of school, during the process the teacher provides direction whenever necessary and the rest of class can also participate in discussion

evaluation as a sign of weak framing, and perceives it as part of the “hidden curriculum” (Christie, 2002, p.55) practice in early schooling. She suggests that as the result of implicit evaluation, many children do not benefit from the morning news activity.

The antithesis of the morning news curriculum in Christie’s research is the secondary geography curriculum, which is strongly classified and strongly framed. Christie argues that one of the linguistic features signalling the strong classification in secondary geography is its reliance on technical discourse. A distinctive set of technical language suggests that the subject operates with a strong “degree of boundary maintenance” (Bernstein, 1974, p. 205). In other words, the specialised language distinguishes geography (see also Humphrey, 1996; Martin, 2002b) from other areas of learning in school.

With respect to framing, Christie recognises that although a strongly classified subject like geography does not necessarily lead to a strongly framed classroom, in practice these classrooms are often strongly framed. The association of strong classification with strong framing, according to Christie, results from the need to ensure that “the students are appropriately apprenticed into relevant pedagogic subject position” (2002, p. 135). Christie has also illustrated at length the ways in which the teacher’s tight control (over the selection of content, sequence, and principles of evaluation, etc) are realised in grammatical choices, for example, the foregrounding of Behavioural Process such as *we’ll look at...I want to you keep concentrating...*, or the use of Textual Theme, such as *and, then, so...* (cf. Christie, 2002, p. 135-155).

To sum up the discussions so far, I have reviewed two important SFL studies on classification and framing. Despite their differences in data, focus and approach, there are some common implications that can be drawn from the two studies. In the first place, both have shown that detailed SFL description of linguistic features enables the analysis of classification at the level of “micro-interaction” (Bernstein, 2000, p.100). Linguistic descriptions are proven particularly useful in unpacking the communication strategies deployed in framing pedagogic discourse. Moreover, Bernstein (2000) has indicated that classification and framing are independent

variables. That is, strong classification can combine with either strong framing or weak framing. The existing SFL literature nevertheless seems to suggest a tendency where strong classification corresponds to strong framing, while weak classification corresponds to weak framing ⁴.

The existing research on classification and framing in SFL has largely dealt with traditional forms of pedagogic interaction (i.e. face to face) and focused primarily on language. In the following sections of the chapter, I shall draw on the findings of these SFL studies and explore the classification and framing relations in hypermedia learning environment. The analysis of verbiage-image couplings and local clusters in Chapter 4, as well as the analysis of verbal elementary genres and technology affordances in Chapter 2 will provide the foundations for the discussions to be conducted here.

5.2 Classification in Multimedia Interactives

The Bernstein notion of classification, as has been discussed earlier, can be applied in describing various categories of pedagogic relations, including those at macro-interactive levels, such as those between different social agencies and institutions, and those at a micro-interactive level, such as those between different types of discourses (subjects) within a school and those between the educator and the student. In this section, my examination of the classification relations in MIs focuses on the two pedagogic categories that are of particular relevance within the context of this research: 1) categories of discourse—the degrees of insulation between varieties of fields of knowledge; 2) categories of activities—the boundary between what constitutes learning (of the primary social science subject) and what constitutes ‘playing’, i.e. multimedia interactive activities. The main argument I put forward here is that MIs are, in general, weakly classified in both categories. On the one hand, there

⁴ Cloran has observed one instance with *possible* combination of strong classification and weak framing. She is uncertain if the combination of weak classification and strong framing exists (see Cloran, 1999, p. 61). However, Hasan, in her recount of Cloran’s work, affirms the correlation between strong classification and strong framing, weak classification with weak framing (see Hasan, 2001, p. 63)

is a low degree of insulation between various fields of discourse (i.e. history, geography, etc) and between school subjects (uncommon sense knowledge) and family/community experiences (common sense knowledge). On the other hand, the boundaries between the learning activities and other types of activities are often indistinguishable.

5.2.1 Weak classification between fields of knowledge

In MIs, the boundary between various fields of knowledge, such as history, geography, etc as well as the boundary between specialised knowledge and common sense knowledge is not clearly established. There are two main (multi)semiotic features that indicate the weakness of classification: 1) the lack of a technical discourse; 2) the hybridisation of (multimodal) genres.

5.2.1.1 Absence of a technical discourse

As Christie (2002) has suggested, one important method for a subject (i.e. field of knowledge) to create a sense of insulation from other subjects is by deploying a distinctive technical discourse⁵. A technical discourse can be seen as consists of two interrelated aspects—speciality and technicality (White, 1998). The former concerns establishing experiential categories that are specific to a field (e.g. cricketing is a specialised field involving various categories for things and procedures). The latter, on the other hand, concerns adopting a set of technical lexis for the experiential categories (e.g. in medicine fingers are referred to as phalanges). Semiotically, such a discourse can be achieved in two ways. The first involves building distinctive classification and/or composition taxonomies, and deploying technical lexis to construe uncommon sense meanings (e.g. Martin, 2007; Martin & Rose, 2008).

⁵ For interpretations of Bernstein's notions of vertical and horizontal discourse (Bernstein, 2000) through the concept of technical discourse, see Christie & Martin, 2007.

In MIs, however, the majority of the classification taxonomy involves common sense categories, such as types of people in history genres (e.g. a taxonomy of people in the Biographical Recount of Liliya in Chapter 4, Section 4.4.2.2). These types of taxonomy are not unique to the field of primary social science (i.e. they are not specialist taxonomy) since they are often learned at home or in community. On the other hand, the classification and composition taxonomies of ‘uncommon’ things in MIs, such as cultural or historical objects (i.e. specialist taxonomy of primary social science), often include very few items and no more than two levels of delicacy (i.e. taxonomic depth). Simply put, the taxonomies in MIs are generally simple and shallow. Plate 5.1 includes two examples of shallow taxonomies in MIs. In Plate 5.1, a classification taxonomy of shaft mining tools is built through Classifying-Exemplifying couplings, which includes only one level of delicacy. Similarly, a simple composition taxonomy in Plate 5.1b is established through relational Identifying couplings. In short, the field as construed in MIs is low both in speciality (lack of specialised taxonomy) and technicality (shallow taxonomy).

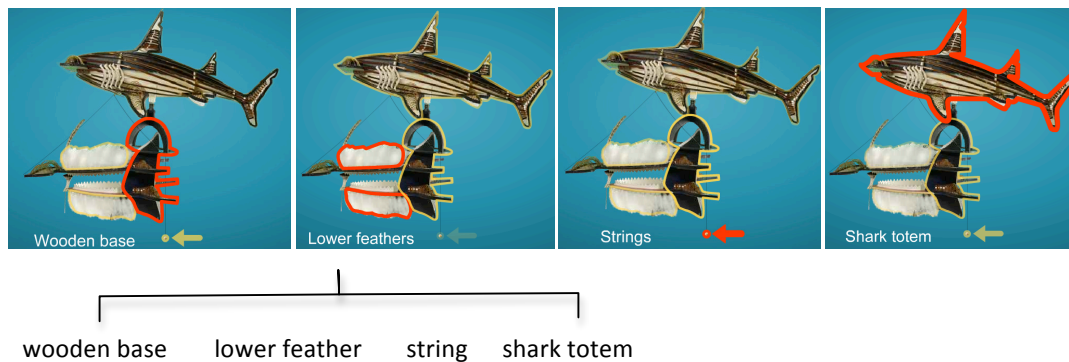
Plate 5.1 Shallow taxonomy in MIs: Classification & composition

a. Classification taxonomy: Shaft mining tools



Plate 5.1 (continued) Shallow taxonomy in MIs: Classification & composition

b. Composition taxonomy: Headdress



The second characteristic of a technical discourse is the high level of grammatical metaphor, in particular, nominalisation (e.g. Halliday & Martin, 1993; Martin & Veel, 1998). In MIs, however, there are very few instances of grammatical metaphor. I shall use history genres as an example here. In history, grammatical metaphor often involves the nominalisation of processes (e.g. *the destruction of lives in Europe*), values (e.g. *humanitarian concerns*) and causal relations (e.g. *the result of the Displaced person's act*). Nominalisation turns historic processes and entities into abstract concepts. This abstraction in turn enables the interpretation and explanation rather than simple recording of history. In this way, history strengthens the boundary between it and other areas of knowledge, including common sense story telling.

In MIs, however, the history genres are often activity oriented (e.g. Biographical, Recount or Historical Recount), focusing on recording the sequence of events. When abstract concepts of history such as causality are introduced they are often construed as a chain of emotional reactions (i.e. an individual's wish promotes an event) and actions by individuals and communities rather than a set of logical relations (i.e. one leads to another). Text 5.1, for instance, is a 'Historical Account'⁶ taken from *New Homes*.

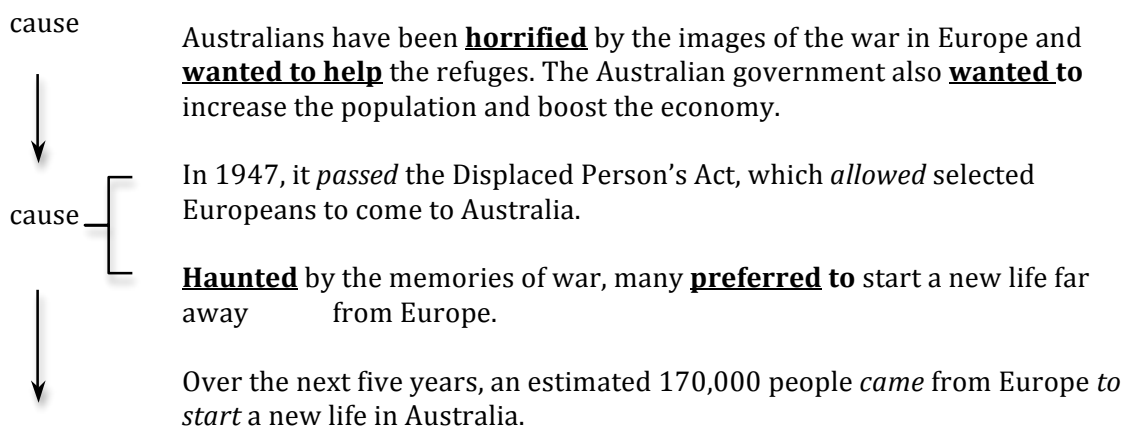
⁶ Topologically Text 5.1 falls between a Historic Recount and Historic Account. However, it is treated as Historic Account here, for the main purpose of the text is to explain the cause of mass immigration rather than record the history of mass immigration. In this text, one event does not simply lead to another as in at typical Historic Recount. Rather, history is advanced by peoples' emotional responses. In other words, the Historical Account here interprets the cause of history from an interpersonal perspective (through the extensive use of Mental processes). The

Text 5.1 Historic Account

World War II lasted for 6 years from 1939 to 1945. Millions of people in Europe lost their lives and many more saw their homes and way of life destroyed. Haunted by the memories of war, many preferred to start a new life far away from Europe. Australians have been horrified by the images of the war in Europe and wanted to help the refugees. The Australian government also wanted to increase the population and boost the economy. In 1947, it passed the Displaced Person's Act, which allowed selected Europeans to come to Australia. Over the next five years, an estimated 170,000 people came from Europe to start a new life in Australia.

The main purpose of the text is to explain the cause of mass immigration to Australia from Europe after WWII, the casual relation here is realised implicitly (without conjunctions) and externally (as result of certain Mental/Behavioural Processes).

Mental/Behavioral process as cause



In this way, the causality of history is construed as ostensible relations between people's reactions (Mental/Behavioural Processes) and their actions (*Material Processes*). Simply put, historic events are re-interpreted as the consequences of concrete desires (e.g. *want*) and wishes (e.g. *preferred*) of individuals and communities. In a sense, we have the story of what happened but not an explanation.

difficulty of labelling genre can be seen as a manifestation of weak classification in MIs since no distinctive category of genre can be established.

5.2.1.2 The hybridisation of multimodal genre

The research by the Sydney School (cf. Martin, 2007, Martin & Rose, 2008, for an extensive list of the literature see Chapter 1, Section 1.3.3) suggests that a school subject (or a discipline or a profession) utilises a specialised set of genres to encode the knowledge-knower structure (Maton, 2007) that is distinctive to the subject. For instance, both secondary history (e.g. Coffin, 2006; Martin, 2003) and science (e.g. Korner, et al., 2007; Martin & Rose, 2008) have developed a system of field-specific genres. It is reasonable to suggest, therefore, a specialised system of genre⁷ is another manifestation of strong classification since it increases the exclusiveness of a field. The lack of genre specialisation, on the other hand, can be interpreted as a sign of weak classification.

As has been discussed in Chapter 2 (see Chapter 2, Section, 2.1.1), at the macro-structural level, MIs demonstrate a stable and consistent pattern. At the microstructure level, however, a MI often consists of a hybrid mixture of verbal elementary genres. For example, the main types of verbal genre in MIs include those from the field of history—Biographical Recount, Historical Recount/Account, and those that are more common to science—such as Procedure, Report and Explanation. Furthermore, the description of relational Naming and Identifying coupling patterns in Chapter 4 suggests that in MIs there exists a strong emphasis on maps—a multimodal genre critical to the field of geography. In short, MIs rely largely on borrowing genres from other fields of discourse rather than developing a distinctive set of genres of its own. This extensive ‘borrowing’ breaks down the category boundaries between MIs as a genre and other types of discourse, and can be seen as another manifestation of weak classification.

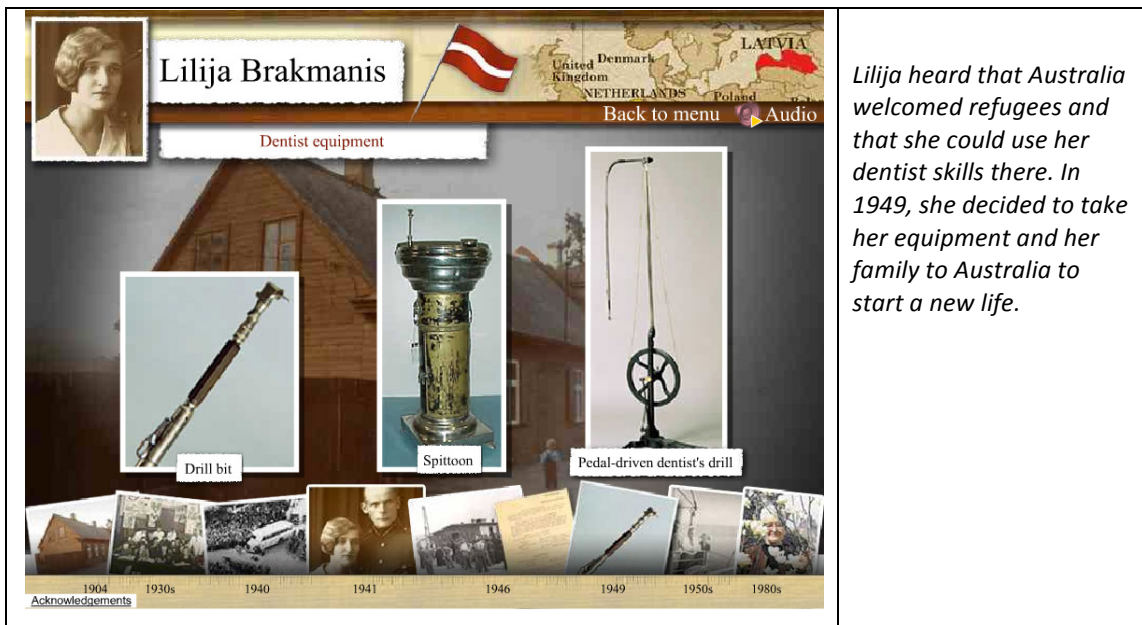
In MIs, the hybridisation of genres also involves the mixing of various multimodal genres. As has been discussed in Chapter 4, elementary verbal genres in MIs can form local ideation clusters with verbiage-image couplings. The forming of local clusters

⁷ Here I refer to field specific genres such as Historical Recount as discussed in Chapter 3. Though Recount itself as a genre can occur in various disciplines, such as Procedure Recount in Science.

enables the creation of a multimodal genre. The semantic relations and the field of this newly formed multimodal genre is an expansion of that of the verbal genre or the visual genre. Here, I would like to make a further distinction between two types of expansion created through ideational clustering: 1) *multiplication* and 2) *addition*. Multiplication refers to instances in which verbiage and image complement each other in construing the field of a multimodal text. In this type of instance, meaning and field expand for we are given two different perspectives of the same experiential domain. One immediate example of multiplication is the photos of Lilija Brakmanis's photos in different stages of her life in *New Homes*. When the example was discussed in Chapter 4 (see Chapter 4, Section, 4.4.2.2), I have pointed out that these images themselves form a lexical string and they construe a visual Biographical Recount of Lilija, which runs parallel to the verbal one. In this example, the visual genre and verbal genre are complementary to each other for they offer two perspectives on the life process of an individual, as actions (verbal) and as change of status (visual).

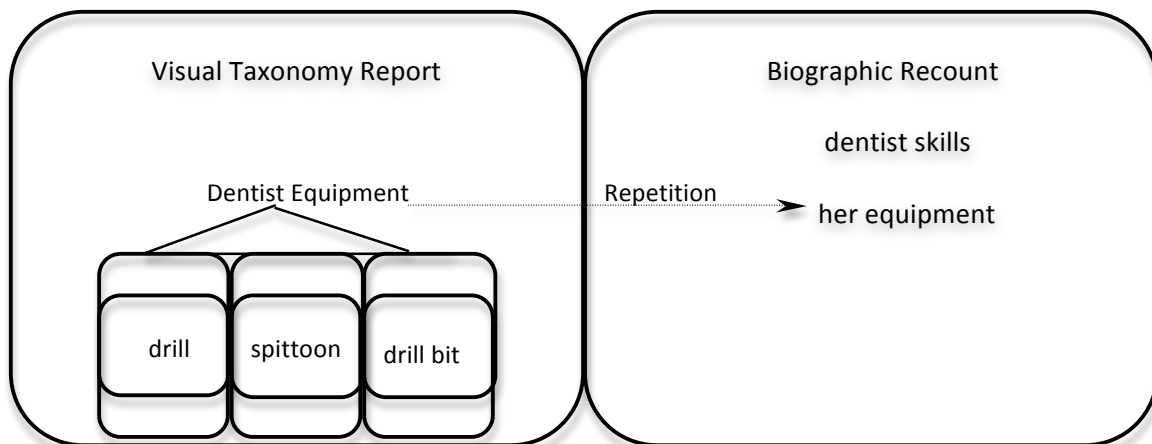
In the addition type, on the other hand, the field expands since the image provides additional albeit related information to the verbiage, and vice versa. A useful example for distinguishing addition and complementary would be different types of weather maps. A pressure map is considered an addition to a temperature map since they offer different information of the weather pattern on a given day. In contrast, a satellite map is considered as complementary to a synoptic pressure map since they provide two perspectives on atmospheric pressure systems of that day, with the former illustrating the movement of the pressure system through a region, while the later highlighting the different levels of pressures on different areas within the region. In MIs, many multimodal genres are linked through addition. This type of genre hybridisation, I argue, can also be interpreted as a sign of weak classification. To illustrate my point, I shall use an example from the same Biographical Recount (Lilija Brakmanis). The example is presented in Plate 5.2, which includes one stage in the Biographical Recount.

Plate 5.2 Field expansion through addition: Dentist Equipment and Lilija Brakmanis



The semantic relations involved in this sequence are summarised in Figure 5.1.

Figure 5.1 Dentistry equipment: A summary of intersemiotic semantic relations



As shown in Figure, 5.1, the verbiage in this sequence comprises one stage (1949) in the Biographical Recount of Lilija. The sequence also includes three image-verbiage couplings (the three dentistry tools) formed through Classification-Exemplifying relations. These couplings then enter a classification cluster with the caption *Dentist equipment*. This ideation cluster essentially constitutes the field of a visual Taxonomic Report (of dentist equipment). The caption *Dentist equipment* also forms a lexical relation (Repetition) with the message *her equipment* in the verbal text. Through this

lexical relation the classification cluster is introduced into the lexical string (Lilija's dentistry career) of the verbal texts.

Through the intersemiotic clustering, a visual Taxonomic Report is now linked to the Biographical Recount. However, the Report does not offer complementary topological information on '*her equipment*,' since this is not in fact Lilija's equipment (compare, *Lilija's house in Canberra*); rather what is exemplified is types of dentistry tools. Nor does this Report function as an embedded stage (cf. Martin & Rose, 2008) in the Biographical Recount, since it does not serve any particular purpose in fulfilling the goal of the genre—chronicling a person's life. Rather, the Taxonomic Report adds an additional field to the verbal text.

I shall argue that the hybridisation of multimodal genres through addition tends to weaken the boundaries between different categories of discourse. It allows different fields of knowledge to interweave as long as they can establish certain ideational semantic relations (i.e. form a coupling or clustering relation of a certain type). For example, hypothetically, we can integrate a Recipe with a Biology genre if they are both concerned with cocoa. In doing so, we challenge an established social boundary (and the underpinning power relations) between domestic activity and scientific endeavour. The mixture of multimodal genres through addition in MIs, therefore, can be seen as a further manifestation of the weak classification.

In this section, I have discussed the weak classification of different fields of knowledge in MIs, and illustrated their manifestation in semiotic patterns. In the following section, I shall examine the weak classification between two types of activities: activity that constitutes the learning of primary social science knowledge, and activity considered as 'playing', i.e. role playing games in mission-oriented MIs and virtual museum visiting in product-oriented MIs (see discussions in Chapter 2).

5.2.2 Weak classification between types of activities

As has been discussed in Chapter 1, on the National Museum of Australia website, MIs are placed under a section titled 'learn and play'. An underlying assumption of the section seems to be that children learn the subject matter of primary social science through 'playing' various interactive games. In the MIs, the boundary between two types of activity is often indistinguishable. In other words, these activities are weakly classified. To understand how learning is disguised as 'play' in MIs, I shall first introduce the concept of learning as a contextualised activity.

5.2.2.1 Learning as a contextualised activity

In the institution of school (or any other types of institutions where learning takes place, e.g. family or public institutions such as museum), learning is not an isolated category of activity, rather it is closely tied with other categories of relations within the pedagogic context of the school, such as spatial relations (e.g. the physical space and the arrangements of leaning objects with the space, etc), social relations (e.g. those between the educator and the student, those among the peers, etc), and relations with other types of activity within the context (e.g. evaluation). For example, in her description of the morning news curriculum, Christie (2002) has described in detail the ways in which a classroom is physically set up, including the types of private objects the pupils are allowed to bring in (e.g. one boy brought with him a different private object for each session), the role of the teacher, and the relations between the students (e.g. what types of questions can be raised and when, etc), and has considered them as integral parts of school learning. In short, learning is firmly situated within a given pedagogic context and tied to the types of relations associated within the context (see also Feez, 2007 for the description of a typical Montessori classroom).

One type of pedagogic context and the types of pedagogic relations associated with it are often distinctive from another type of pedagogic context. For instance, the context for learning in a family is often different from that in a school. Many studies (e.g.

Christie, 2002, Hasan, 2001) have shown that in the first few years of schooling, a large amount of pedagogic resources and time are devoted to apprenticing the students into this context, including regulating behaviours, negotiating social relations (e.g. how to interact with peers and teachers), familiarising students with the physical settings and different types of learning activities and discourses. Unsuccessful school learning often results from the failure to make the transition from family/community context to the pedagogic context of school (cf. Williams, 1995). From a linguistic perspective, many students are unable to engage with a particular subject or subjects for they fail to recognise or acquire the semantic “code” (Bernstein, 2000) that associated with the pedagogic context.

In the pedagogic context of MIs, there are two types of activities, learning and playing. Both activities involve the same physical act: clicking on the anchor. Since clear physical or material indication is absent, the distinction between these two types of activities relies purely on contextual signs. That is, a different context needs to be established for each type of activity. The differences in contexts are in turn realised in different multimodal semantic patterns. In MIs, however, there are no clear semantic patterns that may help differentiate the two types of activity, a point I shall elaborate on in the following section.

5.2.2.2 Digital learning as a recontextualised activity: Weak classification in MIs

The digital learning that takes place in MIs is essentially a decontextualised, or more accurately, a recontextualised activity. On the surface level, MIs relocate the learning of primary social science from the physical environment of school to the virtual environment of hypertext. On a more fundamental level, this physical relocation results in the decontextualisation of learning from its original pedagogic context⁸ and

⁸ In this section, I use the word context more in a Bernsteinian sense (cf. Bernstein, 2001), rather than the notion of context (see discussions Chapter 3) in a strict Hallidayian definition. In essence, the context here refers to ‘material’ context made up of various social relations, e.g. the context of school. Although different, these two notions of contexts are compatible, since from a linguistic point various social

the *recontextualisation* of it in a new context. This new digital pedagogic context is associated with a new set of pedagogic relations, including spatial and social relations, and relations with other pedagogic activity such as evaluation.

In MIs, the digital learning often unfolds in a visually represented place, such as the cricket locker room in *The First Golden Age of Cricket*, and the town of Ballarat in *Gold Rush!*. Ideationally, these virtual spaces do not simply function as a screen background (e.g. the desktop background in a computer) in which digital learning takes place. The analysis of Naming and Identifying coupling in Chapter 4 (see Chapter 4, Section 4.3) has shown that these virtual places in MIs are in most cases⁹ named or identified locations. And the verbal identification of the places enables the encoding of a particular set of community and cultural values. When a learner moves through the virtual space of a MI, therefore, they are essentially engaging socially (instead of purely physically) with the space. In other words, the learning activity is embedded in a particular social construction of a location.

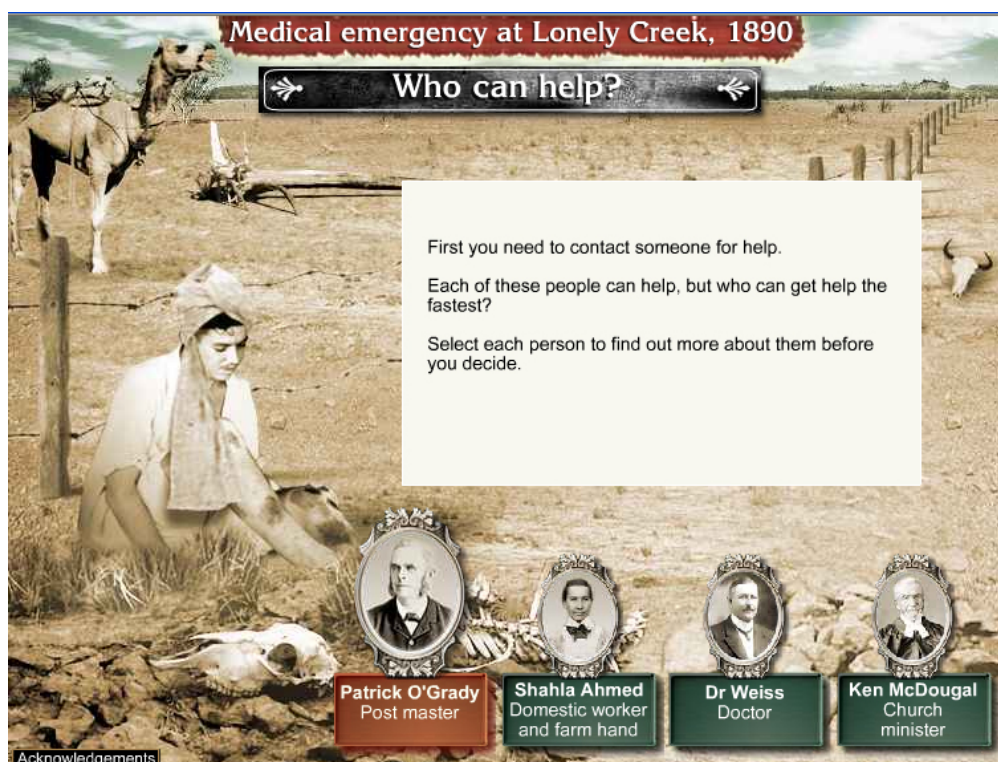
The digital learning in MIs also involves a different set of social relations, that is, the learner is engaging with people other than the educator and their peers. As has been discussed in Chapter 2, in a product-oriented MI, the learner engages with an individual, whose role resembles that of a guide in a museum (through voice over). In a mission-oriented MI, on the other hand, they engage with a game character (the little Chinese girl Ling in *Gold Rush!*) or game characters (e.g. those in *Medical Emergency at Lonely Creek*, see Plate 5.2 on the next page). As has been discussed in Chapter 4 (see Chapter 4, Section 4.3), these games characters are essentially fictitious community members. The digital learning in MIs thus involves enacting social relations that are different from those existing in the pedagogic context of school.

relations are realised in semantic and grammatical patterns of language and other social semiosis (e.g. Hasan, 2001).

⁹ *Mysterious Objects: Torres Strait Islands* has a different strategy concerning the use of screen backgrounds (i.e. it uses plain blue as its screen backgrounds) and will be discussed separately in later part of the chapter.

In establishing a new set of spatial and social relations, MIs recontextualise the learning of primary social science in a ‘digital’ pedagogic context. In this new context, the learning activity becomes indistinguishable from other types of activities, for these relations are associated with both learning and ‘playing’ activities. In other words, they are at the same time pedagogic and non-pedagogic relations. To unpack the argument here, I shall revisit the example of *Medical Emergency at Lonely Creek* (for details of the MI, see discussions in Chapter 2 and Appendix II). Plate 5.3 contains a sequence from the MI, which occurs in the second frame in which the task of the MI is introduced—the learner needs to contact someone to help the fallen rider Sayed (the visual participant left to the text box). This sequence contains several Naming and Identifying¹⁰ verbiage-image couplings, including the naming of an outback town (*Lonely Creek*); the naming of people (*Sayed, Patrick O’Grady, Shahla Ahmed, Dr Weiss, Ken McDougal*); and the identifying of people based on their role in the community (*Post master, Domestic worker and farm hand, Doctor, Church minister*).

Plate 5.3 Weak classification of activities: *Medical Emergency at Lonely Creek*



¹⁰ For the convenience of discussion, I only present one sequence in the frame. The place (Lonely Creek) and the injured rider (Sayed) have been named in an earlier sequence of the frame (i.e. earlier in the logogenetic unfolding), for details see Chapter 4, Section 4.2.

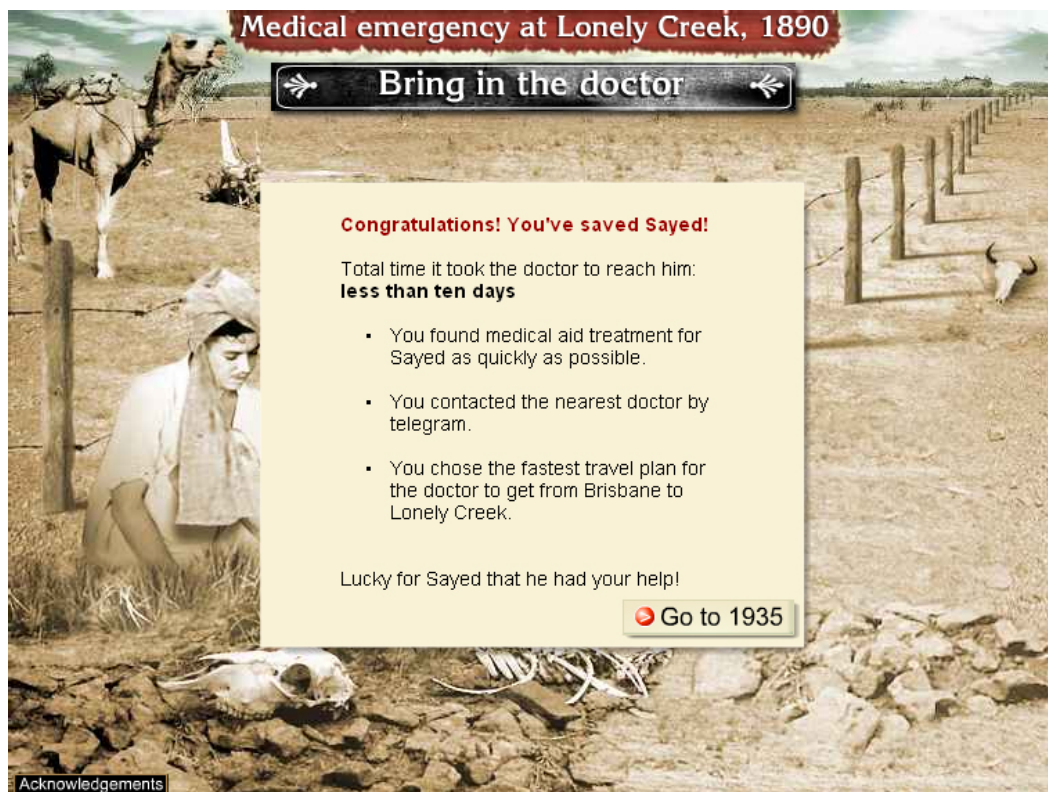
As illustrated in Plate 5.3, to accomplish the task set in the MI, the learner needs to click on one of the anchors (the icons of the people). Each time a learner clicks on an anchor, they *potentially* accomplish two simultaneous tasks: 1) the multimedia interactive task—find out who can help Sayed, 2) the learning task—learn the types of people who make up the (historical) outback community and their roles in the community (how they can help). Here, I emphasize the word ‘potentially’, for the learner may not be able to recognise or be aware of the learning task here.

The difficulty in differentiating these two types of activities results from the fact that one semantic relation (Naming or Identifying coupling) encodes at the same time two types of social relations, which in turn provides the context for two different types of activities: 1) a community relation associated with ‘playing’: as the learner is interacting with a member of their community, they can demand information (or goods-&-services) that can help them to accomplish the task from these community members. Simply put, the learner is acting as if he/she is a member of the community; 2) a pedagogic relation associated with learning —these community members are the source of knowledge (i.e. they are game characters who provide guidance for the interactive tasks) or the knowledge itself (i.e. a community is made up of these types of people). Thus these community members at the same time act as educators and constitute parts of the field of knowledge. In short, there are no clear contextual signs (realised in semantic patterns) that help to distinguish one type of activity from another in MIs since the spatial and social relations provide the context for both. The learner is at the same time learning about the community and its transportation and communication systems, and engaging with the community members and utilising various transportation and communication options.

The weakness in classification between types of activities in MIs also results from the evaluation strategies adopted. Here, I refer to *what* has been evaluated, rather than *how* the evaluation (e.g. where, when and how frequent the evaluation is done) is conducted. The latter involves the issue of framing and will be discussed in later sections of this chapter (see Section 5.3.2.2). In the five MIs used in the research, evaluation is completely absent in two of them—*The First Golden of Cricket* and *New*

Homes. These two, as has been discussed in Chapter 2 (see also Appendix II), are product-oriented MIs, in which the learner is required to produce a multimodal text (respectively, a news reel and a museum exhibition) after navigating through the content in each MI. In these MIs, there are no internal evaluation criteria. On the one hand, the learner demonstrates their understanding of the subject content (e.g. the history of cricketing in Australia) by reproducing a multimodal text. In other words, the making of multimodal text constitutes the evaluation. On the other hand, the quality of these multimodal texts can only be evaluated externally; that is, the learner needs to show it to a third party, for example, a teacher. In short, a learner has no indication of what is being evaluated (i.e. if they are being evaluated for the quality multimodal texts, their learning of the contents or both) or how well they perform.

Plate 5.4 Internal evaluations of the performance in interactive task: *Medical Emergency at Lonely Creek*



In contrast, in the three MIs where the internal evaluation is present, the learner is being explicitly evaluated for their performance in the interactive tasks. For instance, Plate 5.4 contains a sequence from *Medical Emergency at Lonely Creek* where the performance of the learner is being evaluated. The task in this *MEALC* involves

finding the right combination of communication and transportation method to save an injured rider—Sayed, in an outback town called Lonely Creek in 1890. The learner first needs to read various facts about the communication and transportation systems available at the time, and then to make decision on which ones he/she should use in order to save the rider. And each of the participants we have seen earlier in Plate 5.3 will provide either a type of transportation or communication.

As can be seen in Plate 5.4, the learner is being evaluated for his/her performance in the attempt to save the injured rider Sayed (*Congratulations! You've **saved** Sayed!*). The action the learner has taken is then summarised, which includes a series of Material Processes: *found*, *contacted*, and *chosen*. The two learning topics of the MI, communication and transportation, are realised sporadically in the text as Circumstance (*by telegram*) and Participant (*fastest travel plan*). Interestingly, the evaluation here also re-enforces the social relations established in context by explicitly appraising how the action of the learner has impacted on the community—*Lucky* [Judgement: Normality] *for Sayed that he had your help!*.

While what is being explicitly evaluated here is a learner's performance in the interactive task, what is being implicitly evaluated is his/her learning of the subject content. In other words, it is only through an adequate understanding of the transportation and communication systems in Australia in 1890 that the learner can accomplish the task successfully. However, since the evaluation is implicit and hidden in the evaluation of the interactive task, there is no clear sign indicating to the learner that they are in fact engaging with a particular field of knowledge while engaging with the multimedia interactive tasks. In other words, these two types of activities are weakly 'insulated' from each other.

In summary, as Christie (2002) has pointed out in her study of the morning news curriculum, a set of explicit evaluation criteria helps the students to identify the purpose of a learning activity, i.e. what types of knowledge and skills are required in a subject. The implicit evaluation of the learning and the explicit evaluation of the interactive activity, therefore, can be seen as another manifestation of the weak classification in MIs. Simply put, the learning is now hidden behind the playing.

5.2.3 Classification relations in MIs: A summary

In this section, I have examined the classification relations in two pedagogic categories—that between fields of knowledge and that between types of activities—in the digital learning context of MIs and exemplified their respective semiotic manifestations. The main argument I have put forward in this section is that MIs are overall weakly classified. That is, there is a low degree of insulation between various fields of knowledge: between common knowledge and uncommon knowledge, as well as between learning activity and other types of hypermedia interactive activities.

The weak classification arises from three main contributing factors. Firstly, it has to do with the particular ontogenetic stage the MIs are designed for. These are materials designed for primary years. The existing SFL literature on classification and genres (e.g. a comparison of social science subjects in primary years Christie & Derewianka, 2008 and secondary years, Coffin, 2006) suggests that with the progressing years in schooling, subjects (i.e. fields of knowledge) tend to grow increasingly technical and specialised. Secondly, in comparison with science, the horizontal knowledge structures in social science disciplines are weakly classified (cf. Maton, 2007). The weak classification of primary social science therefore is also a reflection of the nature of the discipline itself. Finally, the nature of hypertext, such as its ability to create virtual environments and incorporate various multimodal genres through hyperlinking technology, further weakens the classification relations in MIs. From a pedagogic point of view, therefore, what hypermodality (Lemke, 2002b) could potentially create is a new type of pedagogic context where classification between various categories of pedagogic relations is inherently weak.

The examination of classification relations in this section aims to shed light on the nature of MIs as a pedagogy discourse. In the following section, I shall look at the recontextualisation rules that constitute this pedagogic discourse, i.e. framing. In other words, I shall move from the question of what to the question of how—*how* the discourse is realised in the digital pedagogic practice.

5.3 Pedagogic framing in Multimedia Interactives

In this section, I explore the local interaction strategies in the pedagogic practice, i.e. framing. I am concerned with the ways in which the control over the sequencing, pacing and evaluation of pedagogic content (field of primary science) and activities are achieved in MIs. While framing could be “examined in respect of each discourse, separately” (Bernstein, 2000, p. 102), my discussions focus largely on the framing of the regulative register (i.e. regulative discourse). I shall argue that although the classification of fields of knowledge and activities in MIs is overall weak, there are ways in which different levels of control over pedagogic contents and activities can be achieved in each individual MI. In other words, the degree of framing can vary from one MI to another.

In this thesis, I make a distinction between two different yet interrelated types of framing: explicit framing and implicit framing. Explicit framing is achieved through the ‘physical’ manipulation of technology affordances, i.e. anchor, while implicit framing is realised in various semantic patterns, e.g. textual organisation, interpersonal evaluation, etc.

5.3.1. Explicit Framing

In MIs, the framing of pedagogic discourse can be achieved through manipulating the hyperlink affordance of the technology, i.e. the anchor (see Chapter 2, Section 2.3.2 for descriptions of anchors in MIs). This type of framing is considered to be explicit for it has certain ‘physical’ manifestation. It restricts the degree of freedom a learner can exercise in using the interactive technology— i.e. if, when and where the physical action of clicking can be performed. In doing so, a MI explicitly controls the sequencing and pacing through which the learner can engage with the pedagogic content. There are two basic types of anchor control in MIs: anchor manipulation (can the learner click on an anchor?) and anchor specification (is the learner made aware of the function of the anchor?).

5.3.1.1 Anchor manipulation

In a weakly framed MI, a learner can freely click on any anchors in a frame. In this way, they have full control over of the sequence in which the texts are read and how much time they want to spend engaging with the texts. For instance, Plate 5.5 contains a frame from *New Homes*, which constitutes the ‘homepage’ of Pentronella Wensing’s multimodal Biographical Recount.

Plate 5.5 Anchor manipulation in weakly framed MIs: *New Homes*



As has been explained earlier in Chapter 2, the photos with numbers indicating different periods in Petronella Wensing’s life are anchors. By clicking on one of the

anchors, the learner is directed to a different page, which contains one particular phase in the Biographical Recount of Petronella. In *New Homes*, a learner can freely click on any anchors in a frame and read the Biographical Recount in a sequence of their choice. They can for instance read the period of 1956 before they read the period of 1948. Moreover, the time a learner needs to spend on each part of the Biographical Recount is also not restricted. They can choose to move on to a different part of the text right away or skip one phase altogether. In short, a learner would have full control over the sequence and pacing in reading the Biographical Recount of Petronella.

Plate 5.6 Anchor manipulation in strongly framed MIs: Sequence control

The diagram illustrates the sequence control in a strongly framed MI through three interconnected screens:

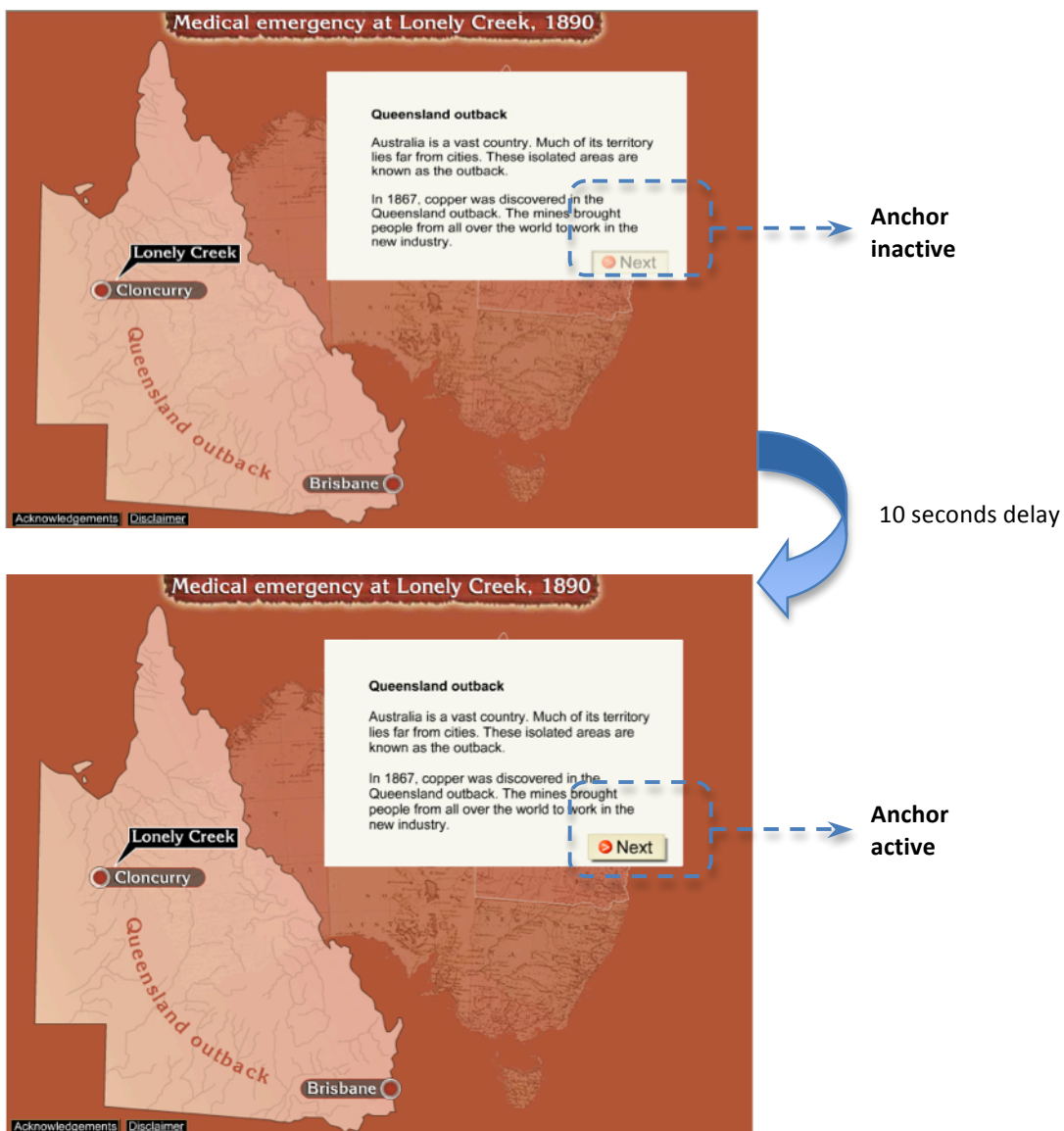
- Top Left Screen:** Features a map of the Torres Strait Islands and a text box titled "The Torres Strait Islands". The text explains that the sea is very important to the people of the islands, making up over 90% of their environment, and that Torres Strait Islanders have a name for every reef, island, and atoll in the whole region.
- Top Right Screen:** Titled "Thousands of years ago: ceremonial objects", it shows a historical image of a Boma ceremony and a shark jaw (beizam). A list of bullet points explains that in ancient times, people from Mer Island followed the Malo-Boma religion, which set out special rules and beliefs for everyday life. It also notes that religious leaders made objects to use in important ceremonies and in war, and that these objects were made from local materials such as turtle shell, shark's jaw and feathers. The beizam is identified as a modern example of these kinds of objects.
- Bottom Screen:** Shows a detailed view of a shark jaw (beizam) with a text box asking "What is this curious object?". The text prompts the user to take a look at the object by using the arrows to turn it around and asks for their thoughts. It explains that on top of the object is a beizam, which is a Torres Strait Islander word for shark, and that this object is unique to the Torres Strait Islands culture.

Blue dashed arrows indicate the sequence of navigation between these screens, showing how a learner can move from a general overview to a specific historical context and then to a detailed view of a specific object.

In a strongly framed MI, in contrast, a learner's control over sequence is often restricted. That is, they will not be allowed to physically click on an anchor before they have visited certain linked pages and read the multimodal contents on the pages. In this way, a learner is forced into a particular sequence, which is typically the naturalised by the unfolding sequence of a particular genre or the 'ideal' sequence of the multimedia interactive activity (i.e. Critical Path). For example, on the 'homepage' of *Mysterious Objects: Torres Strait Islands* (see Plate 5.6), each text box at the top of the frame that contains a question (e.g. *Where is it from?*) is an anchor. Although the page has a similar layout structure to the homepage of Petronella's Biographical Recount, here the learner cannot freely click on the anchors and choose the sequence of the navigation. For instance, they will not be able to click on '*When was it used?*' before they have already read the section '*Where is it from?*'.

Besides the controlling of sequence, anchor manipulation can also be used to control the pacing of pedagogic discourse. Take the opening frame (i.e. the Introduction Stage) of *Medical Emergency at Lonely Creek* (see Plate 5.7) as an example. This frame contains a short Historical Explanation on mining in Australia. The whole text is divided into three stages and appears sequentially in three text box layers (for definition of layer see Chapter 3, Section 3.3.2.2). To move onto the next stage of the text, a learner needs to click on the anchor 'next'. However, they cannot immediately move onto the next phase, for the anchor will stay inactive (see the image on the top in Plate 5.7) for around 10 seconds time, during which the learner is expected to read the Historical Explanation. The Historical Explanation here lay out the background for the MI and do not contain any information on how the task should be performed. In short, they belong to the instructional register. In reality, of course, the learner may not be reading the text during this period. The delay, nevertheless, signals the importance and the mandatory nature of the text even though it will not impact on how well they perform in the actual interactive task (i.e. saving the injured camel rider).

Plate 5.7 Anchor manipulation in weakly framed MIs: Pacing control



5.3.1.2 Anchor specification

In MIs, different degrees of control over the sequence and pacing of pedagogic contents and activities can also be achieved through the ways in which the *function* of an anchor is specified in a given MI. I shall point out that the function of an anchor here does not refer to the affordance (technological functionality) of an anchor, such as Entrance to a different hyperlink or Control for a video clip (for types of anchor based on the technology affordance, see Chapter 2, Section 2.3.2.2). Rather it refers to the function an anchor performs in the interactive activities in a given MI. In other

words, it refers to what the clicking of a particular anchor will achieve and how it will impact on the success completion of the task in the MI.

To illustrate the point, I shall compare two MIs—*Gold Rush!* and *Medical Emergency at Lonely Creek*. Plate 5.8 contains a frame from *Gold Rush!* and Plate 5.9 (next page) contains two frames from *Emergency at Lonely Creek*. Before I discuss the issue of anchor specification in the two MIs, I shall briefly revisit here the tasks set in them. In *GR*, the learner needs to go through various shops in the high streets of Ballarat to obtain permits, tools and supplies for gold mining, while in *MEALC* the learner needs to visit four different people in order to get help for a injured camel rider.

Plate 5.8 Anchor Specification in weakly framed MIs: *Gold Rush!*



In the frame taken from *GR* (Plate 5.8), each image of a shop can either be an anchor (e.g. *Tools*, *Bill's Supply Store*) or just the visual representation of a location (e.g. *Hotel*, *Bank*). As explained previously, to complete the task the learner needs to click on anchors in a particular order. The learner has been given instructions (through a Procedure) in a previous frame on what tasks need to be done and the 'ideal' sequence in which they should be done. To accomplish the task successfully and most efficiently, the learner will have to either remember the task (i.e. the function of each anchor) or reread the instruction (the Miner's Tips on the top right of the frame). In other words, the learner now needs to take control over how they accomplish the task.

Plate 5.9 Anchor Specification in strongly framed MIs: *Medical Emergency at Lonely Creek*

Medical emergency at Lonely Creek, 1890

Who will you go to first?

You must go by camel to tell one of these people that Sayed has broken his leg.

Who should you go to first?

- Patrick O'Grady
- Shahla Ahmed
- Dr Weiss
- Ken McDougal

Patrick O'Grady
Post master

Shahla Ahmed
Domestic worker and farm hand

Dr Weiss
Doctor

Ken McDougal
Church minister

Acknowledgements

Medical emergency at Lonely Creek, 1890

Who will you go to first?

Shahla Ahmed can pick up Sayed in her horse-drawn buggy and take him to get medical aid.

You can reach her in minutes.

Continue?

- Yes, ride to the cattle station.
- No, try someone else first.

Patrick O'Grady
Post master

Shahla Ahmed
Domestic worker and farm hand

Dr Weiss
Doctor

Ken McDougal
Church minister

Acknowledgements

On the other hand, in *MEALC*, as shown in Plate 5.9, the learner has been given the instruction (i.e. *first you need contact someone for help*) in an earlier sequence (see Plate 5.3 in Section 5.2.2.2) that they need to contact one of the people. The same instruction was given here in a slightly different wording *You must go by camel to tell*

one of these people that Sayed has broken his leg. And the text under the instruction *Who should you go to first?* then specifies the function of the anchors, that is, if the learner clicks on one of them (e.g. Shahla Ahmed), he/she thinks the person is the first one that should be contacted. Once the learner clicks on the anchor, he/she is then reminded again of the consequence of his/her action (*Shahla Ahmed can pick up Sayed in her horse-buggy and take him to the first aid. She can be contacted in minutes*) and given a chance to reconsider the action (*Continue?*). In short, while the learner still can click on the anchor of their choice and subsequently take a less than 'ideal' action, their interactive activity here, compared with that in *GR!* is strongly controlled.

Plate 5.10 Strong framing: Combination of anchor manipulation and specification

Mystery object:
Torres Strait Islands

What could it be? Where is it from? When was it used? How big is it? A closer look What could it be used for? What is it?

What is this curious object?
Take a look at the object by using the arrows to turn it around. What do you think it is?

On top of the object is a *beizam*, which is a Torres Strait Islander word for shark. This object is unique to the Torres Strait Islands culture.

Can you work out what it is?
Type in your guess:
Totem
Enter

Now select **Where is it from?** to find out more about the object.

Acknowledgements

So far, I have illustrated two ways in which different degrees of framing can be achieved through the manipulation of anchor and the specification of anchor function. In a strongly framed MI, these two methods can be combined in order to achieve control over the sequence and pacing of pedagogic discourse. For instance, Plate 5.10 includes another sequence taken from *Mysterious Objects: Torres Strait Islands*. As I have discussed earlier, the learner will not be able to click on 'Where is it from?'

before they complete the stage '*What could it be?*'. Furthermore, in a text box on the bottom left in the frame, the learner is given instruction on what anchor to click next, *Now select Where is it from?* and the function of the anchor *to find out more about the object*.

5.3.2 Implicit Framing

In MIs, the framing of pedagogic discourse can also be realised implicitly by various semiotic patterns. In this section, I demonstrate the ways in which different degrees of framing can be achieved through two different types of semiotic patterns: 1) textually, the ways in which learning objects are organised in hypertext; and 2) interpersonally, the ways in which feedback and evaluation are provided in MIs

5.3.2.1 Textual organisation of learning objects

In the hypertext environments of MIs, there are two basic types of textual resources for organising various multimedia artefacts and multimodal texts — layout (cf. Bateman, 2008) and hypertext hierarchy (cf. Djonov, 2005). In essence, layout resources organise various multimodal resources within the same frame while website hierarchy is used for organising information across different frames (i.e. webpage or node). In a strongly framed MI, layout and website hierarchy will provide a guidance for distinguishing multimodal texts that realise the field of primary social science from those that realise the field of MIs. In short, the learning content is highlighted in a strongly framed MI. In a weakly framed MI, in contrast, there are few textual resources that help make such a distinction.

In a weakly classified MI, multimodal texts that realise the two different types of fields in MIs (primary social science vs. navigation activities) are often placed within the same frame and there is little difference between the ways in which these two types of text are organised textually. For example, Plate 5.11 contains a frame from *Gold Rush!*. In this frame, the learner needs to make a decision on whether he/she

wants to purchase a particular item for mining. This interactive activity takes place in a virtual 'checkout', which is presented as a sepia text box with the price of the item and an image of an old-style mechanical till on it. In this virtual checkout, the learner will make a decision on whether they want to buy the item (*Buy now?*). Based on the decision, they will then click on the 'yes' or the 'no' anchor. Immediately next to these two anchors, there exists a third anchor 'currency converter'. The activation of the anchor opens a second text box, which contains a short Explanation on the differences between currency used during the Gold Rush period and the contemporary Australian currency system. This particular text does not serve any purpose in the gold mining task of *GR*, rather it constitutes part of the field of primary social science. In other words, when the learner clicks on the anchor 'currency converter', he/she is not converting any money but learning about the historical currency system in Australia.

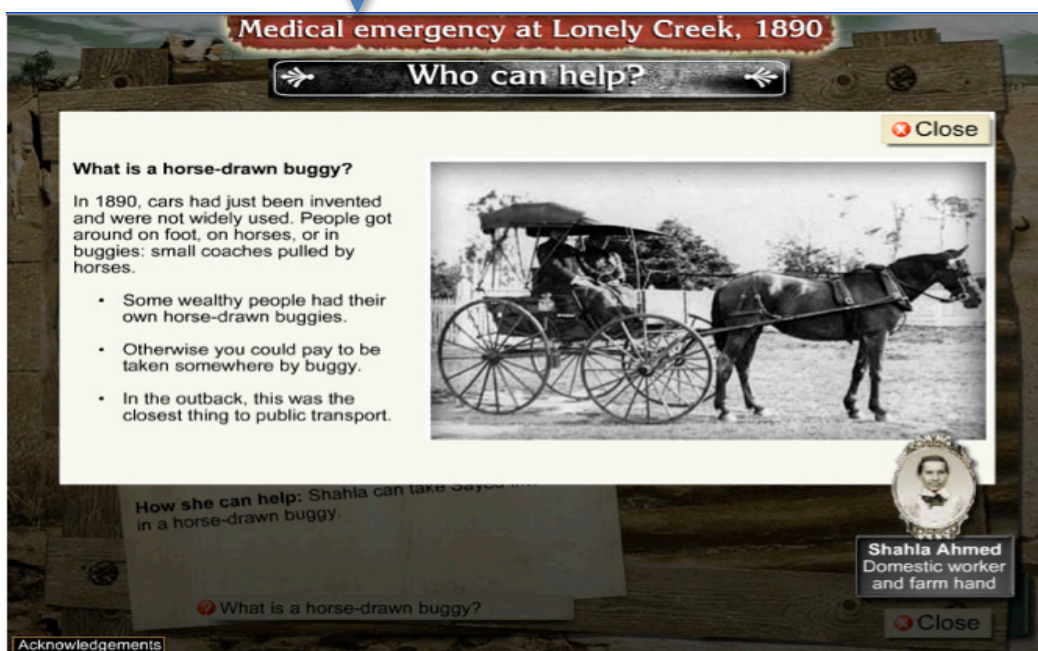
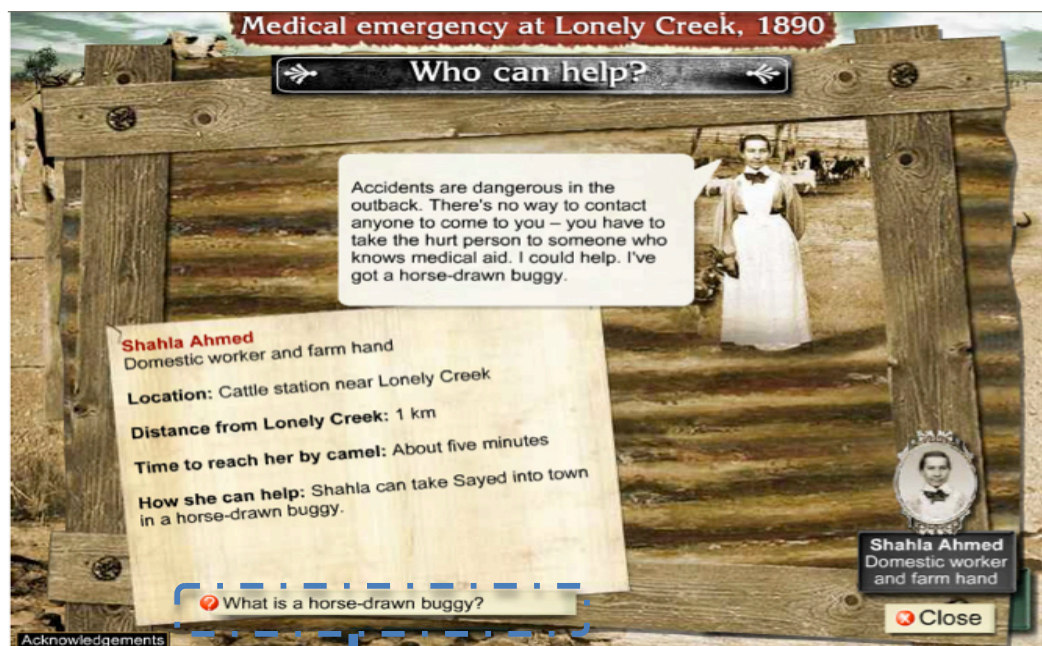
Plate 5.11 Textual organisation in weakly classified MIs: *Gold Rush!*

The screenshot shows a virtual checkout interface for buying a miner's permit. The interface is titled "Buy miner's permit" and is set against a wooden background with "COLONY OF VICTORIA" text. On the left, there is a "Pay" section showing a "Miner's permit" for 5s. Below this is a "Buy now?" prompt with "YES" and "NO" buttons. To the right of the "Buy now?" buttons is a "CURRENCY CONVERTER" button. The "Currency converter" window is open, showing "Making cents of pounds and shillings" and a list of facts: "In 1865, Australia still used British currency: pounds and shillings.", "This is the pound symbol: £", "This is the shilling symbol: s", and "There were 20 shillings in £1." A "Miner's tips" character is visible on the right. Below the interface, two blue arrows point to labels: "Interactive content" under the "Buy now?" area and "Primary social science subject content" under the "Currency converter" window.

As can be seen in Plate 5.11, the layout in the frame does not mark a clear boundary between the two types of content—the virtual checkout (interactive activity) and the

Explanation of the currency system (primary social science). First, the anchor that activates the subject content is placed within the virtual checkout. Moreover, the text box for the Explanation has the same background as the checkout box (e.g. sepia, with watermarks on the four corners) and is presented as an extension of the checkout, i.e. there is a high degree of connection (Kress & Van Leeuwen, 2006[1996]) between the two text panels.

Plate 5.12 Textual organisation in strongly framed MI: *Medical Emergency at Lonely Creek*



In contrast, in a strongly framed MI, texts of the two different fields often occur in separate frames (or separate sequences) and the layout will highlight the different nature of the two texts. Plate 5.12 contains two sequences from *Medical Emergency at Lonely Creek*. In the first sequence, what a game character can do to help save Sayed is explained twice, the first time in a text box on the bottom left, the second time by the game character herself. The learner then needs to click on the anchor within the text box *What is a horse drawn buggy?* (highlighted in Plate 5.12) and study a Descriptive Report on the horse drawn buggy in the following sequence. Here, the multimodal information in the first frame is concerned with the task of saving Sayed, while that in the second sequence constitutes part of the primary social science subject content.

As can be observed in Plate 5.12, the two sequences have distinctive textual layouts. In the first sequence, the text, image and the speech bubble are closely connected to (i.e. overlapping) each other, whereas in the second, the framing is maximum, disconnecting the image from the text (cf. framing in relation to layout in Kress & van Leeuwen, 2006[1996]). Moreover, the backgrounds in the two frames are also different. The first frame appears to use an image of a wooden board as its background, whereas the second one has a dark background with a faded image of the previous sequence. In fact, in *MEALC*, the layouts for the two types of texts (those construing the primary social science knowledge and those constituting the field of interactive activities) are consistent throughout.

The discussion in this section so far has dealt with the framing of pedagogic discourse as whole. In other words, I have examined the framing relation between the instructional (primary social science) and regulative register (multimedia interactive activities). In MIs, the framing within the instructional register on its own can also be realised through various hypertextual resources. In a strongly framed MI, website hierarchy is often used to help distinguish different stages/phases of a multimodal genre or macrogenre, whereas in a weakly framed MI, this hypertextual resource is less likely to be utilised. Thus in a strongly framed MI, a semantic unit (e.g. a generic stage) is more likely to map onto a technological unit (i.e. a node or a link) (for the distinction between the two see Chapter 2, Section 2.2.2). To illustrate the difference,

I shall use *New Homes* and *The First Gold Age of Cricket* as examples. The frames taken from the two MIs are presented in Plate 5.13.

Since I have discussed earlier in the section the homepage of Pentronella Wensing (Plate 5.13a), I shall not explain it again in detail. What is relevant here are two points. First, on the home page, all the anchors are indicated by a period of time in a Biographical Recount (e.g. 1948). Second, each link that an anchor activates¹¹ constitutes one stage in the Biographical Recount of Petronella.

Plate 5.13 Web hierarchy and the framing of instructional register

a. Strongly framed: Mapping between hypertext hierarchy and generic structure in NH



¹¹ As discussed elsewhere in Chapter 4 (Lijila Brakmanis's Biographic Recount), the time indicated by one anchor does not necessarily map onto the Topical Theme (of time period in a person's life) of the verbiage. But these different links nevertheless are of similar semantic status, i.e. they are one stage in the 'new' multimodal Biographic Recount.

Plate 5.13 (continued) Web hierarchy and the framing of instructional register

b. Weak framing: Mismatch between hypertext hierarchy and generic structure in FGAOC



The First Gold Age of Cricket, in contrast, contains a similar navigation structure and similar genres (Biographical Recount) as *New Homes*. The navigation starts in a virtual cricket locker room, and inside each locker is the ‘homepage’ of an individual or individuals. On Victor Trumper’s homepage (Plate 5.13b), for instance, there are several photos. None of the photos, however, are verbally identified. That is, they do not thematically predict what information will occur when an anchor is activated. When the learner clicks on one of the anchors, they may be directed to one stage in Trumper’s Biographical Recount. For instance, the photo of Trump batting is linked to one stage in his Biographical Recount. An anchor can also direct the learner to

something else. For example, the photo of the Melbourne Cricket Ground (MCG) is linked to the photo of the MCG in a larger size, and there is a short historical radio commentary (audio clip) accompanying the image in this frame (*I think undoubtedly the greatest innings ever played on MCG is Victor Trumper 74 at 122*). The photo and the radio commentary here function to exemplify the popularity and quality of Trumper, and form an interpersonal cluster with the Biographical Recount (see discussion in Chapter 4, Section, 4.4.2.2). In short, while the hyperlink that contains one stage in Trumper's Biographical Recount and that containing the photo of the MCG are of similar level of depth in the hypertext hierarchy (cf. Djonov, 2005), they are units of different status in the multimodal Biographical Recount. The difference between *GR* and *FGAOC* in framing is summarised in Figure 5.2.

Figure 5.2 Degree of framing and hypertext hierarchy: A comparison

a. New Homes

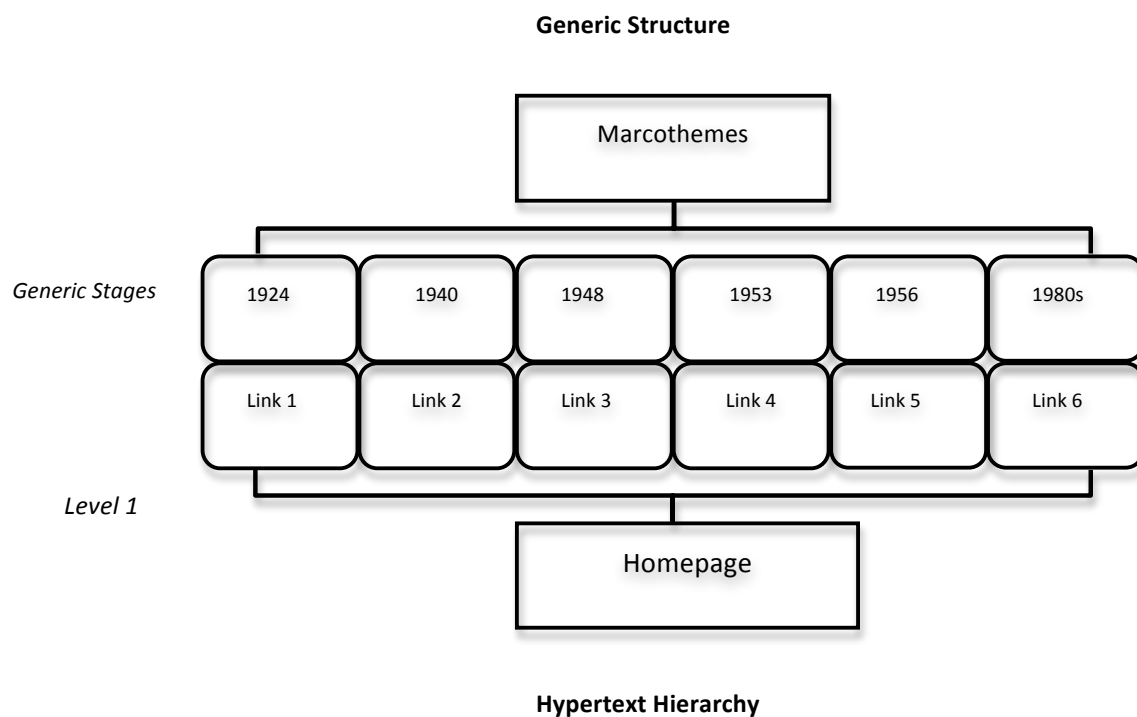
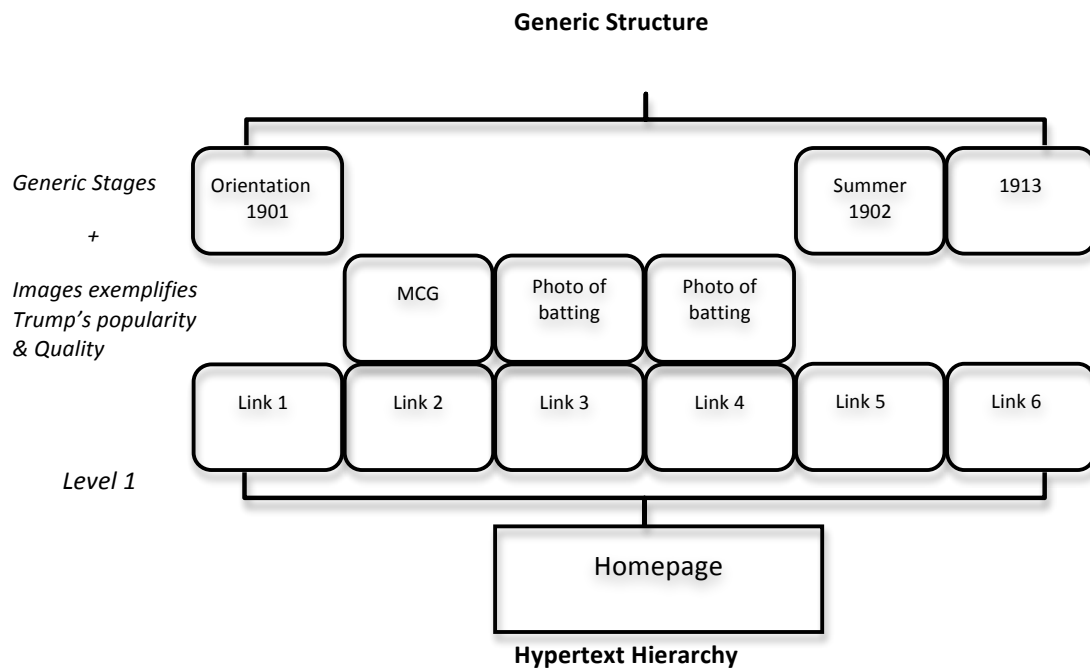


Figure 5.2 (continued) Degree of framing and hypertext hierarchy: A comparison

b. The First Golden Age of Cricket



To sum up, when web hierarchy maps onto the generic structure, the unfolding of a multimodal genre is strongly framed. In contrast, when there is a mismatch between the two, the unfolding is weakly framed. I shall argue that a weakly framed navigation structure might create a sense of 'freedom' and 'control' for the learner, since there is no prediction of what is going to occur in the next link. What it in fact achieves is to obscure the generic structure of the text.

5.3.2.2 Interpersonal evaluation and feedback

In MIs, the framing of pedagogic discourse in a particular regulative register can also be realised interpersonally through various types of pedagogic evaluation and feedback. In Section 5.2.2.2, I have discussed the content of evaluation in the five MIs, and shown that the evaluation is either absent or focuses on the evaluation of the learner's performance in the interactive task rather than the learning of the primary social science subjects. I have argued that what is being evaluated signals the degree of insulation, or classification relation, between the two types of activities (learning

and 'playing') in MIs. Here, I shall focus on the use of evaluation in controlling the progress of the interactive task and the unfolding of pedagogic content. More specifically, I am concerned with where and how frequently the evaluation is given in a MI.

Plate 5.14 Weak framing: Interpersonal evaluation at the end of the task

a. successful completion of the task



b. unsuccessful completion of the task

b-1 warning



Plate 5.14 (continued) Weak framing: Interpersonal evaluation at the end of the task

b-2 Go back to purchase more food



b-3 did not go back and purchase more food



In a weakly framed MI, the evaluation is not given until the very end of the task. For example, in *Gold Rush!* (see Plate 5.14), if the learner completes the task successfully, (that is, they have followed the instruction and complete the task on the Critical Path), they will receive “congratulations” for their “hard work”. If, however, the

learner has made a mistake (for instance, they have not purchased enough food) they will be warned when they reach the goldfields (Plate 5.14b-1), and be given two choices—going back to the town and purchase more food or continue with the dig. If they go back to town, they will end up digging less gold than if they have followed the Critical Path. In this situation, when the dig is over (see Plate 5.14b-2), they will be told, *“there is not much to show”* for their *“hard work”*. If on the other hand, they choose continue digging regardless, when the dig is over they will be informed of their failure to complete the task— *“you are so hungry that you traded all your gold and money for food from other miners.”* (see Plate 5.14b-3). In short, the learner will not have feedback on whether they have understood the instructions and information and made the correct decision until the very end of the MI task.

Plate 5.15 Strong framing: Frequent evaluation throughout the task

a. re-enforcing the correct choice

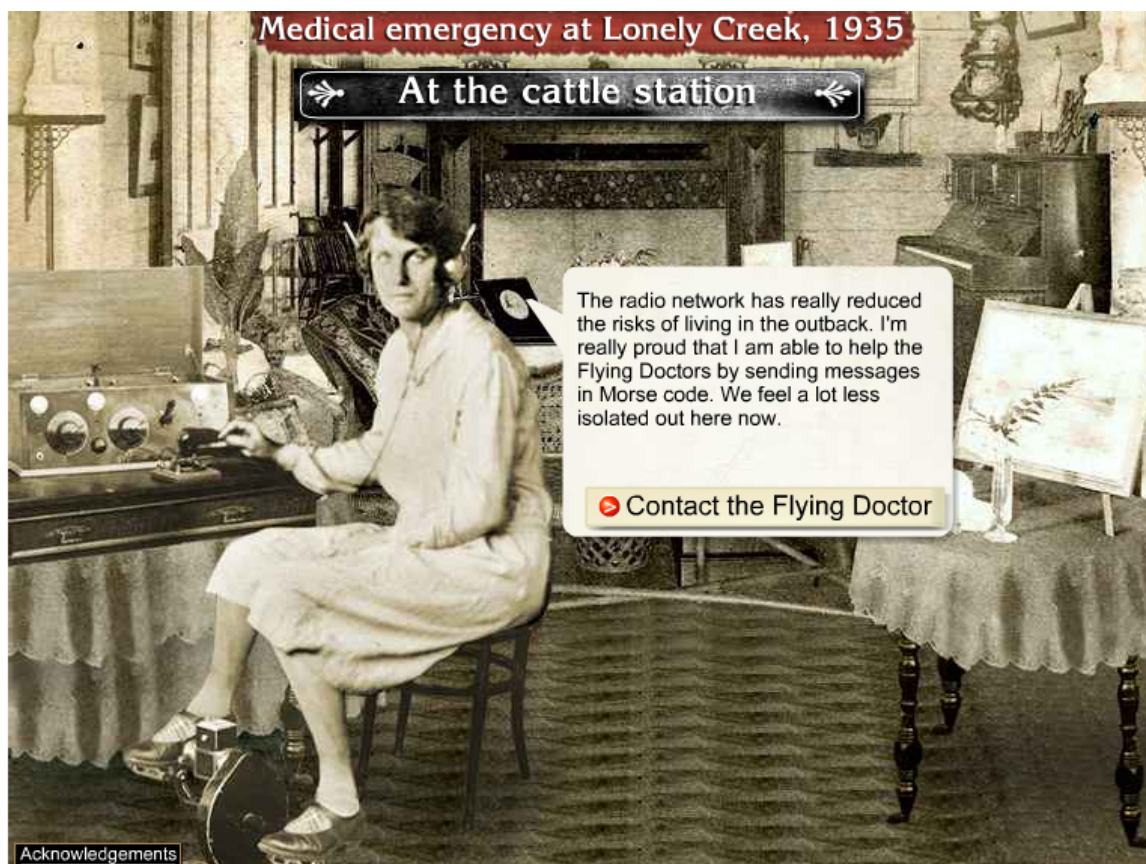
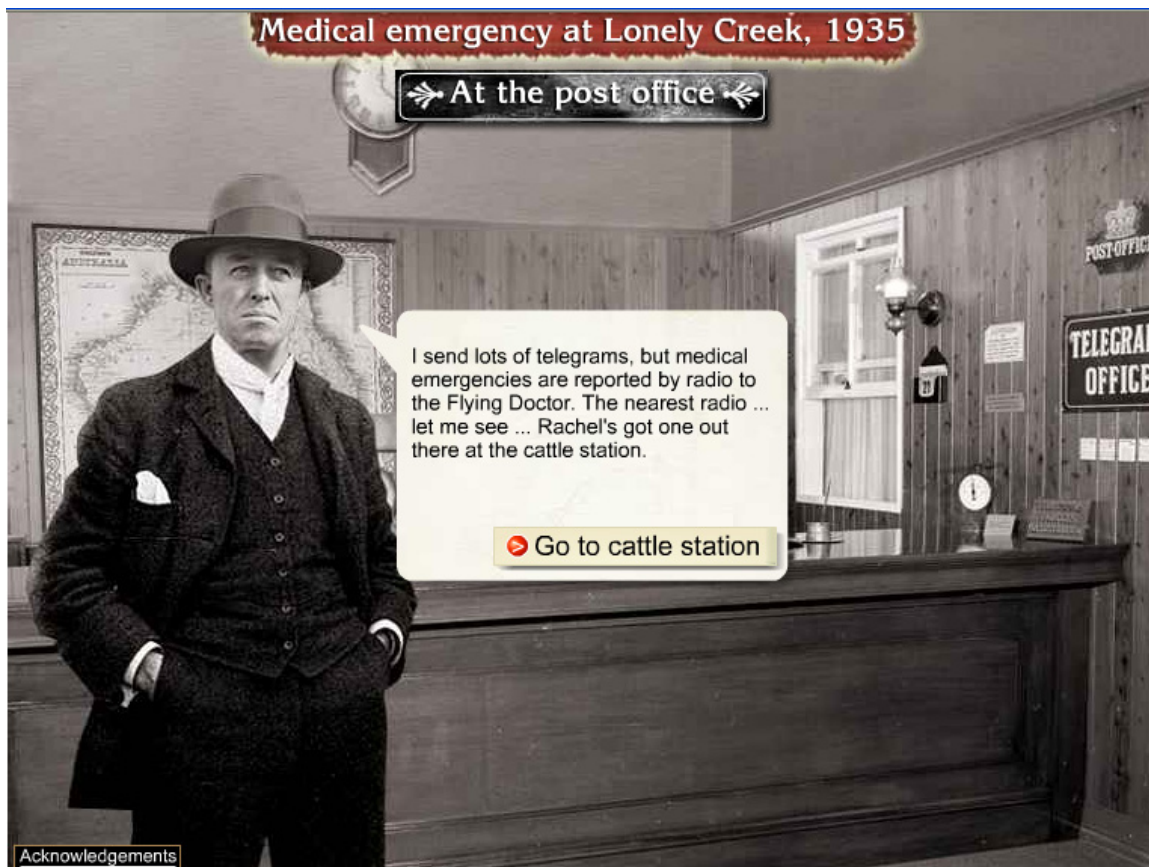


Plate 5.15 (continued) Strong framing: Frequent evaluation throughout the task

b. feedback on the wrong choice



In a strongly framed MI, in contrast, the learner's progress is constantly being evaluated and he/she is given feedback at every step of the MI. There is thus less chance for the learner to fail the task in this type of MI. *Medical Emergency at Lonely Creek* is one such example of strong interpersonal framing. Plate 5.13 contains two frames from *MEALC* (the task in 1935). In this task, the 'ideal' sequence of the task is to contact Rachel (Plate 5.13a) who can use the radio network to contact a flying doctor. If the learner has made the correct choice they will be reinforced by Rachel herself (*The radio network really has reduced the risk of living in the outback*). On the other hand, if the learner made the wrong choice, such as going to the postmaster first, they will be gently reminded of their wrong choice (*I send lots of telegrams but medical emergencies are reported to the doctor by radio*).

To sum up, the evaluation in MIs reinforces the weak classification. That is, the learner is being explicitly given feedback on whether they have performed the task correctly while implicitly being evaluated on their understanding of the information (e.g. *I am really proud that I am able to help **the Flying Doctors by sending messages in Morse code***). However, if the feedback is given frequently and at every step of a given MI task, the evaluation can assist in controlling the sequencing and pacing of the interactive activity. In other words, evaluation can contribute to the strong framing in MIs.

Although framing realised in interpersonal evaluation is concerned primarily with the control of regulative register in MIs, I would like to suggest that it might also impact on the framing of the instructional register. The hypothesis here is that if the learner is given guidance throughout the task, they are more likely to focus on the pedagogic content of the MI, e.g. reading information on Flying Doctors and Morse code. If the regulative register is weakly framed as in the case of *Gold Rush!*, they are more likely to spend time on figuring out how to complete the task (i.e. how much food to purchase) rather than the subject content (i.e. the condition of food supply and price of food during the Gold Rush period¹²).

5.3.3 Pedagogic framing in MIs: A summary

In this section, I have examined the framing of pedagogic discourse in the Multimedia Interactives. I have demonstrated two main ways in which framing can be achieved in the hypertext environments of MIs—explicitly through the ways in which anchors are designed, and implicitly through the textual (layout and hypertext hierarchy) and interpersonal (evaluation) resources of multimodal texts. Table 5.1 provides a summary of the five MIs in terms of the types of control and degrees of framing

¹² In *Gold Rush!*, when purchasing the food, the learner was given some historical information about food supply during the Gold Rush period. (*Life on the goldfields is not comfortable. You have to live in a tent in a crowded camp with thousands of other miners. Food is bad and expensive, up to triple the price of food in Melbourne.*)

achieved through each type of control. “+” indicates strong framing achieved through one particular type of control, while “-” indicates weak framing.

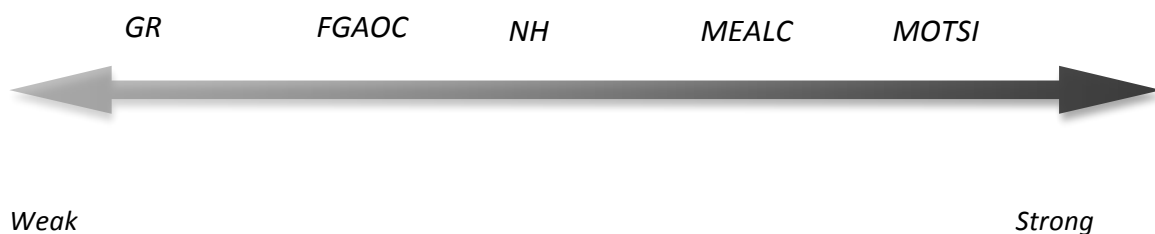
Table 5.1 Types of control and degrees of framing in the five MIs: A summary

Types of control	Explicitly		Implicitly	
	Anchor manipulation	Anchor specification	Textual Organisation	Interpersonal Evaluation
<i>Mysterious Object: Torres Strait Island</i>	+	+	+	+
<i>New Homes</i>	-	+	+	-*
<i>First Golden age of Cricket</i>	-	-	-	-*
<i>Gold Rush!</i>	-	-	-	-
<i>Medical Emergency at Lonely Creek</i>	+	+	+	+

*The evaluation is absent from the two MI, and the framing is considered as weak since the learner has more control over what they wish to achieve using the MI.

As illustrated in Table 5.1, the degree of framing in a MI is a combination of technology design and semiotic choices. I shall therefore suggest that the framing in MIs be considered as a cline rather than two opposite poles, as shown in Figure 5.3. In this way, the strength of framing in a MI is described in relation to the strength of framing in other MIs. I shall also point out that the degree of framing is not related directly to the navigation task of a MI. That is, a mission-oriented MI can be either strongly framed (*Medical Emergency at Lonely Creek*) or weakly framed (*Gold Rush!*). The same principle applies to product-oriented MIs.

Figure 5.3 Degree of framing in the five MIs: A topological view



5.4 Classification and framing in MIs: Implications for digital learning

5.4.1 A summary of discussions in the chapter

In this chapter, I have examined the classification and framing in MIs and illustrated their respective linguistic manifestations. I have shown that there is a low degree of insulation between fields of knowledge, and between two types of activities—learning and multimedia interactive activities ('playing'). The weakness in classification is reflected in the low level of technicality in language/image and the hybrid mixture of multimodal genres. I have argued that while these MIs are in general weakly classified, the degree of framing can vary from one MI to another. I have also illustrated two basic ways in which the control of pedagogic discourse can be achieved in MIs: through manipulation of technological affordances and through semiotic realisations. In essence, when a MI is weakly framed, it reinforces the classification relations. When a MI is strongly framed, it violates the category boundary set up by the classification. This tension between weak classification and strong framing raises many questions for the study of multimedia and hypermedia texts in educational contexts and digital learning in general, a point I shall elaborate on in the following section.

5.4.2 Implications for digital learning and pedagogy of multiliteracies

The contextual interpretation of the textual analysis through Bernstein's notion of classification and framing has raised two interesting questions for the study of digital learning and multiliteracies.

The first question concerns what type of students digital pedagogic discourse such as MIs (in particular those that are weakly classified and weakly framed) is privileging. In other words, who has access to this particular modality of pedagogic discourse? As I have discussed in Chapter 3 (See Chapter 3, Section, 3.3.1.2), the prevailing rhetoric around digital learning seems to accept that the students of today are "digital natives" (e.g. Prenksy, 2001, a, b) who were born into the world of digital technology. However, just like native speakers of English or any other language, while these

students may have (arguably) similar access to digital technologies, their access to a particular semantic “code” (Bernstein, 1971) are not necessarily equal (cf. Bernstein, 1971, Hasan, 2009). If the pedagogic discourse is both weakly classified and weakly framed (as in *Gold Rush!* or *The First Golden Age of Cricket*), what type of students will then be able to recognise the boundary between learning and playing, and between the boundaries of various genres that realise a particular field of knowledge? In other words, while every student can play interactive games, who will in fact benefit from doing so by learning primary social science knowledge? I shall argue that while multiliteracies present us with a new set of issues (i.e. how verbiage and image interact in the text, how hyperlinks function), the fundamental challenges are nevertheless the same— how can we make the access to a particular elaborated code of pedagogic discourse (Bernstein, 1971) equal to all?

The second question raised here concerns the nature of symbolic control—who controls the digital learning process? As the analysis in this chapter has suggested, the digital learning process often creates a sense of ‘choice’ and ‘freedom’ for the learner, for the learner can create her/his own traversal through a hypertext such as the MIs (e.g. *New Homes*). However, the learning process can also be strongly framed and hence restrict the control the learner can exercise (e.g. *Mysterious Object: Torres Strait Islands*). As Bernstein (2000) has argued, control is always present, but it is either made visible (e.g. *Medical Emergency at Lonely Creek*) or invisible (e.g. *Gold Rush!*). In other words, digital learning is not inherently associated with one type of educational ideology or another (i.e. ‘conservative’, ‘constructive’ or ‘progressive’, etc). If this is the case, the question for digital learning thus becomes who is taking control? Why is control made either visible or invisible?

Interestingly, if we compare the developmental timeline of the five MIs studied in the research, we will notice that the recently developed ones such as *Mysterious Objects: Torres Straits Islands* tend to be strongly framed, while the earlier ones such as *Gold Rush!* are often weakly framed. As Bernstein has suggested “change can come at the level of framing” (2000, p.15). When the framing changes from weak to strong, we need to ask some basic questions:

- Which group is responsible for the initiating change and why?
- If the framing is becoming weak, will it eventually impact on the classification values, e.g. will learning be separated from playing?
- Is this change local (restricted to the context of Australia) or global?

Ultimately, the purpose of the analysis of classification and framing in this chapter is not to provide answers to an issue but to open up new debates. It aims to highlight the social nature of hypertext such as MIs. That is, what holds the key to digital learning and hypermedia literacies is not technology itself but the social power relations encoded in it. In this sense, hypertexts such as MIs constitute potential sites in which a struggle for power and symbolic control takes place in the age of digital learning.

Chapter 6 Conclusion

6.0 Overview

In this final chapter of the thesis, I bring to a close the discussion by revisiting the objectives and steps of the research, summarising the most significant analytical findings and theoretical arguments (Section 6.1). I then examine the contributions the research has made to systemic functional linguistic theory, multimodal discourse research as well as the development of a pedagogy of multiliteracies (Section 6.2). Finally, I address the areas of research that have not been able to be explored in this research and subsequently map out potential directions for future work (Section 6.3).

6.1 The Journey: Reprise

6.1.1 A review of research objects and steps

In this thesis, I have examined digital learning materials designed for primary social science subjects in the Australian context, known as Multimedia Interactives (MIs). I have set out to

- 1) Construct an account for the relations between verbal text and modalities other than language (MOLs); and to formulate from the account a metalanguage readily adaptable to educational contexts;
- 2) based on the linguistic description, to provide an understanding of the ways in which primary social science knowledge is recontextualised in emerging electronic multimodal discourses.

In order to accomplish the two goals, I have taken four steps in this thesis. The research process started in Chapter 2 with the exploration of the nature of the research data—Multimedia Interactives—from three different perspectives. The view from above examined the nature of MIs as a type of social process and pedagogic

discourse; the view from around investigated the types of semiotic relations in MIs; and the view from below looked into the nature of hypermedia. In this process of investigation, I conducted some basic analysis, including the analysis of elementary verbal genres and the types of technology affordances (i.e. anchors) in MIs. I also put forward the case for a complementary model for describing intersemiotic relations in MIs. By the end of the chapter, I had established the notion that MIs are in essence a type of 'multisemiotic' 'pedagogic discourse' and subsequently mapped out two main focuses of the research:

- 1) the multimodal construal of primary social science knowledge,
- 2) the recontextualisation of primary social science knowledge in MIs.

The second step in the research was outlined in Chapter 3. In this chapter, I reviewed the relevant literature in systemic functional linguistic theory, with a focus on the modelling of text structure and text as a logogenetic process. I then proposed a time-based model for handling logogenetic unfolding of an instance. The model centres on the introduction of temporal axis and time-based linguistic units and patterns (coupling, clustering and sequencing). In the final part of Chapter 3, I began the preparation of the data for analysis by selecting and coding the basic logogenetic unit of the research—Critical Path,

In Chapter 4 and Chapter 5, I addressed respectively the two research topics of the thesis. Chapter 4 was devoted to the description of major types of couplings and the ways in which couplings form local clusters with elementary verbal genres in MIs. Based on the analysis, I then discussed the construal of hybrid notions of community—including its members and the places to which the community belong—as a key area of knowledge in primary social science. In Chapter 5, I contextualised the textual analysis conducted in the research from a Bernsteinian perspective. I examined the recontextualisation of primary social science knowledge in MIs through the notions of classification and framing.

6.1.2 Major analytical findings

I have provided in this thesis a comprehensive analysis of multimedia and multimodal resources in Multimedia Interactives, including an analysis of technology affordance (functions of anchor), textual analysis (elementary verbal genres, coupling and local clustering) & contextual analysis (the construal and recontextualisation of primary social science knowledge). Three significant findings have emerged from these analyses.

Analysis of anchors

I proposed in Chapter 2 an analytical model for categorising anchors (the clickable areas in hypertext that activate a hyperlink) in MIs. The model distinguishes two aspects of an anchor: its affordance (technological function) and its semiotic representation. The analysis of the anchors in MIs suggests that there are two basic functions an anchor can perform in MIs. As a technological affordance (see Chapter 2), anchors enable the learner to perform various hypermedia tasks, including navigating through the virtual space (Navigation) and activating multimedia artefacts (Inspection). They also allow the learner to perform certain semiotic exchanges (of information and good-&-services) with the hypertext (Semiotic Acts). These anchors are often represented by one or a combination of semiotic resources, such as language, image or visual icons. In certain types of anchor, the semiotic resources that are used to specify the affordances have meaning beyond the technological functions they identify— that is, they are semantic units in the logogenetic unfolding of a given MI.

When an anchor constitutes a semantic unit in the logogenetic unfolding of a MI, it performs a second and non-technological function in MIs—facilitating learning and ‘playing’ (interactive activities, see Chapter 5). On the one hand, an anchor can belong at the same time to the field of interactive activities and the field of primary social science (e.g. the shop anchors in *Gold Rush!* or the game character anchors in *Medical Emergency at Lonely Creek!*). In this way, they contribute to a weak classification of

fields and activities in MIs. On the other hand, the manipulation of anchors (e.g. the degree of control the learner can exercise, whether the non-technological function of an anchor is clearly indicated) is one main method through which the control of pacing and sequencing (i.e. framing) is achieved in MIs.

Textual analysis

The textual analysis in this thesis has been conducted in two separate steps. In the first step (Chapter 2), the verbal elementary genres used in MIs were categorised. The analysis suggests that the successful engagement with MIs (i.e. learn and play at the same time) requires the ability to handle a range of verbal genres, including Procedure, Report and Explanation and history genres such as Biographical Recount, Historical Account and Historical Recount. The Procedure texts in MIs are used mainly to specify the processes of the interactive activities and realise the regulative register of the pedagogic discourse, whilst the other types of genres constitute the field of primary social science and realise the instructional register.

The second step of textual analysis outlined in Chapter 4 dealt with two types of intersemiotic logogenetic patterns: verbiage-image coupling and local clustering (between images and elementary verbal genres). The analysis of verbiage-image coupling demonstrates that there are five main types of coupling relations in MIs: Naming, Identifying, Representing, Classifying-Exemplifying and Circumstantiating. These coupling relations coordinate the integration of verbiage and image through four basic types of semantic relations—‘is’ (Naming & Identifying), ‘symbolising’ (Representing), classifying and exemplifying (Classifying-Exemplifying), and specifying circumstantial elements (Circumstantiating). These semantic relations in turn organise our experience based on three basic principles: abstraction, generalisation and specification. The analysis of couplings also suggests that Naming, Identifying, Classifying-Exemplifying are the most predominant types of coupling relation in MIs.

The analysis of local clustering then brought together the analysis of verbal elementary genres and that of couplings. Firstly, it shows that there is a relatively consistent link between types of couplings and types of elementary verbal genres. While Naming and Identifying couplings tend to occur in history genres, Classifying-Exemplifying couplings are often found in factual genres such as Report or Explanation. The other two types of couplings—Representing and Circumstantiating—do not appear to be associated with a particular type of genre in MIs. Secondly, it also suggests that the same type of verbal elementary genre (e.g. Biographical Recount) clusters with different types of couplings and images, and this has the potential to create multimodal variants of a given genre. Moreover, the analysis of clustering also illustrates the ways in which semantic relations and fields are expanded in multimodal environments. A further distinction is made between two types of expansion in Chapter 5: multiplication (where verbiage and image complement each other in meaning making) and addition (where verbiage and image add extra yet related information to each other).

Contextual Analysis

The contextual analysis of MIs is concerned with both the ways in which primary social science knowledge is construed (Chapter 4) and the ways in which it is recontextualised in MIs (Chapter 5). The analysis shows that the key area of knowledge in primary social science as construed in MIs deals with building hybrid notions of community. There are two interconnected aspects in the multimodal construal of community in MIs: people (the community members) and places (the social spaces to which the members belong). The construal of people is concerned with both the celebration of individuality and the reinforcement of communal values and shared emotions. The construal of places, on the other hand, focuses on the encoding of various social values onto politically, culturally and economically significant sites and locations. In this way, the physical spaces in which the community dwells are transformed into social spaces to which the community belongs.

The analysis of the recontextualisation of primary social science in MIs focused on the notions of classification and framing (Chapter 5). The analysis of classification has two implications. In the first place, it shows that primary social science is a subject of low-level speciality and technicality. On the one hand, there are signs of transition taking place from commonsense knowledge to specialised school discourse. On the other hand, a distinctive boundary between various fields of social science (e.g. history, geography) is yet to emerge.

Secondly, in MIs there is no clear boundary between two types of intended activity: the acquiring of subject knowledge and the navigation of hypermedia texts. In other words, learning is often hidden behind 'playing'. The analysis of framing then shows that in a weakly classified MI, strong control of sequencing, pacing and evaluation of pedagogic discourse (i.e. strong framing) can be achieved through the manipulation of hyperlinking technology and various textual and interpersonal semiotic patterns. A strongly framed MI in essence puts pressure on the weak boundary established by the classification principle. The tension created by a combination of strong framing and weak classification suggests that digital learning is not necessarily 'progressive' (cf. Bernstein, 1990) by nature. The open nature of hypertext structure often gives the learner a strong sense of control over the learning process, that is, the learner is given the choice to create his or her own traversal through a hypertext and to engage with the texts at his or her own speed. The control by educators, designers or other pedagogic agencies and agents is, however, not absent. Rather, it is often concealed in the labyrinth of hyperlinks, and can easily be made visible through simple manipulation of technology and semiotic resources as in some of the MIs. In this sense, hypertexts such as MIs constitute potential sites in which a struggle for power and symbolic control takes place in the age of digital learning.

6.1.3 Major theoretical arguments

In this thesis, I have also put forward a series of theoretical arguments. These arguments can be summarised as follows.

Firstly, I have outlined a logogenetic model for SF-MDA, which involves the introduction of temporal axis (time) into the theoretical description. In this model, the temporal axis provides the basic reference point for recognising semiotic units and describing semiotic relations and patterns. I have argued that a time-based model helps to free the notion of text from the constraint of constituency. Text in this model is defined from the perspective of logogenesis as a meaning making process that aims for a given communicative purpose—in other words, a logogenetic unit. I have argued that such a definition of text is particularly useful in the description of hypertext, where there is no space or time boundary between text units and possible traversals are indeterminate.

I have suggested that the description of text in a time-based model centres on capturing the configurations and reconfigurations of semantic relations (i.e. logogenetic patterns) between semiotic variables of various kinds (e.g. verbiage and image). These semiotic relations are in essence temporal ones, defined by the positions of semiotic units on the logogenetic timeline. I have also proposed three basic types of temporal relations to be considered in multimodal discourse analysis, including coupling (combination of variables at a given point on the logogenetic timeline), clustering (the expansion of semantic relations during the logogenetic unfolding) and sequencing (the overall temporal positioning of units in the logogenetic process).

Secondly, I have argued that a logogenetic model can be productive in describing relations between verbiage and image in a hypertext environment. I have demonstrated that coupling can be used to capture the relations between verbiage and image in an instance. In multimodal text environments, coupling relations coordinate the semantic integration between verbiage and image in a temporarily shared meaning space activated by the mapping of fields between the two. During the logogenetic unfolding, the meaning space created by coupling can be expanded through clustering with various verbal and visual genres. The analysis of clustering thus provides an insight into the basic mechanism behind the ‘multiplication of meaning’ in multimodal text environments.

Finally, I have drawn attention to the relation between multimodal data, systemic functional linguistic theory and multimodal discourse analysis. I have called for a shift of the research focus of SF-MDA away from the simple testing of the adaptability of SFL categories in multimodal environments. My central concern has been that the extravagant theoretical descriptions of SFL have inadvertently imposed certain theoretical assumptions on a new type of data, in this case, hypertext. I have demonstrated that although the absence of theoretical predispositions (i.e. the underlining hypothesis about the nature of semiosis, e.g. stratification, metafunction, etc.) is impossible, different perspectives help to unpack and reveal certain hidden assumptions (e.g. whether visuals have a constituency-like structure, whether hyperlinks form a semantic unit) about the nature of the new data. I have also shown that observing data from different perspectives (e.g. a social-oriented perspective and/or a technological-oriented perspective) can assist us in forming a different set of SF-MDA research questions, which in turn leads to the development of a different descriptive model (e.g. generation vs. discourse analysis). Ultimately, I have endeavoured to demonstrate in my research that, in SFL and SF-MDA, as in every other theoretical discipline, the engagement of the theory with a new suitably challenging set of data will promote a new set of thinking.

6.2 Major contributions of the research to the field

The study presented in this thesis has made contributions to three fields and subfields of research.

6.2.1 Multimodal discourse analysis (MDA)

The first contribution the research makes to the MDA research is the development of a MDA descriptive model that has a reasonable level of translatability and adaptability. The analytical framework for intersemiotic relations used in this thesis is based on a set of theoretical principles (e.g. text as a logogenetic unit, the minimum

mapping hypothesis, etc) informed by basic theoretical hypotheses of systemic functional linguistic theory. The theoretical principles in turn provide a consistent set of analytical guidelines, including the ways in which text units (through the identification of the starting and ending point of a communicative event) and units of variables (from the perspective of field) can be defined. In this way, while the analytical findings of the research (e.g. the types of coupling and clustering) are limited to local applications, the analytical criteria themselves can be easily translated to other types of research.

Furthermore, the research offers a top-down approach to the study of hypertext as a complementary to the predominantly bottom-up approach in SF-MDA (see discussions in Chapter 3, Section, 3.3.1.2). This top-down approach is informed by the understanding of hypertext structures (such as website hierarchy) yet not constrained by such a technological perspective. In this approach, the description of hypertext starts with units of meaning and then searches for the matching or mismatching between semantic units (such as generic stages) and technology units (such as webpage and nodes). The matching or mismatching between the two subsequently leads to various socially significant interpretations (e.g. they realise different degrees of pedagogic framing). In this way, the top-down approach highlights the nature of hypertext as a social process rather than simply a product of technology.

6.2.2 Educational linguistics & Multiliteracies

The contribution of the research to educational linguistics, in particular multiliteracies and digital learning, can be summarised in two ways. In the first place, the research provides a semiotic profile of a subject area that has been less well documented in SFL (see discussions in Chapter 1, Section 1.3.3)—primary social science. On the one hand, the description of primary social science adds to the SFL ontogenetic profile of social science literacies in schools within Australian context (e.g. secondary Coffins, 2000, 2006; Humphrey, 1996). The research thus provides further insights into evolving demands of literacies and multiliteracies skills required

for the subject during the years of schooling. In this sense, the research has the potential of helping better apprentice (Coffin, 2000) the students into this particular area of learning (e.g. how students can make the transition from primary to secondary school). On the other hand, the research offers an interesting comparison with other subject areas in primary years such as English and science. In this way, the research may contribute to understandings of the nature of disciplines (cf. Christie & Martin, 2007; Christie & Maton, 2011) in early years of schooling.

Secondly, although the descriptive framework developed in the thesis is complex in nature, involving various theoretical categories and principles, the analytical results are rather straightforward and can be easily translated into the teaching practice of multiliteracies. In essence, the two types of patterns described in the research—coupling and clustering—separate the issue of multiliteracies into two interrelated dimensions. Coupling deals with the ways in which image and language co-construe experience. It allows the teacher and the student to understand that language and other semiotic resources can organise various aspects of experience through some fundamental principles, such as abstraction, generalisation and specification. These principles are not unique to one developmental stage but are ongoing in the ontogenetic development of an individual (see Painter, 2001 for a description of learning classification in first language development). During each different developmental stage, the emphasis of multiliteracies can then be placed on one particular principle or a semantic category within it. For instance, the teaching of multiliteracies in primary school can focus on building the notion of abstraction and teaching the student to name, identify and classify various visually represented objects. The understanding of coupling also has the potential to promote critical literacies. For example, the distinction made between Identifying and Classifying-Exemplifying coupling, may help to reveal how stereotypes about a particular group of people (e.g. gender, ethnicity) can be created. When people of a certain social group are presented visually, each individual member only *exemplifies* rather than *identifies* the characteristics of this particular group. There is thus an inherent (i.e. built in semiotic patterns) risk in making generalisations about a group of people from a few images.

The description of clustering, on the other hand, potentially extends the practice of genre based literacy programs into the realm of multimodal texts. It will help teachers and students to understand how different types of images can be used in different types of genres and how the meanings of a text can change when the images accompanying the texts are changed (e.g. images in Biographical Recount). The understanding of the ways in which various clusters are formed can also be of potential use for critical literacies. For instance, it can help to unpack how a particular cultural myth (e.g. who are the heroes and how the community has iconised a place or an individual) is built. In this way, the teacher can help the student to develop a resistant reading of various ideological stances.

6.2.3 Systemic functional linguistic theory (SFL)

The logogenetic model developed in the thesis opens a new avenue for handling larger scale texts in SFL and further develops the concerns of dynamic modelling. In essence, the model offers a complementary perspective on the nature of text. Whereas traditional models (such as RST or GT) treats text as made up of smaller units of meaning, the logogenetic model views it as a process of reconfiguring variables. In a sense, the traditional models take a top down perspective by imposing a subordinate structure on the text. The text thus is considered as a fractal of the clause (Martin, 1995). The logogenetic model takes a bottom up perspective, describing the combining (i.e. coupling) and clustering of units of variables in the text sequence. The clause in this sense is simply a text with a shorter logogenetic timeframe. In this type of description, therefore, the scale of the text will not impact on the description, since temporal relations are motivated by the same principle of positioning. A larger scale text thus is a text with more variables, while differences between texts are the differences in possible combinations of positioning of variables.

Traditional SFL approaches also highlight the relation between an instance and the system (potential) and are particularly useful for the understanding of texture of a text, i.e. what constitutes a text. The logogenetic approach, in contrast, focuses on the relation between instances (i.e. logogenetic units of various scales) and is suited for

the understanding of ways in which texts are linked to each other (e.g. between verbiage and image). For instance, traditional SFL models help to explain the differences between types of texts, e.g. how *Hamlet* is different from other types of text such as *King Lear* or *The Origin of Species* (i.e. interpreted as registerial or generic variants). On the other hand, the logogenetic model provides insights into questions such as how the meaning of *Hamlet* can be 'reinvented' when it *clusters* with a different set of instances, e.g. the satirical take on *Hamlet* in *The Simpsons*, or a graphic novel version of *Hamlet*, etc. In this sense, it is suited to discourse analysis which is centrally concerned with how texts are related to each other at a given time in history or across different eras (rather than how a text relates to the overall meaning potential of human semiosis).

6.3 Implications for future research

In this final section of the thesis, I acknowledge the areas of research that have not been explored in this thesis and subsequently map out directions for future research.

In this research, all the analysis has been carried out manually. The manual analysis involved a lengthy process in which the coding of Critical Path, the annotation of linguistic and visual features and the analysis of intersemiotic coupling and clustering patterns are all done separately by hand. In the interpretation stage, the process of cross-referencing between each different set of analysis was undertaken. The deployment of manual analysis can be seen both as the delimitation and limitation of the research. It involves delimitation due to the fact that at the initial stage of the research, as has been discussed at various points throughout the thesis, there was no available method for dealing with how texts can be segmented and whether the boundary set by the hyperlinks is a reliable way to segment analytical units. Computer assisted transcription and annotation, however, constitutes the first step in research and often requires the segmentation of text in one way or another. Manual analysis is a limitation because its laborious nature entails that only a small amount of data can be analysed in a given period of time.

The development of a framework for identifying various types of meaning unit in multimodal texts, in particular those in a hypertext environment, has potential for the development of a computer transcription scheme in which text can be segmented based on boundaries of meaning rather than that of medium or some arbitrary criteria. The scheme should also allow the integration of various tiers of annotation and analysis. In this way, all the patterns unfolding logogenetically in a text can be viewed simultaneously. In addition, research can be carried out to translate various tiers of analysis into a visualisation scheme. The visualisation will then help to reveal patterns, particularly, temporal patterns in high dimensional data such as multimodal text that often cannot be observed by human eyes alone (e.g. Zappavigna, 2010b).

The second delimitation/limitation of the research is also related to manual analysis, since this research is qualitative in nature. The manual and qualitative nature of the study entails that many categories of logogenetic patterns observed in the research, in particular those involving a longer logogenetic timeframe and requiring stricter variable controls such as sequencing and clustering, cannot be handled adequately. Future research can be developed along the lines of designing research methodologies for modelling and testing sequencing and clustering patterns. The research can start with one type (register or genre) of text, investigating whether there is in fact a consistent pattern in which text of a particular type unfolds. Then the analysis can be extended to compare texts of various types. Furthermore, the description of the coupling patterns in the research is limited to one particular field/register. In future, larger-scale cross-sampling of various registers of multimodal texts can be used to test and refine the various categories of coupling described in the research.

Finally, the research has focused on the Critical Path, i.e. the 'ideal' learner's navigation path through MIs and is predominantly text based. The understanding of digital learning the thesis could provide is thus partial and limited. However, many hypotheses have emerged from the analysis (e.g. the nature of classification and framing), which can be used as the starting point for learner-based research in future. For instance, studies can be carried out to compare the effectiveness of similar ICT materials such as MIs in assisting learning for students from various backgrounds. It

would also be interesting to compare MIs of strong and weak framing in terms of learners' responses (i.e. if they feel it is engaging or boring).

The thesis has started as a journey of exploration and I would like to conclude it now with a few lines from T. S. Elliot's *Little Gidding*:

*We shall not cease from exploration
And the end of all our exploring
Will be to arrive where we started
And know the place for the first time.*

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