

# **Multimodal Textbook Design: Analyzing the Construction of the Discourses of Pharmacology**

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**A minor dissertation submitted for the degree of Master of Philosophy**

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**University of Cape Town**

**2008**

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## **Abstract**

The aim of the research is to contribute to a pedagogy of Multiliteracies in the context of Health Sciences. A Multiliteracies approach sees text in terms of a process of 'redesigning' meaning from a range of available resources. These include multimodal semiotic resources such as visual and verbal modes, as well as particular discursive and social practices that the text draws upon.

The study originates from a disagreement over which Pharmacology textbook fourth year medical students should use. The founding argument is that a Pharmacology textbook can be seen as constructing the discourses of the 'prescribing physician' As such, it simultaneously constructs and bears imprints of particular ideologies, discursive formations and social relations which are relevant in the field of medicine and science, as well as those from private and public life-worlds. As a teacher, I am interested in how the textbooks' ideologies contribute to or contest that of the new problem-based medical curriculum. I also analyze the respective designs in terms of their accessibility and suitability specifically for undergraduate medical students.

The theoretical framework is provided by Fairclough's notion of 'orders of discourse' together with Halliday's metafunctional view of text, and is operationalized through a social semiotic analysis of sections of two textbooks. The textbooks analyzed are 'Pharmacology' by Rang et al ('Rang'), and 'the

Oxford Textbook of Clinical Pharmacology and Drug therapy' ('Oxford'). I focus on the grammatical system of transitivity to construct the respective textbooks' views of social reality, and I use an analysis of modality in the texts to construct the social relations between writers, readers and the subject of Pharmacology. The analytical 'toolkit' includes verbal as well as visual semiotic resources within a framework of textual coherence.

The study concludes that while Rang constructs social relations and identities that resonate with a contemporary society, its interest in Pharmacology is scientific rather than clinical. Furthermore, its design features may limit access specifically for undergraduate medical students. Oxford, on the other hand, is dominated by the discourses of clinical medicine and medical education. It constructs the subject of Pharmacology in terms of therapy or 'process', rather than in terms of drugs or 'products', and in this sense may be more suitable as a 'tutor'. However, it does not prepare the student for critical engagement with the changing social realities and relations of power in a post-Fordist society.

The value of the study is two-fold. Firstly, it reiterates the importance of critical reflection on the various aspects of a curriculum. This includes reflection on alignment between the ideologies of textbooks and that of the new curriculum, and between curricular objectives, activities and assessment practices. Secondly, it has led to the operationalizing of a metalanguage of design, specifically in a Health Sciences context. This metalanguage may be used not

only for improving the communicative value of students' assignments, but also to expand their cultural perspectives through critical engagement with aspects of social identities and relations.

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# 1 Chapter One: Introduction

## 1.1 Aim

In broad terms, the aim of this research is to contribute towards developing a pedagogy of Multiliteracies in the Faculty of Health Sciences at a South African university. Textbook choice is one important aspect of pedagogy, and central to a Multiliteracies approach is the concept of Design. Design as process is the ways in which certain representational modes such as vocabulary and syntax are selected from available meaning-making resources, in order to construct text that carries a specific message. However, one can only consciously select from resources insofar as one has a metalanguage to guide the process. Metalanguages can be described as 'toolkits' for working on semiotic resources; they are "languages of reflective generalization that describe the form, content and function of the discourses of practice" (Cope and Kalantzis 2000:34).

In order to make the metalanguage of design explicit, I intend to analyze sections of two pharmacology textbooks in terms of their respective meaning-making systems. The purpose of the textbook analysis is to highlight the design elements as resources, to illustrate how these elements contribute to constructing the discourses of the 'prescribing practitioner' in pharmacology, and to construct a metalanguage of design. The question that I want to pose is this: How does multimodal design construct the subject of pharmacology in two different Pharmacology textbooks?

My purpose in engaging critically and consciously with practices of design is grounded in a desire to contribute to the students' development as 'critical citizens'. I argue that

the ability to reflect consciously and critically on, for example, power relations, is an important skill in becoming a doctor. However, a doctor's authority will be contested by discourses from other life-worlds and domains, for example the law. A Foucaultian view (1981) sees modern power as developed 'from below' in certain 'microtechniques' (such as interviews or counseling) rather than being imposed from above (Fairclough 1992):

They are designed and defined on the basis of the anticipated effects of even the finest detail of linguistic choices in vocabulary, grammar, intonation, organization of dialogue, and so forth, as well as facial expression, gesture, bodily stance and movements. They bring about discursive change through conscious design (1992:216).

This implies that those who use these 'discourse technologies' must have access to a metaknowledge of design, in order to maintain or challenge the status quo.

Apart from constructing a metalanguage of design, textbook analysis may also be used to make different pedagogical orientations explicit, as well as the ideological orientations that are valued in that field. The new medical curriculum uses a problem-based approach that foregrounds the clinical aspect of pharmacology, rather than knowledge about drug substances. In other words, if a particular fact does not translate directly into some aspect of patient treatment, it is deemed less valuable and may be backgrounded or excluded completely. I intend to show that a textbook may be viewed as a pedagogic guide, or tutor, that has to contend with ideologies as well as with accessibility. Depending on how it is realized, a textbook that draws on a Multiliteracies approach in its design may be particularly valuable in a local South African context, where previously-disadvantaged students may have difficulty in accessing the language and discourse practices of the academic world.

## 1.2 Rationale

Choosing and prescribing a textbook is part of our job as teachers; we seldom make our reasons explicit to students and mostly assume that they will value our judgment on this issue. This study is inspired by a disagreement about the choice of textbooks in the Faculty of Health Sciences. The pharmacology department prescribed the "Oxford Textbook of Pharmacology and Drug Therapy" ('Oxford') as core reading for fourth and fifth year medical students because of its clinically based approach. However, the Health Sciences library bought twenty issues of "Pharmacology" by Rang ('Rang'), presumably due to the book's perceived popularity amongst senior students. Feedback questionnaires over a period of two years revealed that roughly three quarters of the students used Rang as their primary textbook. This raises interesting questions, for example: why would students choose a different textbook from that which has been officially sanctioned? Why does the pharmacology department prefer Oxford? Most importantly, is the choice of textbook really that important, and how does it affect the construction of the discipline?

According to the Oxford school dictionary, a textbook is 'a book that teaches you about a subject'. However, when I open the cadaver dissection guide from my student days, its sketches, Latin terminology and smell of formalin represent both the challenge and the power of learning human anatomy. I will therefore argue that a textbook is rather defined as an instance of a discourse, a "dialectic of both linguistic form and social communicative practice" (Hicks 2003:3). There are many reasons why students buy a specific textbook, such as cost and availability. I am interested in the notion of textbooks as configurations of multiple discourses, which, in more or less conscious ways, may influence a student's choice of textbook.

This study is relevant in relation to curriculum design. Students have to 'become doctors'; apart from gaining medical skills and knowledge, they acquire (construct in subconscious ways) the discourse of the 'prescribing practitioner'. The theories of Kress and other interpretivists suggest that students who are exposed to the 'new science textbooks' hold a different view of science and scientists than the traditional, in that they have different notions of authority relations and of the status of science as 'truth' (Kress and Van Leeuwen 1996). I am interested in how the textbooks that medical students use as their 'guides' construct a particular discourse of pharmacology; in other words, how these books draw on particular meaning-making resources to construct relationships between the participants themselves, and between the participants and the subject of 'science'. Seen in this way, the pharmacology textbooks contribute in more or less explicit ways to designing our social futures, to creating a "transformed set of relationships and possibilities for social futures" (Cope and Kalantzis 2000:19).

The process of 'becoming a doctor' is a particular journey which is mapped onto a curriculum. In other words, the medical curriculum is a set of strategies which purports to equip the students with the necessary knowledge, skill and experience to be a doctor. It stands to reason that curricular 'gaps' may translate to students being under-equipped for the task. One area of concern relates to a particular fourth year portfolio task. Students are asked to design and produce a patient information leaflet about a chronic disease, and the aim of the task is to foreground aspects of patient care and patient information. However, the quality of the pamphlets has traditionally been rather poor, and the assumption has been that 'not everybody is equally creative'. Instead, I

want to argue that this may point to an under-diagnosed gap in the medical curriculum. Firstly, creating such a pamphlet requires reflection on social identities and relationships, in other words, aspects of discourse. Being immersed in an environment of Natural (so-called 'hard') Sciences, many students have simply not engaged with issues of identity, language and power. For many, these are 'fuzzy topics' which cannot be tested in an examination and are therefore 'less important'. Furthermore, they do not possess a metalanguage to guide them in this process. Yet, when one considers the policy document which underpins the university's new medical curriculum, it profiles the medical graduate as a team player who possesses traits such as open communication and responsiveness, respect, and recognition of the patient's right to take part in management decisions (University of Cape Town 2002). Textbook analysis that constructs and critiques the discourses of pharmacology may serve to foreground topics such as identity, language and power in the curriculum.

Furthermore, students are expected to produce presentations and posters right throughout their training and sometimes as part of their careers, yet they are not taught about Design as a 'science'. Some students remember a mini-lecture in their first year on how to make a poster. However, there was no reference to design principles as constructing a message, or reaching out to a specific audience; the emphasis was on how to make it 'look good'. It is not surprising that students perform badly at this particular task. Curriculum design requires alignment between proposed outcomes and objectives, the teaching/learning activities and the methods of assessment. One rationale for my study is to attempt to fill this gap. By using Design in the construction of the discourses of the 'prescribing practitioner', I contextualize the metalanguage of Design within a Health Sciences environment.

## **2 Chapter two: Conceptual framework**

The academic learning environment is part of a wider social realm. Many social scientists and linguists agree that increasing diversity, global connectedness and media technology have an effect on language use and on social relations (Cope and Kalantzis 2000, Fairclough 1992). This changing society has created a demand for a new approach to pedagogy (Cope and Kalantzis 2000). The Multiliteracies approach rests on a social theory of language use, or discourse; in other words, it foregrounds the dynamic nature of meaning-making. A framework for interrogating discourse thus requires a closer look at discourse in terms of multiple semiotic modes and in terms of its social situated-ness.

### **2.1 Towards a pedagogy of Multiliteracies**

In September 1994 a group of people, who would subsequently become known as the New London Group (NLG), got together to discuss the future of literacy pedagogy in terms of "the big picture; the changing world and the new demands being placed upon people as makers of meaning" (Cope and Kalantzis 2000:4).

In particular, the NLG identified two aspects which present a significant challenge to traditional literacy pedagogy. Firstly, the media is globally reshaping the way we use language, increasingly relating the written to visual, aural and other modes of meaning-making, as is vividly seen within the electronic hypermedia. Secondly, the increasing salience of cultural and linguistic diversity within communities, and global connectedness across boundaries, signal the emergence of a new social order. The shifting semiotic landscape and changing power relations impact on all realms of our

existence, but especially on the workplace. Post-Fordism (Gee 1994) requires a new kind of worker; a multi-skilled, flexible team-player that can negotiate across these diversities and boundaries. Gee refers to this kind of worker as 'the portfolio person' who exists within 'communities of practice' that avoid permanent structures or traditional authority positions:

There are no discrete individuals. Only ensembles of skills stored in a person, assembled for a specific project, to be reassembled for other projects... Individuals are not defined by fixed 'essential qualities', such as 'intelligence', 'a culture', or 'a skill'. Rather they are, and must come to see themselves as, an ever changing 'portfolio' of rearrangeable skills acquired in their trajectory through 'project space'- that is, all the projects they have been in (2000:47).

Since education has to serve society and prepare students for the workplace, the NLG's 'pedagogy of Multiliteracies' extends traditional literacy pedagogy. The term Multiliteracies was chosen because it encapsulated both multimodality and social diversity, foregrounding the dynamic nature of meaning-making. In a Multiliteracies approach, pedagogic activities are chosen and structured not only to facilitate greater access for students from diverse cultural and language backgrounds, but also to enculturate students into the new authority structures and the roles of the 'portfolio person'.

A practical example of such a pedagogic activity is the jigsaw method of cooperative learning, used by Brown and Campione (1994 in Gee 2000). In a science classroom, students work in small research groups, each devoted to a different sub-topic of the overall theme. As soon as they have mastered the sub-topic, they redistribute themselves to different learning groups, where each student takes a turn at teaching his or her area of expertise to the new group. Thus, "there is no 'centre', only a flexible network of distributed roles and responsibilities" (Gee 2000:52). Brown and Campione borrow from the theories of the Russian psychologist Lev Vygotsky (1962), who

described 'sensitive periods' within which instruction was most feasible and productive. This is a 'zone of proximal development' in that it is an activity which is too difficult for a student to perform alone, but can be mastered when supported by an adult or competent peer through scaffolded activity (Dixon-Kraus 1996, Hicks 2003). Scaffolding refers to the way a teacher structures an activity to facilitate concept formation, abstract synthesis and application of theory. In Brown and Campione's science classroom, the structure of the activity itself forms the scaffold.

A textbook may also employ scaffolding devices in more or less obvious ways; in fact, Brown and Campione expand Vygotsky's notion of 'interaction with adults and peers' to include even "powerful artifacts" (Brown et al 1993:191 in Gee 2000). In working with the 'artifact' or textbook, the student often has to 'translate' or transcode meaning from one semiotic mode into another. A good example of transcoding in the medical field is to use a cartoon picture to 'explain' how a disease may present. The picture represents an 'alternative language' (Prabhu 1987) which may facilitate information processing (for example understanding) or presenting (for example writing exams). Although the practice of transcoding was historically regarded as inferior in verbal-dominant societies, Kress, Cope and Kalantzis and others suggest that it should be included as a natural part of learning. In fact, Archer argues that "it is in this act of moving between 'languages' that the most significant learning takes place" (2000:95).

## **2.2 Discourse: a theory of social practice**

According to Fairclough, the Multiliteracies Project is built on a view of language that brings together "a theory of language structure and a theory of discourse- that is, a

social theory of language use" (2000:163). In this section, I define my use of the term discourse, and relate discourse to social identity and social change.

### **2.2.1 Exploring definitions of discourse**

In order to define discourse in a way that will adequately serve this research, I draw on theories put forward by Gee (1992), Fairclough (1992), Kress (1996) and other writers in this field. Gee uses the term Discourse (with a capital D) to describe ways of being in the world: where the 'right' person is "saying the 'right' thing at the 'right' time and in the 'right' place" (1996:124). By being immersed in Discourse practices, we take on new sets of core values, new perceptions of the world and new views of ourselves, often without being critically aware of these changes. In other words, in the process of studying medicine, students 'become doctors'. Not only do they take on new perceptions of their own identity, but others perceive them as 'being doctors'. In other words, they learn to look, sound and act like doctors. This is why Gee defines literacy in a particular field as mastery of a Secondary Discourse, or rather many Discourses. In this context, he sees discourse (with a small d) as "connected stretches of language use that make sense, like conversations, stories, reports, arguments, essays, and so forth. For that reason, "discourse is part of Discourse" (Gee 1996:127).

Fairclough also sees discourse as a process of social interaction: it is 'language-in-use', and it is at the same time "a mode of action, one form in which people may act upon the world and especially upon each other, as well as a mode of representation" (Fairclough 1992:63). Therefore, spoken and written text may be seen as forms of meaning-making, as well as resources for meaning-making. The discursive practices associated with text production, distribution and consumption are situated within the wider social struggles of the world and contribute to it. Fairclough's view of discourse

is therefore a three-dimensional one: discourse as language-in-use must be seen in terms of text, discursive practice and social practice.

Kress expands the view of discourse as language-in-use. He sees text, or “the stuff of our communication” (Kress 2003:47) as fixed in specific meaning-making modes, which take shape as kinds of texts. This view specifically acknowledges the many semiotic modes of meaning-making in contemporary society, where spoken or written language either co-exist, are integrated with or have been replaced by visual, audio and spatial ‘languages’. Mode refers to a semiotic resource with systematized control over elements of meaning-making, for example verbal language with its system of grammar. The multi-semiotic character of modern texts may be seen in examples such as computer interfaces

It is clear that Gee, Fairclough and Kress all refer in more or less explicit ways to the social as well as the multi-semiotic nature of language. For the purpose of this research paper, discourse can be seen as socially-situated language use, where the term language is expanded to include other semiotic modes of meaning-making.

### **2.2.2 The dialogic nature of discourse**

‘Becoming a doctor’ requires immersion in the discursive and social practices of a medical institution, and in the process, the student acquires new identities. I want to conceptualise social identities and relationships by briefly focussing on the Bakhtinian concept of dialogism (Bakhtin in Holquist 1990).

Bakhtin attempted to make sense of human behaviour and the identity of the self through the use humans make of language. The word 'dialogue' in everyday English language means 'a conversation between people'. Dialogism in the Bakhtinian sense perceives our very existence as an activity (the event of being); moreover, it is a shared activity (co-being), where we not only author our 'self' from how we perceive others to see us, but also respond to other human beings and to the cultural and historical configurations of the world.

As such, my responses begin to form a pattern; the dialogue I have with existence begins to assume the form of a text, a kind of book. A book, moreover, that belongs to a genre (Bakhtin in Holquist 1990:30).

Genre refers to the naturalized conventions that people use when they engage in discourse, while text refers to the "written or spoken 'product' of the process of text production" (Fairclough 1992:3). Dialogism thus expresses discourse in terms of language and in terms of the identity of its users in a particular time/place arena

Dialogism thus relates social identity to a process of authoring, in other words, "each time we talk, we literally enact values in our speech through the process of scripting our place and that of our listener in a culturally specific social scenario" (Bakhtin in Holquist 1990:63). Perception depends on where the 'I' (as the centre of one's existence) arranges the world (the other) in a particular meaning-filled place on the horizon. For example, the signifier 'thirst' is imbued with meaning potential when 'it is I that thirst'. The word 'I' is in itself empty; it exists to shift "the centre of discourse from one speaking subject to another" (Bakhtin in Holquist 1990:23). Although not directly related, dialogism can be compared to Einstein's theory of relativity, where an observer can only detect the motion of a body if it moves relatively to other bodies. In both theories, the position of the observer is fundamental. For the word 'I' to have meaning, it must be appropriated by a specific identity in a specific time and place.

### **2.2.3 The dialectic nature of discourse**

Fairclough sees discourse in terms of a two-way perspective, where discourses are seen as both socially constitutive and socially determined. In its socially constitutive role, language use may have a conventional function in that it maintains the status quo, or it may have a creative or transforming function, in that it renegotiates the boundaries between participants and discursive practices. This means that even though discursive practice in a given field may be oriented to particular economic, political or cultural views, it has to contend with the presence of other discourses, and this encounter has a shaping influence on the discourse.

This dialectic perspective can be seen in the medical field. Before a surgeon can operate on a patient, he has to consult with the patient to examine and diagnose. In the process of consulting and operating, the surgeon's reputed skill and bed-side manner becomes a commodity which ensures the continuation of his practice. Even though he cannot advertise his 'excellence' in the conventional way as a plumber or computer specialist might, he appropriates a particular kind of language and manner which is more characteristic of the discursive practices of the marketplace and the world of advertising. In other words, what he says, how he says it and what others say about him, become acts of selling and buying. This use of language in a creative sense not only contributes to the construction of contemporary society, but it is also influenced by aspects of social practice and social change in the modern world.

### **2.3 Orders of discourse and intertextuality**

The above example highlights the fact that every discursive event has to be seen in terms of “complex, interdependent configurations of discursive formations” (Fairclough 1992:62). Fairclough uses the Foucaultian term ‘orders of discourse’ to refer to a socially produced array of discourses which interact dynamically with each other, sometimes in a complementary way, and sometimes in opposition to each other. Boundaries between discourses may be more open or closed, and relationships complementary or contrastive. However, these boundaries and relationships are always shifting, thereby reshaping and reconstructing the orders of discourse, and therefore the social structure of society.

One type of process which shifts boundaries in contemporary society is “the recent extensive colonization of orders of discourse by advertising and other discourse types” (Fairclough 1992:99). This extension of market models to new spheres such as education is called marketization. Fairclough sees it as “economic neo-liberalism” where “public services are increasingly having to operate like private businesses” (2000:164). An example here is where universities have to source funding from private institutions and evaluate research projects on the basis of profitability. Privatisation of services introduces greater choice for the consumer; consumers acquire authority in that they need to be ‘won over’ or enticed. In the process new discourse practices, that is, changes in language use are adopted within existing discourses. These include “rewordings of activities and relationships, for example rewording learners as ‘consumers’ or ‘clients’, courses as ‘packages’ or products” (Fairclough 1992:7).

Another contemporary feature which impacts on discourse is conversationalization, where the language used by professionals such as doctors or lawyers becomes like

ordinary conversation. This forms part of a restructuring of the boundaries between the public and private domains. When I was studying medicine twenty five years ago, students were taught to maintain a formal relationship, for their own protection as well as for the patient's. Language, dress code and professional distancing served to maintain these boundaries. In contrast, conversationalization, as "a strategically motivated simulation and appropriation of life-world practices" (Fairclough 2000:175) in order to win support, means that today medical students are taught to use 'everyday' words that relate to the patient's culture and background. Many doctors prefer to wear 'normal' clothes instead of the traditional white coat, in order to claim "the culturally prized virtue of being ordinary" (2000:175). Thus we can see that both marketization and conversationalization have brought about discursive shifts in social practices and authority relations. When doctors are seen as 'ordinary' and patients as 'consumers' the result is not merely informal doctor-patient relationships but also different treatment practices. Patients are given greater degrees of choice, they are 'better informed and they exert their right to a second opinion.

Textbook production exposes the complexities inherent in orders of discourse. It involves negotiating between the values and interests of the worlds of media, business, marketing, research, academia and pedagogy. A textbook therefore represents multiple complimentary and contrasting discourses, where some emerge as more dominant. A textbook is an instance of hybridisation, which occurs as a compromise between the demands of different discourses. A textbook's prime purpose is to inform and educate the reader about a specific topic. However, it also competes in an economic environment where the reader has a choice of many textbooks. The text takes on a hybrid form of "telling-and-selling" (Fairclough 1992:116), where strategies such as marketization and conversationalization co-exist

and struggle with the values of the academic discourse. In the case of a pharmacology textbook, the nature of the information 'on sale' makes it imperative that the reader is not ambivalent about the rules and safe-guards expressed in the content, and this aspect creates dilemmas for text producers. Another kind of hybridity occurs when a textbook employs 'interactive' strategies, for example the option of browsing and selecting content. This kind of hybridity occurs as a result of a blend of the interactive computer-mediated communication genre and the traditional linearity of print.

Hybrid texts also feature in the pharmacology classroom. In an activity similar to Brown and Campione's jigsaw method described earlier, small groups of medical students prepare case studies of drug poisoning, which they then teach to the rest of the class in a fifteen minute presentation. They are free to style the activity as they choose, and may use PowerPoint slides, flip-charts and/or role-play. Many groups present in the traditional lecturing style with slides or charts, reproducing the discourses of an academic teaching institution. Occasionally, students blend a medical discourse with those from other life-worlds, for example, staging the presentation as a television talk show. One such group blended medicine with a legal discourse, enacting a scene where a doctor is on trial for negligence. Group members assumed the roles of prosecutor, defence attorney, specialist witnesses and the accused. The genre of law practice was realized in court-room language such as 'objection!' and 'overruled!', as well as in discourse-specific turn-taking sequences. It is doubtful that any of them have first-hand experience of a murder trial; therefore the sensationalist mix of medicine and law that they recreated in the classroom has already been transformed by the discourses of entertainment. It is already a hybrid text, common to television crime dramas, and it impacts on the way medical students learn medicine.

This example of classroom practice reiterates that the design and content of a particular text are connected to what is valued in a particular social practice; the notion of power or Bourdieu's 'capital' (Bourdieu and Wacquant 1992) is realised not only in 'what is included' and 'what is left out', but also in the relationship between the text producers (authors) and text consumers (readers). Bourdieu describes social practice within and across orders of discourse as 'fields'. A field is "a social arena within which struggles or manoeuvres takes place over specific resources or stakes and access to them" (Jenkins 2002:84). Bourdieu refers to these resources as 'capital' and distinguishes four types. Economic capital refers to access to material goods and resources which are translatable into money. This may transform into cultural capital, or access to education and training credentials such as medical school. Social capital refers to access to institutional facilities, social relations and group membership (such as being part of the medical fraternity), and may rely on the possession of economic and/or cultural capital. The process of becoming a doctor can therefore be described as a process of accumulating economic, cultural and social capital. However, its value or legitimacy may still be challenged outside of the medical discourse, for example, in a courtroom. Symbolic capital thus refers to the degrees in which these different forms of capital are recognised and valued within a larger social and cultural field. The accumulation and legitimization of capital within a field is constantly being contested.

Agents and institutions constantly struggle, according to the regularities and the rules constitutive of this space of play... to appropriate the specific products at stake in the game. Those who dominate in a given field are in a position to make it function to their advantage, but they must always contend with the resistance, the claims... of the dominated (Bourdieu and Wacquant 1992:102).

The struggle for dominance within a field becomes visible in text. Looking at a textbook, the interests of the marketplace may often be represented in a conversational, marketized approach, which aims to avoid traditional models of

authority. It positions the readers as colleagues and equals rather than learners, and presents content as dialogue rather than instruction. A textbook may also employ strategies that incorporate familiar aspects of other life-worlds, for example design features that are suggestive of a web-page. This view of a textbook sees text as "being full of snatches of other texts" (Fairclough 1992:84) and is referred to as intertextuality. Text can thus be seen as absorbing and being built out of texts from the past. This results in transformation and restructuring of text traditions as well as orders of discourse. Intertextual analysis can be viewed as connecting specific texts (seen in terms of their discourse, genre and realization mode) to specific orders of discourse. In other words, intertextual analysis identifies and gives insight into the social world in which the text belongs.

To explore the nature of intertextuality in a medical context, we may apply the concepts of discourse, genre and mode to the example of a doctor-patient consultation. An intertextual view understands the surgeon's 'everyday language' as an instance of text production, in the process of negotiating shifting discourse boundaries. Fairclough refers to this as constitutive intertextuality (1992), or interdiscursivity, where text is constituted from orders of discourse, rather than from other texts. The patient's role is one of text consumption, as he rearticulates or 'understands the surgeon's speech act from the framework of 'other texts' from other (private or public) life-worlds. Even the consultation notes are not merely transcripts of the speech act, but are remade in the process of text distribution. The consultation notes are expressed as a multimodal combination of many texts: the patient's history as understood and rearticulated by the surgeon, the surgeon's findings and opinion as expressed in written, discourse-specific terminology and anatomical (scientific) sketches, as well as oversimplified (less scientific) diagrams or pictures that the

surgeon uses to explain relevant but complex anatomy and physiology to the patient. Thus the consultation is also seen in terms of 'manifest intertextuality' (Fairclough 1992) where the text draws overtly in more or less heterogeneous ways on specific other texts, rather than on orders of discourse. Furthermore, even though the generally accepted conventions of a consultation (in other words, the genre) are stable and recognisable, we are able to 'read' the changing power relations in this encounter, mirroring that which is happening in the wider social world.

## **2.4 Discourse in terms of power and ideology**

Fairclough sees the intertextual nature of texts as being conditional upon relations of power (1992). A framework for critical discourse analysis therefore requires a focus on power relations, and how participants struggle to either maintain the status quo, or contribute to transformation.

Sola and Bennet (1993) argue that the text taught in American schools today "are used to carry certain kinds of social relationships and to construct certain kinds of cultural knowledge. Schools are using writing instruction not only to inculcate certain skills, but also to shape their students into particular kinds of social beings." (1993:117). The fact that 'words are used' to 'shape people' acknowledges domination of one set of values over another. However, students also exercise power as members of a particular community, deriving solidarity from their collective culture, identity and discourse. This particular form of domination, referred to as hegemony, is characteristic of contemporary society. Dominion is exerted by one class through constructing alliances with, winning consent of and integrating subordinate classes, rather than through brute authoritarianism (Fairclough 1992). Hegemony, like

discourse, has a dialectic nature: the hegemonic struggle between classes is an unstable equilibrium between contradictory elements that make up orders of discourse, and the articulation and rearticulation of orders of discourse is one stake in the hegemonic struggle.

Social change centres on hegemonies which contribute to challenging or reproducing existing orders of discourse. Change 'leaves traces in text' in the form of contradictory or inconsistent elements- mixtures of styles, vocabularies, and authority relations- and when these new elements 'catch on', they are naturalized into new conventions, thereby establishing new hegemonies. Schools are ideological apparatuses in the larger order of discourse which is the state, insofar as they incorporate significations in text which contribute to the hegemonic struggle. Fairclough sees ideologies as "constructions of reality (the physical world, social relations, social identities), which are built into various dimensions of... discursive practices, and which contribute to the production, reproduction or transformation of relations of domination" (1992:87). Or to put it in another way, discursive practices can be seen as "material forms of ideology" (1992:87). Consumers may or may not be aware of an ideological agenda, for example, many medical students may be unaware of the subtle 'reading' that takes place alongside the obvious content. Furthermore, it is important to note that it is the discourse, not the text, which is ideologically invested, and the text may therefore bear imprints of a particular ideology. The naturalization of ideological views into 'common sense' is an important stake in the hegemonic struggle.

## **2.5 Ideology and the new medical curriculum**

In the context of this research project, a short discussion is necessary on one of the ideologies that underpin the new medical curriculum, namely the integration of scientific and clinical subjects. A rationale for this approach is found in the blueprint for the proposed changes to the curriculum, which was implemented in 2002. It states that "Currently many students find it difficult to apply the principles that they have learned in the first three years of pure scientific theory to their last three years of clinical practice...A key structural change has been the removal of the preclinical and clinical divide" (University of Cape Town 2002). In other words, an integrated approach may enable students to see the clinical utility of the scientific concepts.

After interviewing medical students, Entwistle (1992) comments on the problematic of a pre-clinical/clinical divide. He quotes Coles, who found that students often needed to reprocess basic information once they start to gain practical experience:

Mere understanding what they are learning (deep-processing) is not in itself sufficient. They need to elaborate their knowledge; to build up more and more complex networks; to structure their knowledge...integration must be seen as something only they can do (Entwistle 1992:600).

The new medical curriculum's answer to this dilemma is a Problem-based Learning approach, which links scientific conceptual understanding to cases within the clinical context. This pedagogic approach is supported by texts that are based on the same ideological values, for example, a pharmacology textbook with a clinical rather than drug-based organizational structure.

## **2.6 A local pedagogy of access**

A discussion on power and ideology immediately presupposes inequality. In this era of globalisation, people travel across social units and communities that have different

codes, customs and rules, which are linked to specific cultural and economic values and expressed through particular use of language. Bakhtin refers to this aspect as heteroglossia, conceiving the world as made up of a mass of languages, each with its own distinctive markers, linked to specific discourses. Bakhtin's dialogism assumes that "at any given time, in any given place, there is a set of powerful but highly unstable conditions at work that will give a word uttered then and there a meaning that is different from what it would be at other times and in other places" (Holquist 1990:69).

Aspects of heteroglossia can be seen within English in its role as a 'global language'. It has morphed into 'many Englishes' as linguistic diversity within communities and the flow of information across national and cultural borders have become the norm. However, 'voice' (the capacity to mobilize semiotic resources for a specific meaning-making function) carries economic weight; in Blommaert's words, "difference and inequality are two sides of a coin" (2005:69). So, for Afrikaans or Xhosa speakers from a rural community, the ability to speak English may be culturally and economically prized in their environment, but the same speakers may find themselves misunderstood and misunderstanding colleagues in an urban, English-speaking work place. The gap between 'their English' and that of the workplace often translates into social inequality and economic marginalization.

The same is true of other semiotic resources. It is increasingly difficult to find employment in administrative positions without being computer literate, even in state institutions, where most employees traditionally do not have tertiary qualifications. Thus economic capital is linked to cultural capital (Bourdieu 1992). Access to economic capital is dependent on access to language: firstly to language in particular

forms (linguistic resources, styles, genres) and secondly to language in particular contextual spaces (that is, the capacity to interpret those forms situationally). Blommaert uses the term pretextuality (2005) to describe the contextual nature of language forms. Every instance of language is therefore not only intertextually charged (seen as historically connected to other texts and to discourse) but is also pretextually charged.

Why is pretextuality important in the context of textbook analysis? The answer lies in local as well as global demographics of inequality. One way of addressing the wrongs of South Africa's apartheid past is through education for social and economic empowerment. In South Africa, many children enter school and tertiary education with pretextually marked resources which place them at a disadvantage. Many children are taught in a language other than their 'home tongue', and since language is a tool that supports thinking (Howe 1996), the cognitive development of these learners may be delayed.

Even when children are taught in their home language, their resources may still be inadequate. Children learn language early on in the context of their daily activities and interaction (Gee 2000). Meaning is derived from the context in which words are used, rather than from the uttered words. School language, in other words, the language of lectures and books, tends to be more 'decontextualised' or explicit, in that meaning is derived from the words themselves. Children bridge this gap into 'specialized domains' much easier by being exposed to, for example, children's literature or science-related television programs. For many minority and poor children, no such bridges exist or are built. In fact, Gee suggests that they are often asked to "deny the value of their life-

worlds and their communities in deference to those of more advantaged children” (2000:66).

Gee’s solution is to “change our society” (2000:66). He sees the Multiliteracies manifesto as a ‘pedagogy of access, as a “schooling Bill of Rights for all the children of this world” (2000:43) whereby children have a moral right to the integrated instruction proposed by the NLG. A textbook that recognizes pretextuality would aim to make those aspects that are culturally and economically value-laden, explicit, by mapping language to explicit meanings through its design features. This includes making use of accessible language forms (vocabulary and syntax), providing opportunities for transcoding as well as employing strategies that scaffold and contextualize conceptual learning.

Within a pedagogy of access, the relationship between the teacher and the learner is central. Vygotsky sees tutors as authoritative rather than authoritarian figures, whose power lies not in their person as such, but rather in their role of selecting appropriate content, pedagogy and scaffolding (Dixon-Kraus 1996). Commenting on interviews with medical students, Entwistle highlights the importance of the tutor:

Perhaps most influential in encouraging a deep approach in students has been a set of characteristics which reflect lecturing style- the quality of the explanations provided (striking examples and concrete illustrations), interest and enthusiasm shown for the material taught, and empathy with the students (being friendly and anticipating potential difficulties) (Entwistle 1992:601).

These same arguments hold true for the textbook as tutor. The design features and ‘lecturing style’ employed by a textbook’s designers may do much to empower students from disadvantaged back-grounds, and so contribute to eradicating the inequalities inherent in our educational system and our society.

## 2.7 Multimodality

Cope and Kalantzis (2000) describe a new kind of literacy, or rather multiple literacies, where the dominance of the written word is challenged by visual, aural, and spatial ways of communicating. In fact, Kress and Van Leeuwen go as far as saying that “visual literacy will begin to be a matter of survival, especially in the work place” (1996:3). While mode refers to “the culturally shaped material available for representation” (Archer 2006:461), multimodality refers to the integration of these modes, for example the integrated visual, linguistic and aural elements of electronic text. As Goodman puts it, “it is impossible to imagine life before graphic design” (1996:39).

In challenging the traditional dominance of verbal written language in the industrialised, modern world, it is conceivable that multimodal communication as a resource for meaning-making would be formalized. By formalized, I am referring to the fact that, in order to qualify as a mode, a semiotic resource must have a grammar (Kress 1996). Grammar here refers to the ‘regularities’ of a resource; a shared understanding of meaning. Different role-players combine and integrate these grammars to articulate socially-situated messages for a particular purpose, for example, a financial magazine would value a more serious, densely-printed text containing figures and graphs, which a reader outside this discourse may find difficult to understand. To put it simply, within a particular context, and for a particular purpose, the design elements of modes ‘say’ something and the reader interprets ‘what is being said’.

Some aspects of the message may be implicit. A multimodal theory of ‘systems of grammar’ makes it possible to interrogate those meanings, by linking it to Halliday’s

social semiotic view of text. Halliday developed a model of descriptive grammar as a network system, where every linguistic unit can be explained as a subsystem of choices. He believed that “the particular form taken by the grammatical system of a language is closely related to the social and personal needs that language is required to serve” (1985:142). He links language function with linguistic structure by relating the networks of choices to three metafunctions of language: the ideational, the interpersonal and the textual. The ideational represents objects and the world around us, the interpersonal relates to social interaction and the textual attempts to present text as internally coherent as well as relating to the context in which it is produced. This socio-linguistic approach will be used as a basis for critical discourse analysis, which is outlined in chapter three.

## **2.8 The ‘what’ and ‘how’ of a pedagogy of Multiliteracies**

According to Archer, “multimodality is emerging as both a theory of communication and a particular approach to pedagogy” (2006:451). In other words, multimodal forms of communication both characterize and extend the cultural and subcultural diversity of contemporary society, and therefore multimodality has to form part of a pedagogy that aims to create learning conditions for full social participation. Cope and Kalantzis calls this a “transformed pedagogy of access – access to symbolic capital with a real valency in the emergent realities of our time” (2000:18).

A Multiliteracies approach recognizes that individual makers of text stretch, adapt, change and modify the elements of a language according to their need, and focuses on the concept of Design as the basis for a metalanguage. Kress explains that the process of design is “both about the best, most apt representation of my interest, and

about the best means of deploying available resources in a complex ensemble” (2000:157). As there is never an ‘exact fit’, the resources are always transformed in the process of designing.

Based on a theory of Design, the New London Group introduced the notion of pedagogy as design involving three elements: available designs, designing, and the redesigned. Available designs are the resources, which include the grammars of semiotic modes as well as orders of discourse. These include not only particular discursive design conventions but also the “linguistic and discursal experience of those involved in Designing” (Cope and Kalantzis 2000:21). Designing can thus never be a simple repetition of available design; applying the concepts of intertextuality and pretextuality means that in the act of someone using old materials, these materials are always transformed. The redesigned is also not simply creative; it is truly a newly interpreted re-presentation of the resource, and it now becomes a new available design. Cope and Kalantzis also suggest that in the process of designing, the meaning-makers themselves are transformed; they “reconstruct and renegotiate their own identities” (2000: 23), and the redesigned text is the evidence of that change.

According to Cope and Kalantzis, the ‘how’ of pedagogy “must be based on views about how the human mind works in society and classrooms, as well as about the nature of teaching and learning” (2000:30). A pedagogy of Multiliteracies is based on a complex integration (in contrast to a rigid learning sequence) of four factors: situated practice, overt instruction, critical framing and transformed practice.

Situated practice refers to immersion in meaningful practices within a community of learners, which include experts in that field. For medical students, for example, this

would include contact with clinical practices, such as hospital ward rounds. This practice does not necessarily lead to the ability to critique or apply theory to practice. Overt instruction refers to any active interventions (such as lectures) by experts that aim to teach the rules and conventions that are valued in that discourse. The goal is conscious awareness and control over what is learned. Critical framing occurs when a sentence is taken out of its home discourse and placed in a wider context. Students learn to critique, apply and extend the concept beyond its original scope. Transformed practice occurs when students are asked to demonstrate understanding by 'redesigning'.

Critiquing the design of a textbook or a patient information pamphlet is a good example of these practices. Overt instruction involves teaching a metalanguage of design, while drawing on the students' own experiences of clinical practice and 'becoming a doctor'. Critique asks 'why', and encourages an awareness of whose purposes and interests are best served by a particular approach. In other words, the practice of critical framing "interrogates contexts and purposes, adding breadth to one's perspective on the life-world" (Cope and Kalantzis 2000:241). The idea is not to foster cynicism about a designer's underlying agenda, but to expand the student's cultural horizon with fresh perspectives and newly relevant knowledge of underlying processes and other discourses. A good example of transformed practice would be to have these students now produce their own texts, such as a pamphlet or poster, which challenge or rearticulate existing notions and assumptions. The insights and depths gained in the process of reflection and redesigning transform the designer's identity as well as the redesigned text, and this new level becomes, in turn, situated practice.

## 2.9 Overview

In summary, I have set out to construct a framework that requires a social theory of language use, or discourse, and an understanding of the multi-semiotic nature of communicative acts. Central to the argument is the concept of Design, referring to the choices that are selected by a particular party in order to serve a particular interest. A textbook's design draws not only from the grammars of multiple semiotic resources, but also from multiple discursive practices. A Pharmacology textbook can be seen as a tutor, which, apart from providing access to factual knowledge about drugs, sends out particular 'messages' about its views on science and on social relations.

The textbook exists as an unstable equilibrium of sometimes contradicting elements within orders of discourse. As boundaries are always shifting, the compromise between the demands of different discourses results in hybrid texts within the textbook. The concept of intertextuality, where text is seen as drawing from prior text and text types, as well as from orders of discourse, results in contemporary phenomena such as conversationalization, where text takes on the characteristics of ordinary conversation, and marketization, where the discourse of the marketplace colonizes other domains. Within this struggle for hegemonic dominance, Bourdieu's concept of 'capital' (1991) describes the chances of profit in a given field. This capital includes the naturalization of ideologies that serve particular interests, for example, that of the new medical curriculum.

Apart from its ideological focus, a textbook's design may contribute to the Multiliteracies goal of 'access' (Cope and Kalantzis 2000). Semiotic resources are linked to specific cultural and economic values and do not necessarily travel well across national and cultural borders (Blommaert 2005). A textbook may bridge this

pre-textual gap by including strategies such as accessible discursal language, scaffolding and a non-threatening learning style. Lastly, analysis of textbook design may not only make the question of ideology and access explicit, but also constructs a metalanguage of design. This metalanguage may be useful within a medical curriculum. In exploring and critiquing social reality, identities and relations within a medical context, textbook analysis contributes to the Multiliteracies goal of 'critical engagement' (Cope and Kalantzis 2000).

## **3 Chapter Three: Methodology, Methods and Data analysis**

### **3.1 Overview of research methodology**

The aim of this research project is to analyze the discourses of pharmacology as constructed in two widely-used pharmacology textbooks. The research methodology for this task combines two aspects: social semiotics and discourse analysis. I use social semiotic analysis to illuminate engagement with and construction of texts. Halliday's metafunctional view of text (1985) together with Fairclough's notion of 'orders of discourse' (1992) is used to analyze the discourse constructions in the texts.

#### **3.1.1 A social semiotic approach**

Halliday sees language, and by extension semiotic modes, as realizing meaning on three levels: the ideational, the interpersonal and the textual. Semiotic modes such as verbal language, color and images act as resources for constructing representations of (aspects of) the world. One grammatical system that realizes ideational meaning is transitivity. Transitivity deals with "the types of process which are coded... and the types of participants involved in them" (Fairclough 1992:178). In other words, transitivity is useful for constructing, for example, the discursive configurations and social reality of the world of medicine. Transitivity in the verbal mode may be signified in the type of clause that is chosen, for example 'nitrates cause venorelaxation'. In the visual mode, this same meaning could be expressed through images connected by a directional arrow, or vector.

Halliday's interpersonal function is concerned with social interaction between text producer and audience. One grammatical system that realizes interpersonal meaning is modality. Modality refers to "a degree of affinity with the proposition" (Hodge and Kress 1988:123 in Fairclough 1992), in other words, it may be used to make the writers' attitude towards their topic explicit. Modality is 'interpersonal', because "reality is in the eye of the beholder... what is regarded as real depends on how reality is defined by a particular social group" (Kress and Van Leeuwen 2006:158). In other words, whether modality is seen as high or low depends on the coding orientation of that particular community. From a naturalistic point of view, a high level of correspondence between the visual representation and what we see with the naked eye is regarded as 'real', while scientific realism is defined on the basis of what things are like generically and underneath the surface. Modality or 'truth value' is signified in the verbal mode by using, for example, auxiliary verbs such as 'should' or adverbs such as 'definitely' (Fairclough 1992). Visual modes such as images may also represent people, places and things as though they are more 'real' or more abstract. Modality also constructs degrees of affinity between communicating parties, such as expressing either solidarity or social distancing (Fairclough 1992). In this sense, modality is linked to power relations, such as the writer-reader relationship. In the verbal mode, the use of humor may signify a more relaxed, conversationalized and equal relationship, while in the visual mode the use of cartoon images may afford the same meaning.

A third metafunction of language concerns the textual. Semiotic resources that realize ideational and interpersonal meaning also serve to make the text 'coherent' (Halliday 1985) and recognizable as a particular type of text, for example, as a discussion rather than a lecture. Producers and users of text are able to "make and recognize patterns

and relations so that the various elements in the constituting discourses relate to each other” (Archer 2004:17). The textual function is realized in the verbal mode through cohesion and in the visual mode through composition. In other words, verbal coherence and visual composition act as integration codes, realizing “what is foregrounded and backgrounded” (2004:68).

### **3.1.2 Critical discourse analysis**

According to Fairclough’s view of critical discourse analysis (CDA), every discursive event has three dimensions: it can simultaneously be seen as text, as discursive practice, and as social practice (Titscher et al 2000). In terms of text, the elements of social semiosis (Halliday’s model of descriptive grammar, related to his metafunctional view of language) are used to describe engagement with and construction of text. Discursive practice links text and social practice. It explores the relationships between production and interpretation of texts, where “text production leaves so-called ‘cues’ and interpretation takes place on the basis of textual elements” (Titscher et al 2000:150). Social practice attempts to explain the discursive practice in terms of different levels of social organization and orders of discourse.

Widdowson critiques CDA by describing it as a biased interpretation, prejudiced because it is based on some prior ideological commitment (Titscher et al 2000). Therefore, an important part of CDA is to make one’s own commitment explicit. The traditional view of science is positivist/empiricist. It sees the world as ‘objective’, in that it exists independently of knowers. It leads to an approach that values, amongst others, “determinacy (that there is a certain truth that can be known), rationality (that there can be no contradictory explanations) and impersonality (that the more objective

and the less subjective the better)" (Usher 1996:13). My epistemological position is post positivist. I see knowledge as always being prejudiced in the sense that it can only be approached through an initial pre-understanding, situated in the knower's standpoint in history, society and culture. I see intellectual work (including science) as social practices (rather than truths), which produce their own discourses and readings of the world through social interaction with the world and other discourses, and where some readings are more powerful (and therefore more true) than others. Texts are sites of struggle over discourse, meaning and power, rather than truths. This epistemological approach positions me to look at curriculum and classroom practice in a critical way.

### **3.2 Methods of data collection**

In order to consider the question "how does multimodal design construct the subject of pharmacology?" I look at three specific sections of the two textbooks, "Pharmacology" by Rang, and the Oxford "Textbook of Clinical Pharmacology and Drug Therapy".

These sections are

1. the cover page
2. the preface and table of contents
3. the topic 'angina'.

The first three sections were selected as representing important discursive markers. A potential buyer would probably look at the front cover and flip through the pages to get an impression of whether its contents and level of difficulty are appropriate, and whether the style is user-friendly. These represent first impressions, and may contribute to a reader/consumer buying the book. The preface introduces the textbook

from the authors' perspective, and informs us who this book was written for and to what purpose. The table of contents provides an overview of what is valued as knowledge in a particular book, while the clinical topic focuses on the actual subject matter. In other words, the table of contents and the clinical topic represent the value of the textbook from the teacher's perspective. The topic 'angina' is chosen for several reasons. It is presented in both Rang and Oxford in great detail and provides a complex and fascinating insight into two very different dominant discourses. As both textbooks use written language, a diagram and a table or box, 'angina' represents a rich and interesting sample. Furthermore, good management of angina is a crucial skill to learn, and it covers a range of drug and non-drug treatment choices, which makes it particularly suitable for critical discourse analysis.

### **3.3 Data analysis**

In order to interrogate the grammatical systems of transitivity and modality, as well as textual coherence, I selected a 'toolkit' of design elements. These elements are resources that may be semiotic modes in their own right, such as verbal language, or may exist as a resource that is dependent on a multimodal design environment, such as color and layout. While transitivity and modality represent the 'what' of this analytic exercise, these resources represent the 'how'. Verbal coherence and visual composition serve to integrate the text into a coherent 'whole' (Kress and Van Leeuwen 2006).

#### **3.3.1 Tools used for analysis of the linguistic design**

In terms of linguistic analysis, I focus on two semiotic resources: clause and wording. A clause is a 'simple sentence' containing at least a noun (agent or goal) and a verb. A clause may represent an action, an event or a relational process (a way of being),

for example, 'nitrates relax blood vessels'. A clause may be nominalized, in other words, an action is converted into a nominal or noun (for example, 'venorelaxation affects the blood pressure'), and function as a participant. Clauses are multifunctional (Fairclough 1992). They realize ideational meaning by identifying participants and processes that construct a particular social reality, and they may at the same time signify interpersonal meaning through assigning or avoiding responsibility and blame. The term 'wording' (Fairclough 1992:190) refers to the multiple ways in which one can 'word' a meaning; it acknowledges the different perspectives that designers and consumers of text may hold, rather than the codified and standardized 'vocabulary' of the dictionary. In this sense, nominalization is a type of 'wording'. It serves an ideational function in that it represents the perspective of a particular domain of experience, such as a science discourse. On an interpersonal level, nominalization serves to distance the writer/reader from the subject.

For Halliday's textual meaning, I look at how verbal coherence is realized through 'theme' and the principle of directionality. 'Theme' is the initial part of a clause and signifies informational prominence. Fairclough states that "looking at what tends to be selected as theme in different types of text can give insight into commonsense assumptions about social order, and rhetorical strategies" (1992:183). In other words, particular elements in the text may be 'thematized' in order to foreground them and this fore and backgrounding affords internal coherence to the text. In terms of its continuity, texts exist as 'chunks' that are separated by more or less recognizable boundaries. The order of navigating these chunks is determined by fore and backgrounding, which may be realized in 'highlighting signs' such as a numbered sequence (Bezemer and Kress 2008). These influence a particular reading path, or directionality, which may be linear or not.

### 3.3.2 Tools used for analysis of the visual design

Halliday's ideational, interpersonal and textual meaning is also realized in visual design. The resources that signify and construct meaning in the visual domain may exist as highly articulated modes, such as 'image' and 'layout' with its codified and formalized 'grammar'. 'Shape' as a semiotic resource represents a different order of mode; it is 'mode-like' in that it depends on 'what people do' with it. In other words, it offers 'the prospect of universality' to a much lesser degree (Kress and Van Leeuwen 2006). Color exists somewhere between the 'categories' of image and shape, because although it functions as a "systematically organized resource... Semiotically, a single 'system' has not developed" (2006:228). All of these resources exist as elements of multimodal compositions. These elements construct meaning not only through their presence (or absence), but also in the way they interrelate with each other and with the verbal language. In other words, while each resource 'plays by its own rules', they all work together in fulfilling a specific communicative function.

I focus on layout, colour, typography and visual images, as well as writing within visual structures such as diagrams, and I use composition as "an overarching code whose rules and meanings provide the multimodal text with the logic of its integration" (Kress and Van Leeuwen 2006:177). A textbook page becomes a 'semiotic unit' (2006) which is structured according to the principles of visual composition, where a semiotic mode such as verbal text "becomes just one of the elements integrated by information value, salience and framing, and the reading is not necessarily linear" (2006:178). The semiotic modes realize ideational and interpersonal meaning within a coherent structure. Salience is expressed through size, shape, color contrasts or iconic symbols, and serves to highlight certain aspects while backgrounding others. Framing refers to the degree that design features are spatially connected or separated as units

or chunks of information, and may be expressed through borders or the absence thereof, or through color discontinuity. Explicit framing and obvious 'chunking up' (Bezemer and Kress 2008) of text introduce the notion of skim-reading and in this way contribute to constructing social relations and identities, or modality.

Information value is concerned with the placement of elements and how their placements relate them to each other and to the viewer. It may feature in the layout of a page or within images such as diagrams. The traditional model of assigning value to center/ margin and left/right positions is not common to the lay-out of scientific texts. Rather, Bezemer and Kress suggests that traditional science textbooks tend to present information as a continuous flow of information with a 'first-then' directionality, while modern science texts are increasingly 'chunked up' and sequenced in a 'back-and-forth' directionality (2008:11). Layout is thus concerned with framing, salience and directionality. As such, Bezemer and Kress see layout as a mode that operates at a higher level; it "can only work after image and/or writing have produced 'complete' chunks" (2008:8).

Information value within scientific visual structures (such as diagrams) may follow the centre/margin or left/right model or it may construct a particular foregrounding and directionality with the use of vectors. Vectors refer to lines that draw the eye, establishing a visual connectedness that signpost a relationship, an action or a chain of events. Diagrams can be 'visual narratives' where participants are connected by arrows. These arrows suggest a reading path which may be linear, or that may indicate cycles of events with greater interactive potential. Apart from their textual role, vectors may express modality or 'truth value' by visually suggesting or denying

'choice', while the transactional nature of an arrow may construct transitivity, or 'who is doing what to whom'.

Visual shapes such as circles and rectangles are 'mode-like' resources that may signify ideational and interpersonal meaning. Kress and Van Leeuwen suggest that "the more abstract the sign, the greater its semantic extension" (2006:54). However, they point to some fundamental principles that unite these meanings, for example, circles and curves are associated with an organic and natural order, while squares and angularity are associated with the inorganic, technological world. The values and modality attached to these meanings depend on the interests and viewpoints of the text producers and interpreters. Shapes may also contribute to textual meaning through their salience.

Similar to 'shape', typography is a 'mode-like' resource which represents the 'typographic image' or "the holistic visual impression" (Van Leeuwen 2005:138) of writing. Meaning may be signified through font size and color, and use of symbols and icons (Van Leeuwen 2005). A smaller font size could minimize the value of the information, while a bold typeface expresses salience. In this analysis typography has primarily a textual function; using particular typeface size and color for paragraph headings and sub-headings organizes content and provides coherence and rhythm.

Another mode that expresses a 'holistic visual impression' is 'image'. According to Kress and Van Leeuwen, images primarily 'offer' information; however, "what can be said and done with image does not only depend on the intrinsic and universal characteristics of these modes of communication, but also on historically and culturally specific social needs" (2006:123). A naturalistic type of image constructs a 'real',

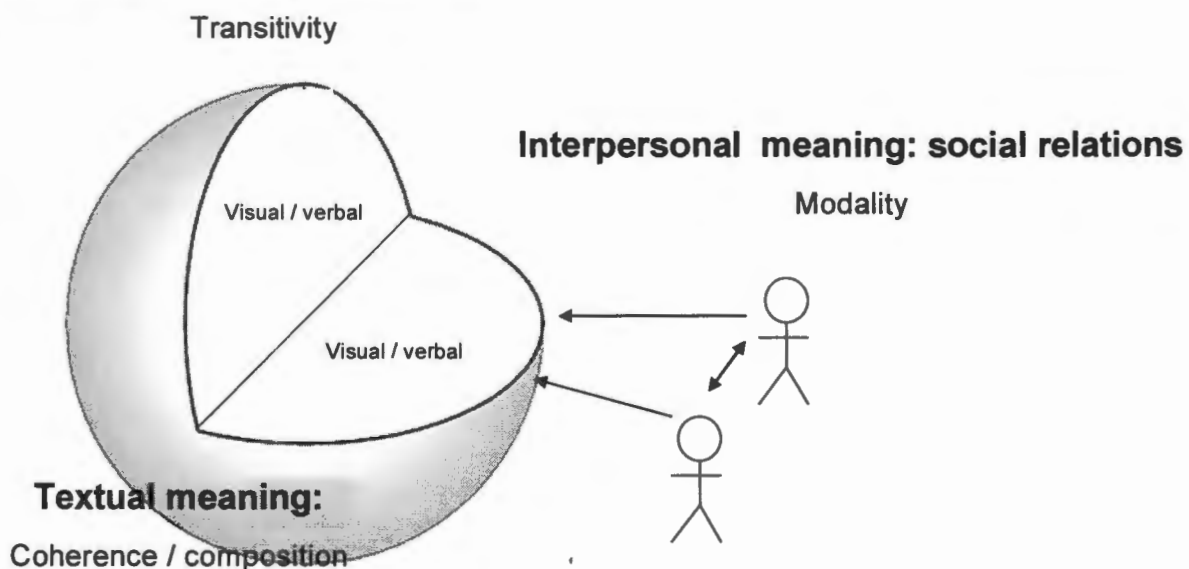
naturalistic world, whereas levels of abstraction and the inclusion of writing within an image could signify 'scientific-ness'. Images are particularly useful for constructing degrees of solidarity with readers; what is valued is linked to a particular community of practice.

As seen so far, colour is a semiotic resource that may be used to realize ideational and interpersonal meaning in its interaction with other 'modes' such as shape, typography and image. Color may express differentiation (ranging from monochrome to a full palette), saturation (from dull to bright) and modulation (from flat to tinted shades) (Kress and Van Leeuwen 2002); however, the value and levels of modality that are assigned to these characteristics depend on the coding orientation of the designers and interpreters. From a naturalistic perspective, colors that contain shades and tints may seem more 'real', whereas a scientific perspective may value more 'flat' or 'abstracted' color. Color also plays an important ideational and textual role, for example, a designer can identify similar units of information such as drugs by a particular color, and then use this color consistently as an integration code.

In summary, I see the analysis in terms of three integrated parts of a sphere. The vertical level of the sphere constructs Halliday's ideational function, and uses the system of transitivity to construct a view of the world and of discursive configurations. The horizontal level constructs the interpersonal function. It realizes social relations through the system of modality, constructing levels of affinity with the subject and with the readers. Halliday's textual function structures both the ideational and interpersonal dimensions. It acts as a skeleton, or shell, and constructs coherence through systems of verbal coherence and composition. All three of these metafunctions are realized in the verbal and the visual domains through a range of multimodal semiotic resources.

The analytical framework is visually presented in Figure 1 in a multimodal form.

**Ideational meaning: social reality**



**Figure 1: Diagram of Analytical Framework**

Visual	Verbal
<p><b>Composition</b></p> <ul style="list-style-type: none"> <li>• Semiotic resource               <ul style="list-style-type: none"> <li>○ Layout</li> <li>○ Colour</li> <li>○ Shape</li> <li>○ Topography</li> <li>○ Images</li> <li>○ Writing</li> </ul> </li> <li>• Directionality               <ul style="list-style-type: none"> <li>○ Vectors</li> <li>○ Highlighting</li> <li>○ Layout</li> </ul> </li> </ul>	<p><b>Coherence</b></p> <ul style="list-style-type: none"> <li>• Semiotic resource               <ul style="list-style-type: none"> <li>○ Clause</li> <li>○ Wording</li> <li>○ Theme</li> </ul> </li> <li>• Directionality               <ul style="list-style-type: none"> <li>○ Linearity</li> </ul> </li> </ul>

## 4 Chapter Four: Macro Context

The macro-analysis of the two textbooks focuses on the cover page, preface and general organization of both books. This means that I look at the textbook from a writer and reader/consumer point of view, but I do so through the critical lens of a student of social semiotics

### 4.1 Rang's cover: first impressions count



Figure 2: Rang's Cover

Rang's front cover is eye-catching. To someone with a medical background, the combination of bright yellow, red and green blotches on a blue background is reminiscent of a Magnetic Resonance Imaging (MRI) scan. MRI is a modern and

expensive diagnostic aid, and its presence on this textbook cover suggests affluence and cutting-edge science to those who recognize the image. The scan's colour splashes are out of focus and therefore recede slightly, giving more prominence to the title which is superimposed over the image in large, clear, bright yellow letters. The title is simply "Pharmacology", meaning 'the study of drugs'; it represents a particular product-oriented ideological view of the subject. The names of the authors and publishers are placed in a peripheral position in smaller white print and do not distract from the striking visual impact of the cover page. The publisher's logo includes an image of a small white sailing ship, its sails billowing against the blue backdrop. Next to it is a stamp-like image, identifying this book as an 'international edition'. The lively, contemporary feeling is also apparent when one rifles through the pages. At first glance, it seems that nearly every page has colourful graphs or diagrams. Even the contents are colour-coded into six major sections, where each section forms a different colour block. These colours are carried through to the spine of the book, facilitating easy access to a particular section.

It is obvious that in Rang, colour is an important resource of visual communication. Kress and Van Leeuwen see colour as multifunctional (2002). In terms of realizing an interpersonal function, colour may convey affect, meaning that it may enable the speaker to express a certain mood or attitude. Rang's pure bright reds, blues and yellows remind of Kress' reference to a "Mondrian colour scheme" which "are key signifiers of the ideologies of modernity" (2002:356). Their meaning potential thus connects to an association with ideas that are contemporary and current. Colour differentiation, or the diversity of colour in the design, is also a key affordance of affect. Rang's colours echo the energy and exuberance of the sailing ship on the cover. The choice of flat colours rather than colours that are modulated with tints and

shading is related to the issue of modality or truth value. Rang's flat colours suggest "abstract truth" (2002:357) or impartiality, in other words, a distancing from that which is 'real' and 'naturalistic'. Both the flat modulation and the choice of primary colours underscore the simplicity and boldness of the title word "Pharmacology". However, the communicative function of colour is not restricted to affect. The colour blocks in the book have an ideational function in that they identify specific classes and topics that belong together. The colour blocks also function on a textual level, in that they form the main organizational structure of the book.

On closer inspection of the table of contents, it seems that the majority of the chapters are organized around specific organ systems and the particular drugs that impact on that system. Chapter 17, for example, is titled "The heart" and its sub-titles are "Physiology of cardiac function" and "Drugs that affect cardiac function". Whenever pathology or disease is specifically mentioned, it exists as a sub-section of a particular drug group, for example, malaria is a sub-heading under "anti-protozoal drugs". In other words, the organizational structure of the book positions the subject of pharmacology as the study of products (drugs) and their associated biological processes.

One's view of the subject Pharmacology may be seen as one's ideological position; since Rang has a science-oriented interest in drugs, it leaves traces in the text that are linked to a science discourse. The view of treatment as a 'sum of products', rather than as 'therapeutic process', is also held by many undergraduate medical students. The origin of this dilemma is found in the previous curriculum's pedagogical approach. Before the era of Problem Based Learning, which now forms the basis of the new medical curriculum, pharmacology was taught as a pre-clinical subject. Pharmacology

as 'knowledge about products' was accepted as 'common sense'. Rang's table of contents thus bears the imprint of a science rather than a clinical discourse. Globalization has seen a shift from the manufacturing of products to a greater dependence on services (Castells 2001). In the same way, medical education has moved away from teaching science as a valuable 'product' in itself. Rather, science is now taught only insofar it serves the clinical aspect of medicine. This means that, for example, only those scientific principles that are linked to the commonly-used drugs are considered core knowledge. The new curriculum go to great lengths to include both drug and non-drug (life-style) management as equally important aspects of therapy, and many prefer to use the term 'Therapeutics' rather than 'Pharmacology'.

As this struggle over ideology signifies a discursal shift in medical education and practice, advocates of the new medical curriculum see Rang as expressing a more dated view of pharmacology. When seen from the perspective of a clinical discourse, the contemporary edge of Rang's visual design now appears as a contradiction.

#### **4.2 Rang's preface: 'notes from the authors'**

Because of practical constraints that limit the size of this study, I do not analyze the preface in great detail. Rather, I look briefly at whom the book is intended for, in other words, how the authors attempt to position their subject and their readers.

Rang's first sentence introduces the subject of pharmacology as not merely describing "what drugs do, but to emphasize the mechanisms by which they act". The authors describe their approach as "a good starting point for understanding and using a new compound intelligently". In other words, this is a book about drugs, cells and systems.

In avoiding reference to people as patients, the authors construct particular social roles, or "who does what to whom" (Goodman 1996:26). In this case, "drugs that affect the cardiovascular, nervous, respiratory and endocrine systems" identify the participants as drugs and systems, rather than doctors and patients.

According to Fairclough, a clause which codes an event (ideationally) will also assess (interpersonally) "the truth or probability of the proposition so encoded, and the relationship between producer and addressee" (1995:27). Rang's dehumanized relationship with pharmacology expresses ambivalence, and it is used as a distancing technique. In other words, dehumanizing the clause disconnects the authors from the messy emotional connotations with disease and death, and so avoids issues of responsibility and blame.

In direct contrast to their linguistic distancing from the topic, the authors construct a relaxed and conversational relationship between themselves and their readers, using humour and adjectives that convey a friendly and positive attitude. The phrase "as will already be apparent to the astute observer, we have gone into riotous colour" is an important one, because it ties the image of an 'astute' and serious scientific observer to a notion of fun and playfulness. Furthermore, it really does not require an 'astute observer' to notice the 'riotous colour' used in the design. Rather, the authors use the irony and word-play with opposites to poke fun at themselves, thereby bringing a hint of light-hearted humour into a serious discussion. The effect is repeated in the comment on obesity, where "the 'new drug' pipeline is expected to disgorge many more such agents- as horizontally-challenged individuals will be pleased to learn". Whereas the use of the term 'disgorge' may be slightly risqué when speaking about obese people, word-play as a kind of dry intellectual humour seems quite appropriate

in distinguished, academic circles. The phrase “horizontally-challenged individuals” is a humorous nod at the politically-correct language of a modern society, but the discourse may not be well suited to students from a wider range of backgrounds.

Rang does not explicitly indicate who its readers are. Half-way through the preface, the authors mention “students” of “the medical curriculum” and near the end they refer to “non-medical students studying pharmacology”. There is no specific reference to either undergraduate or post-graduate status. It is probable that economic imperative underlies this ambiguity; the blurring of the readers’ identity corresponds with the blurring of the boundaries of academic and market discourses.

#### 4.3 Oxford’s cover: selling the philosophy of therapy

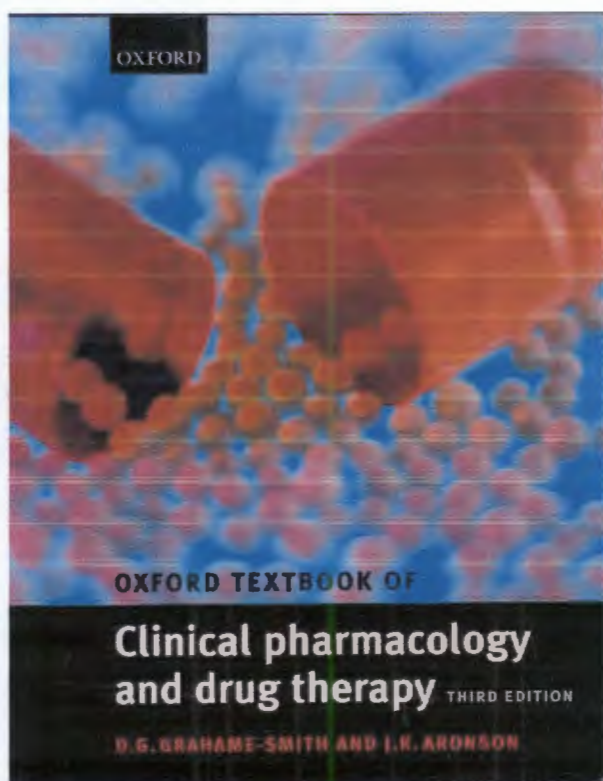


Figure 3: Oxford’s Cover

In analyzing the cover, first impressions and preface of Oxford, it is useful to compare it with Rang. Oxford's front cover consists of two parts. The top part represents a large image of tablets spilling out of two containers. The image is blurred and out of focus. This, together with the choice of muted pink, red and blue colours, causes it to recede visually. In contrast, the lower part of the cover page is taken up by the book's name and those of the authors, printed in clear thick letters on a black background. The book is titled, "Oxford textbook of Clinical pharmacology and drug therapy". The absence of bright or warm colours and the long, almost ponderous title afford it a more serious tone. The name of the publisher, Oxford, appears twice on the cover page. Compared to Rang's sailing ship, there is no logo, but the name Oxford itself symbolizes the image and prestige of an internationally-known academic institution, thereby contributing to the cover's serious tone.

Surprisingly, closer inspection of the cover page's composition reveals characteristics of other life-world practices. Media advertising, for example, appropriates genres that use the traditional information value of 'Ideal' and 'Real' (Kress and Van Leeuwen 1996). Advertisements are often structured along a vertical axis, where "the upper section visualizes the 'promise of the product'" (1996:186). This part is also described as the Ideal, the "realm of the consumer's supposed aspirations and desires" (1996:187) as well as "the generalized essence" (1996:187) of the topic or information. The lower section represents the Real, in that it "visualizes the product itself" (1996:186) providing the solid foundation or 'down to earth' information. The upper section of Oxford's cover features a hazy image of tablets. It represents the Ideal in that the generalized theme or essence of Pharmacology concerns drugs. It suggests the 'essence' of medication because the tablets are not specifically identifiable. However, 'drugs' are here specifically represented as being tablets, as having a

particular shape and substance that a doctor or patient may recognize in 'real life'. Even though the picture is 'fuzzy' and therefore 'generalized', the choice of modulated or shaded colours suggests that the tablets belong in a real, naturalistic realm. It is a modality marker in that it signifies a naturalistic interpersonal relationship between doctor and patient. By comparison, Rang's cover constructed an abstract and distanced relationship with its choice of the flat primary colours of an MRI. Thus, the design elements of Oxford's cover strongly suggest that one should 'ideally' learn and know Pharmacology in the context of treating patients. Oxford's lower section confirms this point: the title "Clinical pharmacology and drug therapy" is represented in the realm of the Real.

Not only does Oxford's lower section describe a particular view of the essence of Pharmacology in so many words; it also adds modality or truth value to the Real by anchoring the title in solid black and white. Black and white is at the lower end of colour saturation, and less saturation is generally judged as "less than real, ethereal... or ghostly" (Kress and Van Leeuwen 1996:159); it is usually a marker of low naturalistic modality. However, the use of black and white for the title paradoxically suggests a certain permanence or legitimacy, something that is 'written down in black and white'. Black and white may also be used to signify right and wrong, or absolute truth. Oxford's cover page thus makes a firm visual and linguistic claim about its view of pharmacology as 'therapy'.

While Oxford clearly stakes a particular ideological claim, it does so within wider orders of discourse, and it therefore also bears imprints of boundary shifts and other discourses. One of these boundary shifts is seen in the intertextual nature of Oxford's cover page. Intertextuality refers to a text's historical connection to other texts

(Fairclough 1992). Oxford's composition borrows from the advertising genre, and so appropriates aspects of public life-worlds that one would not expect in a scientific text, such as the Ideal/Real lay-out. This is an example of conversationalization (Fairclough 1992), and it attempts to make science seem 'ordinary' by relating it to the reader's 'ordinary life'. Note that Rang chose an MRI for its cover, in the process entrenching the exclusivity and desirability of being a member of a scientific community. Oxford's market-orientated genre can be described as 'telling-and-selling' and is specifically appropriated for an ideological rather than economic purpose. The 'ordinary' is usually linked to common sense; therefore it may contribute to the naturalization of Oxford's ideological view. The cover page may be seen as 'selling the ideology of Pharmacology as therapy' rather than signalling a democratization of the writer-reader relationship. Even so, it is still a marketized strategy, pointing to the intrusion of discourses of the market-place and the spread of consumerism into academic fields.

The contrast between Oxford's cover page and the rest of the textbook comes as quite a shock. It quickly becomes apparent that the picture of the pills on the cover is literally the only picture in the book. Instead of continuing in a style associated with public life-worlds and mass-media texts, Oxford abruptly reverts to the stereotypical features of a serious academic publication. Compared to Rang, there is no 'riotous colour' here; apart from a dull red colour used for headings, the densely-printed pages feature a monochromatic palette. The only breaks in the print are provided by tables and graphs. It almost seems as if Oxford wants to reaffirm its validity as a scientific text by shunning any elements that may be considered frivolous or distracting. Its overall impression is neat, orderly and business-like.

A closer look at the table of contents reveals that Oxford is orientated towards patient care. Oxford's chapter one is headed "the four processes of drug therapy" and the word "process" is repeated nine times on that page, as if to ensure that the reader gets the message: pharmacology is about therapy, and therapy is a process, not a drug. This contrasts sharply with Rang's product-oriented disposition. Even though most of section one deals with 'hard' scientific principles, it is explicitly oriented towards people: the old, the young, or the pregnant. Even psychological aspects of drug therapy are included in the "scientific basis", for example, patient compliance and placebos. While section two sets out the principles and rules on "how to write a prescription", this content is completely absent from Rang. Section three in Oxford is called "the drug therapy of disease". In contrast to Rang, whose designers organize drugs according to physiological systems, each chapter in Oxford deals with the drug therapy of a specific group of diseases. The drugs used in cardiovascular disorders, for example, are managed under separate topics such as hypertension, angina, cardiac failure and so forth. Section four, the "pharmacopoeia" is the only part that focuses on drugs as product. However, these drugs are not even mentioned in the Contents pages; rather, the index of drugs is listed on page 461.

It is clear that there is a marked contradiction between Oxford's lay-out and its ideological content. According to Archer, scientific significations "serve to create a disjunction between everyday commonsense knowledge and the systematized knowledge of the discipline" (2006:455). Text that is more impersonal, objective and technical in nature is seen as more scientific. Both the written and the visual modes may express 'scientific-ness'; the written with specific lexicogrammatical choices and the visual with features such as diagrams, labelling and organizing content into "analytical hierarchies" (2006:457). As can be seen from the cover and content,

Oxford is a textbook based on a particular ideological view that centres on Pharmacology as therapy. Oxford thus presents the science of pharmacology as a clinical, and therefore softer, more people-oriented version of science, where even psychological factors are seen as 'scientific'. At the same time, Oxford's visual mode reminds of a more technical and distant view of science. Its word-dense pages, absence of illustration and colour and its more formal tone therefore contribute to Oxford's legitimacy and 'truth value' as a scientific text.

While Rang's design seems to encourage quick access to drug information, Oxford's content is embedded in disease management. If a student wants information about a particular drug, he or she can only search for that drug's information in the context of the disease for which it is used. This is once again an ideological victory for proponents of the new curriculum. However, it may be problematic for students. Exams that feature drug-centred questions encourage students to study drug products rather than process, and for them, studying from Oxford could be very frustrating and time-consuming. Oxford thus assumes that its readers not only are embedded in the 'new curriculum' ideology, but are also steeped in progressive pedagogic practices, for example, where teachers reflect continuously on the alignment between objectives and assessment.

#### **4.4 Oxford's Preface: 'notes to the readers'**

As with Rang's preface, I look only at whom the book is intended for, in other words, how the authors position their subject and their readers.

In contrast to Rang', Oxford's preface is short and contains less detail about the subject. Although the authors state that "we have restricted ourselves to discussing drugs, and have not generally dealt with other matters concerned with the management of illness" they stress that "one of our particular aims in writing this book has been to marry the scientific disciplines with the practical approach to drug therapy". In other words, in contrast to Rang's drug-orientated ideology, this is a book about the practicalities of prescribing drugs.

The very first sentence in Oxford is most significant. It reads, "We have written this book with the needs of medical students in their clinical years paramount in our minds". This, then, is the key to Oxford. It positions itself as a tutor that teaches pharmacology to students in the context of a clinical medical discourse. In contrast to Rang's abstract and artificial environment, this is the world of consultant-led ward rounds, bedside tutorials and patient interviews.

In line with this view of the world, Oxford constructs a more traditional, lecture-style relationship between authors and readers. Rather than the conversational and humorous commentary found in Rang's preface, Oxford's tone is more formal and its language more businesslike. The reader may already 'read' a formal and more distanced relationship from the book's disciplined and almost austere visual design, and this notion is supported by Oxford's formal language and lack of humour.

Oxford's authors declare that "some may be surprised that we have not included references. We did not feel this to be necessary". These clauses construct what Halliday calls a behavioural or "one-participant material process" (1985:103) which focuses attention on the Actor, in this case Oxford's authors. Thus, the writer-reader

relationship here is one of “someone telling what the case is in no uncertain terms, and someone being told” (Fairclough 1992:76). This is a modalizing feature, and realizes an unequal and distanced relationship between the authors and readers.

In contrast to this social distancing of its readers, the clause signifies a high degree of affinity with the subject. By playing down the need for references, the designers position the content as ‘absolute truth’. A seemingly contradictory statement reads that “it is always possible that errors have been missed...we urge all who use this book to consult...other sources of information before prescribing”. I argue that rather than reflecting on the truth value of the text, this statement expresses Oxford’s commitment to aspects of personal responsibility and accountability. In other words, they urge readers as future prescribers to assume a similar responsibility for their own texts (prescriptions) by verifying drug information with other resources; after all, “one cannot be too careful”.

#### **4.5 Conclusion**

In summary, I have demonstrated that while Rang constructs an artificial world of drugs and ‘products’, Oxford constructs a naturalistic world of clinical therapy. Rang targets a multileveled and diversified audience; it invites the reader to join in an academic discussion with scientists. As such, it constructs ambivalence and neutrality towards its topic and solidarity towards its readers. Rang is an explicitly hybrid text, where the medical discourse co-exists and clashes with discourses of ‘hard science’ and other life-worlds. Oxford, on the other hand, is written specifically with the medical undergraduate student in mind. As such, it foregrounds ‘therapy’ and encourages an attitude of accountability. Although also intertextual in nature, Oxford is dominated by

discourses of academic clinical medicine; it constructs a rather dated view of an authoritative 'knowledge transmitter' and of knowledge as 'absolute truth'. However, by "representing its selections and claims as natural, truthful and scientific, as, quite simply, the way things are and should be" (Luke 1996:318), Oxford seems to contribute to the clinically-orientated ideologies of the new medical curriculum.

While Rang seems like a user-friendly book about drugs, Oxford is specifically organized into 'disease categories' to discourage students from studying pharmacology as a non-clinical science. The dominance of this ideological view is clearly an important stake in the unstable equilibrium that exists between contesting discourses in the field of medical education, or what Luke refers to as "a battleground for a politics of representation" (Luke 1996:308). Bourdieu's three forms of 'cultural capital', namely 'embodied', 'objectified' and 'institutional' capital (1991) are realized in this battlefield. Medical students aspire to 'embodied capital' as the sum of particular knowledge and skills internalized in the processes of socialization and education. This cultural or informational capital is 'objectified' in a textbook like Oxford and may lead to 'institutionalized capital' in the form of academic qualifications. Yet, "ultimately, capital is only capital if it is recognized as such; that is, if it is granted legitimacy, symbolic capital, within a larger social and cultural field" (Bourdieu 1991:72). This process of legitimizing some practices and not others is a complex one, which finds utterance in ideological institutions such as schools and universities (Fairclough 1992). As such, a curriculum is 'ideologically charged' through its "selections of arbitrary knowledges and a textual corpus on the basis of dominant class, patriarchal and cultural interests" (Luke 1996:318). Seen in this way, Oxford may be read as the 'voice' of the new medical curriculum. Rang's textual practice, on the other hand, may not be recognized as institutionally legitimate, because its ideological view of Pharmacology translates

into “objectified capital (textual artefacts) which has little value within specific fields” (Luke 1996:330).

However, the legitimacy of Oxford’s pedagogic approach is contested in the wider social domain of private and public life-worlds. Oxford’s writer-reader relationship, while perhaps appropriate in a particular context, is reminiscent of a more hierarchical society such as seen in the era of Fordism (Cope and Kalantzis 2000). Fordism was characterized by highly organized and regulated hierarchical structures and their associated texts, as well as a worker mentality that required and depended on a vertical chain of command. Post-Fordism and globalization requires the emergence of a multi-skilled and flexible ‘portfolio person’ (Gee 1994) that operates fairly independently within temporary networks. Because institutionalized training performs the function of skilling people for the workplace, a Multiliteracies pedagogy envisions the transformation of not only training institutions and notions of literacy, but also of social relationships (Cope and Kalantzis 2000). Rang’s democratized writer-reader relationship may seem appropriate in a modern society; however, Rang has less value in the field of clinical medicine. Oxford’s ideological approach may ultimately benefit patients, but does it truly benefit students in a wider social domain? In other words, a Multiliteracies approach in a textbook does not only focus on making ‘what counts as capital’ explicit, but also contributes to developing “the capacity to speak up, to negotiate, and to be able to engage critically with the conditions of their working lives” (2000:13).

## **5 Chapter Five: Micro Context**

The multimodality of modern textbooks means that meaning is constructed by a number of modes of representation. It is misleading to think of the verbal and visual domains as separate categories, because within text they exist as part of a composition. However, in looking more closely at the topic angina, I will broadly discuss the two textbooks in terms of their linguistic design and in terms of their visual design, keeping in mind that such a distinction is an artificial one and merely intended to contribute a measure of clarity to the analytical process.

### **5.1 Linguistic analysis**

#### **5.1.1 Analyzing the construction of Rang's social reality**

For the sake of managing a more in-depth analysis, I focus mostly on the 'clause' or 'simple sentence'. A clause may represent an action, an event or a way of being, or it may be converted into a noun that assumes the role of a participant (Fairclough 1992). In Rang, many clauses are directed actional processes, in other words, they contain a subject-verb-object, or 'agent acting on a goal'. Agents are mostly drug substances, for example "a mediator that causes coronary vasodilatation is responsible for initiating pain". The clauses are transitive; they indicate 'who does what to whom' and they construct an artificial world of medical science.

People are presented either as scientists who experiment or make discoveries, or as generic passives. Rang states that "the ability of organic nitrates to relieve angina was discovered by Lauder Brunton, a distinguished British physician, in 1867". The nominalization of 'nitrates relieve angina' into an ability or character-trait means that it

can be placed in the clause's informationally-important first position. It becomes 'theme', affording greater importance to the drug substance than to the 'distinguished physician'. In another instance, Rang refers to nitrates as being "the cause of 'Monday morning sickness' among workers in explosives factories". Note that Rang uses the term workers rather than 'patients who work in factories'. This has the effect of grouping and categorizing people generically and lessening the human element. These workers are also depicted as passive, as being subjected to the effects of the drug.

Another way of positioning nitrates as the primary agent in this text is through paragraph headings that are drug-oriented. "Organic nitrates" is subdivided into "actions", "mechanisms of action", "tolerance and unwanted effects" and so on. The vitally-important paragraph headed "clinical use" contains only one sentence, which reads "the clinical uses of organic nitrates is summarized in the box", thereby referring clinical medicine to the visual design elements.

Nitrates are further represented in metaphor. A metaphor is used to restructure reality in a different way (Kress and Van Leeuwen 1996). In this case, the drug dipyridamole is juxtapositioned with nitrates because even though it also dilates blood vessels, it worsens angina. Dipyridamole "has the effect of diverting blood away from ischemic areas, producing what is termed a 'vascular steal'. This effect is exploited in a pharmacological stress test". The metaphor of 'robbing' the cardiac tissue of blood, and therefore oxygen (as expressed in the terms 'diverting away', 'vascular steal' and even 'exploiting') serves to emphasize the beneficial role of nitrates in angina. This drug action is also visually illustrated in a large, salient image.

Within this artificial world of drugs and systems, the use of the simple present tense, for example, “organic nitrates relax vascular smooth muscle” realizes a high affinity or “categorical modality” (1992:159) and the authors’ perspective assumes a universal quality. This becomes more salient as all human activity relates to historical data and is thus expressed in the past tense, as seen in the example, “Nobel discovered how to stabilize nitroglycerin”.

### **5.1.2 Analyzing the construction of Rang’s social relations**

Rang’s dehumanized and artificial world, where drugs and physiological systems dominate, serves to distance readers. The reader is disconnected from the text participants through abstraction and nominalization techniques, through the construction of non-human identities and through placing humans in a back-grounded historical context.

A likely explanation for this distancing concerns Rang’s avoidance of topics that point to responsibility and blame. Rang is, after all, a book about drugs, not people. Seeing it from a Bakhtinian perspective (Holquist 1990) means that in perceiving the world, the position of the observer in cognitive time/space is fundamental. Holquist states that “dialogism, like relativity, takes it for granted that nothing can be perceived except against the perspective of something else: dialogism’s master assumption is that there is no figure without a ground” (1990:22). The perceiver always occupies the centre place, while the perceived “arrange themselves as a horizon whose meaning is determined by wherever they have their place in it” (1990:22). In other words, Rang’s authors (as the centre of their existence) rearrange their world into biological systems, assigning a different value to participants and to their actions. The authors thus

legitimize their detached interpersonal relationship with the subject matter. They are able to avoid the dilemmas of responsibility and accountability because in this particular cognitive space, it is drugs that do things to cells, rather than people working with patients.

Apart from avoiding accountability issues, Rang's distancing and neutrality serve to elucidate an important aspect of modality: that modality is not simply about the 'truth value' of content or knowledge, but it may be used to signify 'affinity' or solidarity in relationships. Low modality in this environment supports Rang's claim as an academic text. It draws on the tradition of avoiding categorical modality in academic writing discourses, "motivated by the projection of an approved cautious and circumspect subjectivity and ethos for 'the scholar' rather than because of low affinity with propositions" (1992:162).

### **5.1.3 Analyzing the construction of Rang's verbal coherence**

Explicit causal relations are common to discourses with a dominant medico-scientific voice (Fairclough 1992) and they may be indicative of 'universal truth'. Rang constructs dense 'information chunks' in its written text. It links together successive clauses in a cause-and-effect chain, while condensing preceding clauses into nominals and substituting wording such as 'this'. One example reads as follows.

Nitrates relax vascular smooth muscles. They (muscles) cause marked venorelaxation with a consequent reduction in central venous pressure. In healthy subjects, this (venous pressure) reduces stroke volume. (As a result) Venous pooling occurs on standing and can cause postural hypotension.

These four sentences represent a complex, linear chain of events; the kind that is usually represented in science textbooks as an algorithm or flow diagram. The use of the verbal mode for this type of information is startling in such a multimodal textbook,

and may affect Rang's suitability for students who have problems with language or with physiology.

#### **5.1.4 'Reading' Rang in terms of ideology, access and critical engagement**

Rang's linguistic mode constructs a very different view of the prescribing physician than what is ideologically important to proponents of the new medical curriculum. Rang's target audience includes undergraduate medical students; however, unless students have been made critically aware of Rang's particular orientation, an inexperienced reader may fail to realize that a discursive shift has taken place. By 'discursive shift' I mean that the Bakhtinian 'I' (Holquist 1990) has shifted away from the practice of clinical medicine and patient-oriented care, and is now focussed more on drug research. Therefore, the use of Rang in undergraduate medical training may undermine the ideological struggle to naturalize the subject of 'pharmacology' as 'therapeutics'. Since universities are ideological apparatuses in the larger order of medical discourse (Fairclough 1992), it is important for teachers of the new medical curriculum that the texts they prescribe bear the imprint of patient-based drug management.

A textbook is important not only in terms of its ideology, but also in terms of access. Particularly in the South African context, medical students may have unequal resources in terms of language and prior schooling. Blommaert referred to every instance of language as being 'pretextually charged' (2005). Some of the strategies that construct 'scientific-ness' in a textbook may pose a problem for students that come with their own pretextually-charged resources. Nominalizations that are

condensed and linked together construct a more difficult reading than, for example, the same information presented in a flow diagram.

Furthermore, it is not only students from disadvantaged backgrounds that may struggle with Rang. Undergraduate medical students follow a problem-based learning (PBL) curriculum, where the gathering of information spirals out into ever-widening circles as the student becomes more proficient. Student feedback has shown that one of their main difficulties with PBL is to form an idea of the depth and boundaries of information and understanding that is required at their particular level. Their inexperience in the context of so much information creates frustration and anxiety. A textbook like Rang may contribute to the problem, because it includes information that, while interesting and useful elsewhere, is not 'core content'.

Rang also excludes content which, according to learning objectives, is in fact core knowledge for an undergraduate student, such as explicit details on side effects and how to inform patients of them. These forms of knowledge and understanding translate to Bourdieu's 'cultural capital' (1991) and eventually into economic capital. The notion of 'capital' is a way of talking about power and access. Therefore, some would argue that students at undergraduate level need a more authoritative 'voice' that will not only instruct them about safe and responsible practices, but also provide them with a sense of direction along this learning spiral.

### **5.1.5 Analyzing the construction of Oxford's social reality**

The clause is used in a number of ways to construct Oxford's central message of patient-centred therapy. The first clue is found in "patients with angina pectoris should

stop smoking... and lose weight if obese". This sentence contains actional transitive clauses and the patient as the agent is positioned as agent and as 'theme'. Patients are thus seen as capable of changing their lifestyle.

This foregrounding of the patient is also seen in the sentence "All patients with angina should have their plasma lipid concentrations measured". However, while the role of the patient is still central, the patient is now presented as passive and as someone that needs to be guided in the context of medical procedures and treatment. Even though patients are positioned as more passive in clauses that refer to drugs, they are not presented as generic. The following paragraph emphasizes patients as 'real individuals'.

Patients should be told that if pain relief does not occur within a few minutes, they should not continue to use glyceryl trinitrate but should consult a doctor. They should also be advised of the use of a tablet of glyceryl trinitrate taken sublingually in order to prevent a single attack of angina pectoris that may be anticipated (for example just before unusual exertion, in anticipation of an emotional stress, or before going out on a very cold morning). Glyceryl trinitrate in tablets is unstable... patients should be told to keep their tablets in a dark container, only taking out enough tablets for a day's supply at a time, if it is their habit to carry tablets loose. The bottle in which the tablets are stored should have an aluminium foil-lined cap; neither cotton wool nor other drugs should be kept in the same bottle. For patients who cannot manage all this or for those in whom attacks are infrequent, there is an alternative, more expensive formulation of glyceryl trinitrate in a stable aerosol spray.

This is a different kind of patient from Rang's passive and generic 'workers'. In Oxford, the patient is recognized as an individual. This person lives in a real world, and has habits, stresses, individual coping skills and financial resources. Because the patient is seen as specific and real, Oxford emphasises adapting the drug treatment to suit individual needs. The patient is at the centre of the drug discussion; however, the patient is also positioned as someone who needs 'to be told'. I will return to this example again in a discussion on modality.

Where drugs are placed as agent, nominalizations such as “extensive first-pass metabolism of nitrates” are common and refer to the text’s medico-scientific origin. In general, the information chunks are not as dense as Rang. Most of the information about nitrates is provided under one heading only, namely, “the treatment of acute attacks of angina pectoris in chronic stable angina”, which is a sub-heading of “the treatment of angina pectoris”. This structuring necessitates a linear directionality, with little option of selecting or highlighting sections of information. Even though the text appears dense, it reads easily. However, as pointed out in the analysis of the table of contents in chapter four, one has to have pre-knowledge about angina in order to access this information on nitrates.

Apart from patients and drugs, the text introduces two other participants. In the clause “We shall not discuss the place of coronary artery surgery”, the authors identify themselves explicitly as agent. Furthermore, this agent is a knowledge transmitter that has absolute knowledge or ‘truth’. This clause serves to make their role as instructor explicit. The role of the doctor is seen as self-evident, as doctors themselves are not mentioned.

#### **5.1.6 Analyzing the construction of Oxford’s social relations**

As with Rang, different levels of modality are ascribed to different relationships. Oxford uses the simple present tense to signify categorical modality and objective (universal) truth. In contrast to Rang, Oxford does not include any historical, speculative or experimental data; implying that all of its content is ‘core knowledge’. The most obvious modality marker, however, is the presence of auxiliary verbs such as “should”, “can” and “shall not”. These verbs are associated with high degrees of ‘truth value’

and afford responsibility and blame to participants. The patient is expected to take responsibility for life-style changes such as giving up smoking and losing weight. In these aspects, the 'patient is to blame'. The sentence "treating hypercholesterolemia, diabetes and hypertension, and encouraging gentle exercise are all advisable" allows for a slight shift in responsibility. In terms of the doctor-patient relationship, the doctor's role is seen as helpful and supportive in treating co-morbid disease and helping to reduce risk factors. Even the authors' attitude is tentative, in that these things are 'advisable'. This more relaxed tone changes when it comes to prescribing drugs. In the paragraph quoted above, the authors use the auxiliary verb "should" no less than seven times. In other words, they foreground the patient as someone that "should be told to" and "should be advised of".

These instructional clauses once again focus attention on two separate relationships. In the doctor-patient relation, the doctor assumes a more authoritative position when prescribing drugs than when, for instance, addressing aspects of life-style. In the author-reader relation, the authors assign a stronger commitment to medication than to, for example, other aspects of therapy. In other words, Oxford is prescriptive on what the doctor should say, and expects the doctor to be prescriptive in giving relevant drug information. This particular set of instructions about the storage of nitrates is managed very differently in Rang:

Once a bottle of the tablets has been opened, its shelf-life is quite short because the volatile active substance evaporates; spray preparations avoid this problem.

Rang is quite ambivalent about the possible inactivation of the tablets. It does not point a finger at the doctor for negligence, nor does it consider the cost implication to the patient (the spray preparation is considerably more expensive).

At this stage it is already apparent that in Oxford, authority is vested in the authors as the tutor. Bourdieu describes this power as a type of 'social capital' (1991), where "there is a whole dimension of authorized language, its rhetoric, syntax, vocabulary, and even pronunciation, which exists purely to underline the authority of the author and the trust he (sic) demands" (Bourdieu 1991:76). In a multimodal society, Bourdieu's 'language' may be expanded to include visual as well as linguistic elements of text.

Oxford's instructive author-reader relationship is also seen clearly in the clause "we shall not discuss the place of coronary artery surgery". It is made more forceful by placing the authors as agent, by stating the clause as a negative and by omitting to offer any explanation. This clause signifies absolute authority and absolute commitment to the proposition. In this case the authors' comment is understandable; this is a book about drug treatment, not surgical procedures. However, it is the way that the authors enter their own voice ('we') directly into the text that marks it as ideologically important. It identifies Oxford's text as constructing a traditional pedagogical discourse within a clinical medical discourse. Both these discourses fit into a world of consultant-led ward rounds and tutorials, where the knowledge transmitter's authority and boundaries are accepted as valid and true, and the purpose of teaching and learning is focused on patient care. In contrast, Rang's resources include a wider mix of discourses, and the compromise that occurs as a result accounts for its non-committal ambivalence.

### **5.1.7 Analyzing the construction of Oxford's verbal coherence**

From a textual point of view, both Rang and Oxford use clause 'themes', or positionality, to design internal coherence as well as coherence within the larger corpus of text. In Oxford, patients are foregrounded in a relatively passive role, and while Oxford does not construct strong causal relations between drugs and processes in the same way as Rang, the causal relation between drug use and the doctor-patient is explicitly marked by the clumping together of instructional clauses containing the verb "should". This causality is a modalized rather than transitive feature, but its repetitive use also serves to link clauses together to construct a coherent reading.

Text producers actively set up cohesive relations of particular sorts in the process of positioning the interpreter as subject. Consequently, cohesion seen in these dynamic terms may turn out to be a significant mode of ideological 'work' going on in a text (Fairclough 1992:177).

This resonates with Oxford's overall ideological view of Pharmacology.

### **5.1.8 Reading Oxford in terms of ideology, access and critical engagement**

Even though Oxford's views seem more aligned with that of the new medical curriculum, one still has to consider the question of the text's accessibility to especially disadvantaged students. While Oxford uses nominalizations as part of a science discourse, it does not construct dense clumps of information on physiology. Rather, it relies on presenting these complex physiological processes as a visual algorithm, and it may arguably be an easier way to understand this kind of information.

Another way of improving access to knowledge is by providing 'cues' in the text (Kress and Van Leeuwen 1996). In Oxford, the patient-drug relationship features prominently in the linguistic text, and posed as a set of 'instructions', the repetition of 'should' becomes a linguistic cue. As such, Oxford may be an 'easier' textbook to use for

students that are disadvantaged in terms of language and prior schooling, in other words, it increases their access to 'cultural capital' (Bourdieu 1991). Conversely, students from disadvantaged backgrounds may initially be discouraged by Oxford's densely-written pages, the dominance of its linguistic design and the lack of visual cues.

It is not only disadvantaged students that may object to Oxford's verbally-dense design. Students are part of private and public life-worlds, where cultural and linguistic diversity and advances in communication technology are changing the semiotic landscape (Cope and Kalantzis 2000). The encroaching of discourses of the marketplace and of entertainment into these public and private spheres are also changing the ways that students access and interpret information (Kress and Van Leeuwen 1996). Increased use of the internet encourage a culture of information selection and a more critical view of science and of 'truth', such as is seen in Rang. On the other hand, students of the problem-based curriculum often request more didactic teaching in their feedback, because they are insecure about the level and depth of knowledge that is required of them. In other words, even though its design may appear potentially alienating and out-dated to these students, Oxford may provide more access to the practices of the new medical curriculum. Of the two textbooks, Oxford is perhaps more suitable for undergraduate medical students; however, it falls short of addressing the social restructuring that is a characteristic of a Multiliteracies pedagogy (Cope and Kalantzis 2000).

## **5.2 Visual analysis**

Visual design, like all semiotic modes, fulfils Halliday's three major functions of language (Kress and Van Leeuwen 1996). Its grammar makes available patterns of representation (the ideational), patterns of interaction (the interpersonal) and patterns of coherence (textual function) and in this sense, we can say that "design is also information" (Van Leeuwen 2005:138). In order to compare the visual design differences between Rang and Oxford in more detail, I will focus on the page containing the majority of information on the nitrates, and also on a diagram which unpacks the physiological processes underlying angina. As with the linguistic analysis, I use the grammatical systems of transitivity and modality to identify the participants and the interpersonal relations that construct meaning. I discuss the semiotic resources within the textual framework of visual composition. In the process, I focus on aspects that relate to ideology, access and critical engagement.

### **5.2.1 Rang: 'what is in the box?'**

The topic 'Angina' is found in Rang under the heading, "The heart". The authors define angina and provide an accompanying diagram depicting the effects of myocardial ischemia. The discussion of nitrates is only found nine pages later under the heading "Anti-Anginal drugs: organic nitrates". The page lay-out consists of half written text, half visual elements. On the left page, there is a large colour diagram comparing the effects of nitrates and dipyridamole, which I will not discuss because of time constraints. The right page contains two colour information boxes. The colourful appearance of these pages adds a lively and contemporary feel to the textbook. The boxes and diagrams have borders with rounded corners, which visually separate them from the script. Their bright colours contrast with the black font of the written text and

serve to highlight them. Their salience on the pages challenges the traditional dominance of written text (Kress and Van Leeuwen 1996). Within the written text itself, the information about dipyridamole is presented in a smaller font in an indented paragraph, suggesting a visual 'text box' which "can be skipped by the reader in a hurry without losing the main thread" (Rang: Preface). However, the illustration comparing nitrates and dipyridamole presents the same information, and the salience of the image challenges the notion that this 'text box' should actually be skipped.

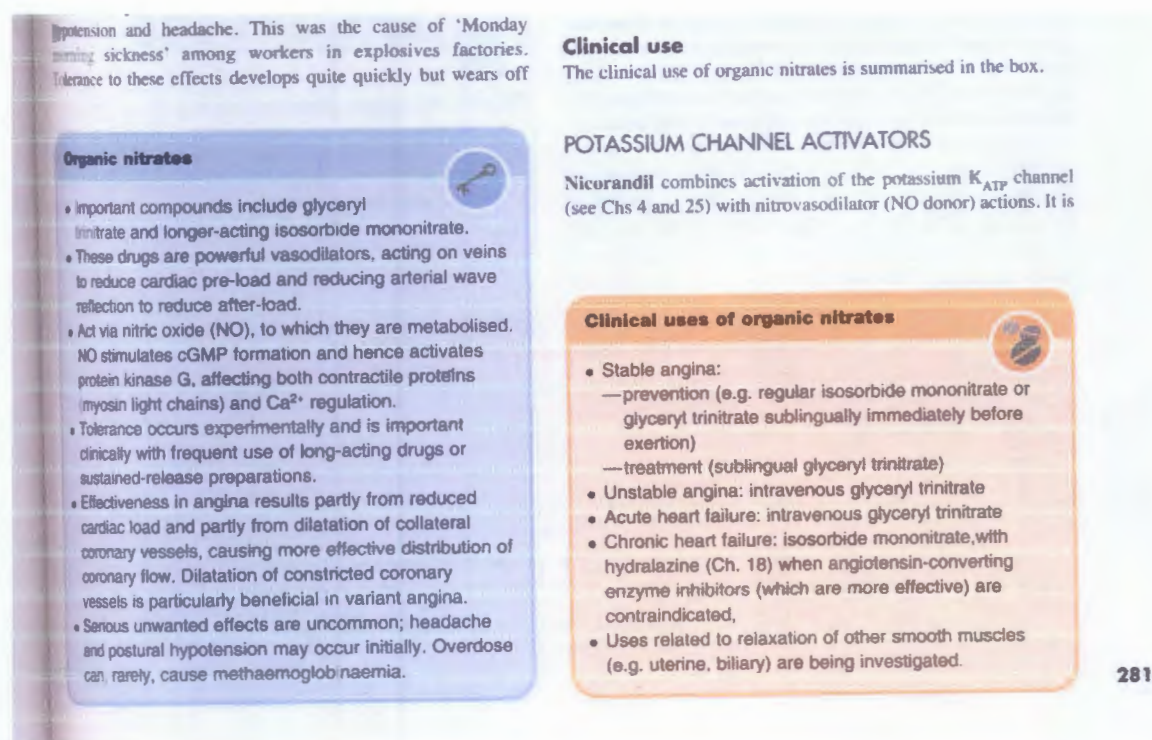


Figure 4: Rang's Information Boxes

The blue box simply reads "organic nitrates" but is identified as "key points" by the presence of a culturally significant symbol in the corner, a small black key within a white circle. Six 'key points' are listed in bullet form. The smaller orange box is labelled

"clinical uses of organic nitrates" and features an icon that represents tablets. Five disease conditions are bulleted as well as the appropriate form of administering the drug (for example, sublingual or intravenous) but no other information is given. Given the fact that the text heading "Clinical use" only refers the reader to the box (as discussed in the linguistic analysis), the student is given little information about the nitrates in the context of a particular disease. Also, although the 'key box' contains information which may be present in the main text, this information is now represented as separate and distinct and therefore more salient. The boxes introduce the possibility of 'scanning' the contents of the page, rather than reading it in a linear way.

Rang's option to skip-read is based on certain assumptions. Firstly, the cues in the boxes and the selection of particular items of information represent Bourdieu's 'capital' (Bourdieu and Wacquant 1992), namely what is valued in a particular social practice. Skip-reading these sections may erroneously come to represent 'absolute truth' for the uncritical reader from a different kind of social practice or discourse. Secondly, the choice to skip-read therefore also assumes that the reader has enough wisdom and maturity to critique and choose appropriately. This wisdom involves at least a pre-knowledge about the content boundaries and the level of engagement that is expected of the reader. The notion that the undergraduate student may 'scan' the boxes for important facts is thus misleading, as the boxes actually contain very little information and would not be of much benefit to a medical student.

This point echoes several concerns that are raised in the preceding analysis. Firstly, Rang's content includes information that is not essential for a medical student, and it omits information that is essential. Rang's wide reader base necessitates a broader scope and a more democratized relationship between readers and writers, which is

realized, among other things, in skim-reading strategies. These strategies may in themselves be harmful for the undergraduate student, who may not have the pre-knowledge to judge for himself what is considered as 'important'. This concern is even more relevant because Rang's multimodal composition, with its boxes and icons and colours looks quite similar to the 'windows' of a computer screen. This similarity to a computer interface changes the text interpreter from a 'reader' to a 'user' (Kress and Van Leeuwen 2006), emphasizing the notions of knowledge selection and 'browsing'. At the same time, it attracts and resonates with the reader as a participant of other personal and public life-worlds.

### **5.2.2 Rang: anatomy of a diagram**

According to Kress and Van Leeuwen, a diagram is a "schematic reduction of a semiotic reality" (2006: 62). It is made up of boxes and arrows, where the boxes represent participants and the arrows represent the processes that relate them. Thus, "boxes are like nouns, the arrows like verbs" and "together, they form clauses" (2006:48). In a narrative process, in other words, where one participant acts on another, directionality is indicated by arrowheads, or vectors. These vectors place participants as either 'agent' or 'goal'. Participants may be human, non-human entities or even processes. This means that an action may become a participant by virtue of being placed in a box, either in the form of a nominalization (such as 'decreased preload') or in the form of a transactional clause ('nitrates decrease preload'). A diagram is thus in itself an example of visual "nominalized writing" in that it may "represent events which take place over time as spatial configurations, and so turn 'process' into 'system' – or into something ambiguously in between" (Kress and Van

Leeuwen 2006:62). Both Rang and Oxford use the diagram in this way, but they differ in the way they construct ideational reality and interpersonal relations.

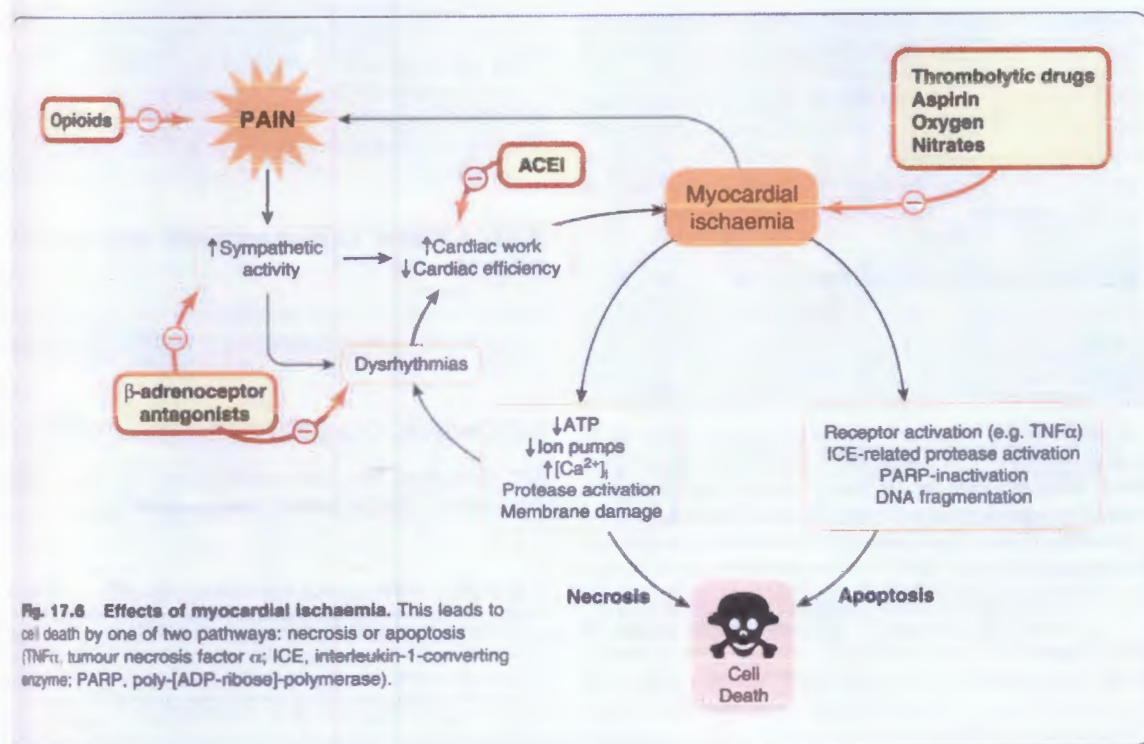


Figure 5: Rang's diagram

Rang's diagram on 'myocardial ischemia' represents information that is not present in the written text at all. It is not an illustration of the text; the framed diagram with white space between the different elements stands on its own as separate and salient. This, according to Bezemer and Kress (2008), is a phenomenon seen in contemporary textbooks.

The status relation between image and writing has shifted from unequal to equal. Ontologically, that means a shift in the evaluation of knowledge: from an ontology in which knowledge constructed in writing dominates over knowledge constructed in image to an ontology in which these bases for knowledge are placed on an equal footing (2008:9).

This equal status in the representational landscape echoes the increasingly diverse linguistic and social landscape in the workplace and elsewhere.

The traditional information value system, represented by assigning value to centre/margin and left/right positions, is absent in Rang. However, Bezemer and Kress (2008) suggest that this model is not commonly found in the genre of textbooks, and may perhaps be more suited to discourses of media and art. Instead, Rang uses a layout seen increasingly in contemporary textbooks: one where 'chunks' of texts are represented in different but equal modes, and where a reading path may be suggested by highlighting some aspects. These "highlighting signs" (Bezemer and Kress 2008:9) steer a reader's attention by creating a division between foreground and background. In Rang's page layout, this highlighting is provided by the salience of the boxes. Within the diagram itself, Rang highlights a central 'axis of evil', where three modes, namely shape, colour and image, interact to form an important information triangle between pain, ischemia and cell death. This axis thus constructs the diagram's central message.

The first mode used in the axis concerns the meaning potential of shapes. According to Kress and van Leeuwen, "the emotional force of an absolute shape is unique and not replaceable by any other means... Shapes exult and shapes depress, they elate and make desperate" (1996:54). In this particular diagram, 'pain' as participant is identified in black capital letters on a pointy orange shape that is suggestive of an explosion. The shape of 'pain' is thus interpersonal and emotive, communicating an intensity which cannot be conveyed verbally. All the other boxes are rectangular shapes with rounded corners. In this sense, shape also has an ideational function, in that it distinguishes between the participants.

The designers use a second mode, colour, to separate as well as link different groups. Orange is used to connect the different shapes of 'pain' and 'myocardial ischemia' in a relationship, while drugs are all represented in pale yellow boxes. Compared to the other colours in the diagram, the orange of 'pain' is 'hotter', more alive and more intense. Colour itself thus has an ideational as well as interpersonal role in the diagram. It even contributes to the overall coherence of the text, in that the colours of the information boxes and the diagram are the same colours used throughout the textbook.

The third mode used to construct the central message concerns imagery or symbols. The term 'icon' usually refers to an image that represents a person, place or thing. Symbols are one category of icon; they are "images we use to represent concepts, ideas and philosophies" (Mcloud 1994:25). In Rang's diagram, the 'skull-and-crossbones' which is associated in western society with piracy, danger and death, is used to depict cell death in the presence of myocardial ischemia. It is a visual metaphor because it represents the consequence of 'robbing cardiac tissue of life-giving blood-flow and oxygen', echoing the linguistic metaphor in the written text. The black and white imagery of the icon signifies the finality of death, and is more closely linked with the black-on-white words "Necrosis" and "Apoptosis" that are printed on either side of the icon in bolded letters, than with "Myocardial ischemia" in the orange block. This suggests that ischemia and death are separate categories, even if they are causally related. In other words, the diagram follows the progression from intense pain (explosive orange shape) that occurs in live tissue which becomes progressively more ischemic (orange block) as it is 'robbed' of oxygen, and it leads to the finality of necrosis and cell death, represented by the black and white skull.

Another type of participant in the diagram concerns physiological processes such as “enzyme activation”. These processes are grouped together and back-grounded against the highlighted signs of the central axis; they are marked as ‘less important’ by being placed in identical colourless boxes with thin borders. In fact, the reader may prefer to gloss over or exclude them altogether without losing the main thread. Some of these processes are very complex and are indeed inappropriate for undergraduate students. In the boxes they exist either as nouns or nominalizations, where arrows replace words such as ‘increase’, ‘decrease’ and ‘reduce’. This form of writing, which I will refer to as ‘science shorthand’, serves to construct ‘scientific-ness’ within this diagram. It also challenges the dominance of traditional letterforms and expresses the ideational power of the icon.

A third group of participants in the diagram represent drugs. The drugs that treat ischemia are given salience and ideational value by grouping them in yellow boxes, and linking them to a particular event or activity with a red arrow or vector. The opioids, for example, are linked to pain with an arrow, and this has a ‘minus’ superimposed over it. The minus-symbol is another example of science shorthand. It is an “icon of the practical realm” (Mcloud 1994:27) and indicates that opioids can be used to reduce pain. In the same way as the ‘up and down arrows’ replace all the verbs in the boxes, so the vector arrows and minus-symbols replace actions that connect participants.

Rang’s diagram is thus a ‘visual narrative’ where the participants are identified by words, shapes or images and the ‘action verbs’ are replaced by vectors. In a visual narrative proposition, a vector usually takes the form of an arrow, which represents at

the same time an action and a narrative directionality, or suggested reading path (Kress and Van Leeuwen 2006). The shape and salience of an arrow may also affect meaning. In Rang, for instance, the arrows which connect the participants are curved, partaking "of the symbolic value of the circle, so that the process is represented as 'natural'" (2006:71). In other words, the events encoded so objectively in Rang's diagram are part of a naturalistic cycle of life, sickness and death. Also, the directionality is not linear. It depicts interconnected cycles rather than a hierarchical sequence of events. As such, it can be read from more than one entry point, depending on the reader's choice. Note, however, that the salient 'axis of evil', the directionality of the arrows and the finality of death still impose a sense of order and logic. Within this 'natural' sequence of events, drugs may be introduced that may interrupt the cycle. The significance of this fact lies in an amplified vectorial relation (2006:71), that is, the increased salience suggested by the bold red arrows connecting drugs to processes.

To summarize, Rang's diagram depicts reality as interrelated physiological cycles of life and it identifies instances where drugs and science may alter this 'natural' course. It constructs graded categories of non-human identities (pain/ischemia/death, drugs and lesser physiological processes) and set up cause-effect relationships between them. Thus, even though emotive aspects of life and death are realized with colour, shapes, images and vectors, this is still an artificial world, a 'scientific bubble' which scientists observe while standing outside of it. Diagrams are characteristic of "scientific and bureaucratic writing" that "put most of their meaning in the nouns rather than in the verbs" (Kress and Van Leeuwen 2006:61). Diagrams thus offer a kind of knowledge that is objective and dispassionate, "ostensibly free of emotive involvement and subjectivity" (1996:121). In other words, diagrams are a distancing feature; they

encode the objective attitude valued in the discourse of science. This distancing is grounded in a scientific discourse, and further realized in the use of nominalizations and 'science shorthand'.

At the same time the readers and authors, as scientists, are engaged in a peer discussion. This solidarity or affinity with readers (Fairclough 1992) conveys informality and involves the conversationalization of the science discourse. In other words, science is made to appear non-threatening, commonplace and even entertaining. This can be seen in the roundness of the boxes, or rather, the 'absence of sharpness'. Also, the skull-and-crossbones icon is distinctly cartoon-like, and even appears to be smiling. The blurring of boundaries between learning and entertainment is thus encoded in the hybrid nature of the text.

Rang is thus explicitly intertextual: it bears traces of contrasting texts, such as cartoons and science textbooks, as well as contrasting discourses, such as academia and entertainment. It recognizes that the global move towards the visual is changing the very constitution of a discipline such as science. Students who use these new kinds of texts will have a different view of authority relations and of what science is. Rang's visual design constructs a discourse that at the same time values neutrality and connectedness in a culturally hybrid world. Students "no longer have a common culture, instead they have become complex, diverse and discursively divided, and therefore in need of new forms of information" (1996:27). Power is thus distributed more equally; Rang sees its role as 'informing the reader' rather than 'prescribing to the reader'. The non-linearity of the diagram, as well as the graded categories of the participants, makes it possible for the reader to 'browse' through the text, ignoring some information units that are less salient or that involve pre-knowledge (such as the

enzyme activation processes). This distinctly un-authoritarian view of social identities and relations marks Rang as a modern scientific text (Bezemer and Kress 2008). Just like a computer interface, Rang is 'interactive'; it "leaves it up to the reader how to traverse the textual space" (1996:222).

Herein may lie a danger for undergraduate medical students: even though modern students are being enculturated into a different kind of society, and may hold a different view of what science and truth is, they still have to go through the processes of acquiring legitimized 'cultural capital' (Bourdieu 1991). Using Rang as a textbook means that there is no authoritative voice giving instructions as to what is important; they must 'pick and choose' the content and depth that is appropriate to their level. Rang's visual imagery and design is modern, fascinating and apparently user-friendly, but it contains both too little and too much information. Too little, in that the box refers almost cryptically to clinical aspects. Too much, in that while catering for a much wider field than just the medical discourse, it contains 'key points' and details of physiological processes which are inappropriate for undergraduate medical students.

### **5.2.3 Oxford: drugs do not constitute 'therapy'**

In Oxford, the topic 'angina' is found in "The drug therapy of cardiovascular disorders". It is further divided into two main sections headed "Mechanisms of action of the drugs used to relieve or prevent angina pectoris" and "The treatment of angina pectoris". All the headings in Oxford are red and stand out against the densely-printed page, clearly foregrounding the central theme of clinical pharmacology. The page lay-out features a drug table and a diagram on the pathophysiology of angina

**Table 23.4** Drugs used in angina pectoris**1. Treatment of an acute attack in chronic stable angina**

Glyceryl trinitrate (p. 563)  
 Isosorbide mononitrate or dinitrate (p. 563)

**2. Prevention of acute attacks and treatment of unstable angina**

Glyceryl trinitrate (topical application)  
 Isosorbide mononitrate or dinitrate  
 Beta-adrenoceptor antagonists (p. 476)  
 Calcium channel blockers (p. 500)  
 Nicorandil  
 Aspirin (p. 582)  
 Heparin (p. 537)

1. By causing arteriolar dilatation, lowering peripheral resistance, and reducing myocardial work and oxygen demand.
2. By causing peripheral vasodilatation, reducing venous return, thereby lowering left ventricular end-diastolic pressure and

volume, again reducing myocardial work and oxygen demand.

3. By relieving coronary arterial spasm in variant angina, and any spasm occurring as part of common angina.
4. By redistribution of myocardial blood flow to improve the perfusion of ischaemic areas.

Beta-adrenoceptor antagonists act by blocking the action of noradrenaline released from cardiac sympathetic nerve endings, thereby reducing the effects of endogenous sympathomimetic amines on cardiac  $\beta$ -adrenoceptors. This has two effects: first, the increase in heart rate in response to physical or emotional stress is reduced; secondly, the force of contractility of the myocardium is reduced. Both of these effects result in prevention of increased oxygen requirements at times of stress.

The calcium channel blockers cause peripheral arterial and venous vasodilatation. In this respect, they act like the nitrates. They also dilate normal coronary arteries.

Nicorandil is a potassium channel opener. It opposes depolarization in vascular smooth muscle cells, causing vasodilatation.

**Figure 6: Oxford's Drug Table**

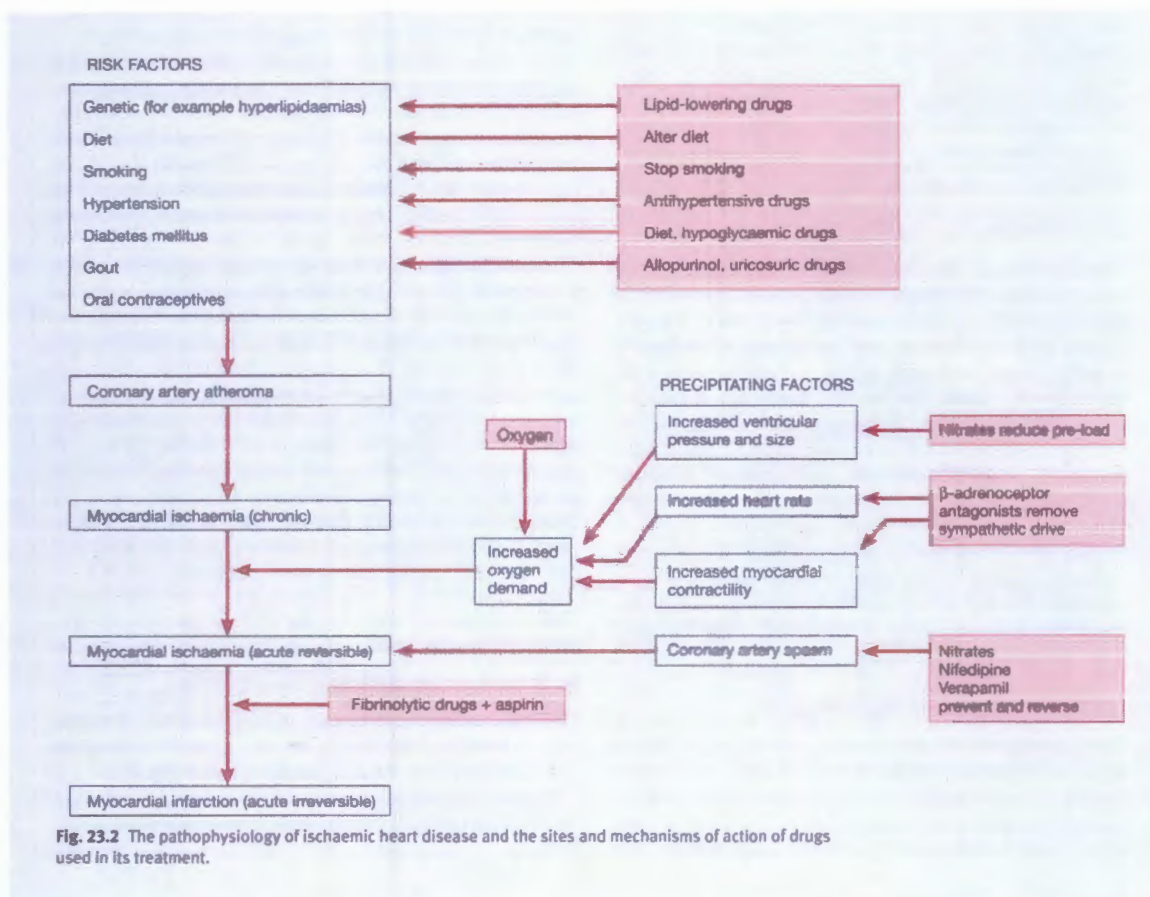
In contrast to Rang, there are no borders to separate the diagram from the text, and the drugs table takes the format of a frameless list rather than a separate box. This weak framing allows the diagram and table to become an integrated part of the written text. As such, Oxford is reminiscent of older, more traditional science textbooks, where "writing constitutes the main body of the text, and... image is subordinate to that" (Bezemer and Kress 2008:8). Even though the table and image represent 'chunks' of information, they are not, as in Rang, explicitly highlighted with colour, shapes and images. Even within the table and the diagram, written text dominates, with some foreground and backgrounding provided in the use of a dull red colour for certain elements. This suggests a linear reading path down the pages, similar to that of traditional written texts (Bezemer and Kress 2008). Font sizes and colour intensity of the paragraph headings support this notion; main headings are depicted in large, thick, bright red letters, while secondary headings and subunits use progressively smaller font sizes

and less saturated red colour. In other words, readers are not enticed to 'browse', as in Rang.

Oxford and Rang differ in their commitment to summarizing information. Summaries are a major feature in Rang, such as 'key points' and 'clinical uses' boxes. Oxford, on the other hand, sees all its content as 'core' and it sees Pharmacology as centred on knowing drugs within a clinical context. In other words, Oxford's main corpus of text may be read as a 'key/clinical use box'. Oxford's table, on the other hand, does the same work as Rang's main body of text. It lists the drugs used in the treatment and prevention of angina together with page numbers in the Pharmacopoeia. The Pharmacopoeia is a collection of short summaries of drugs from a 'substance' perspective. In this sense, the table is a summary that contains a different kind of information, one that is focused on drugs rather than patients. The weak salience of the small unframed table may be an ideological strategy, because it certainly suggests that its content (substance information) is subordinate to the main text (the clinical aspects of nitrates).

#### **5.2.4 Oxford: the pen is mightier than the 'paintbrush'**

Oxford's diagram contrasts significantly with Rang's. Both diagrams are schematic versions of a narrative process and involve the same participants, namely disease, drugs, and physiological processes. However, different meanings are realized through the grammars of the various modes, as these modes are associated with specific social and discursive practices.



**Figure 7: Oxford's Diagram**

Instead of the colourful, cartoon-like hybrid blend of science and entertainment, Oxford's version of the physiological events of angina is serious and business-like. Red boxes are used ideationally to identify the agents of therapy, and non-drug as well as drug measures are included. This red colour visually links treatment in the diagram to the treatment of angina in the red headings. This gives them salience over the other participants, namely risk factors, precipitating factors and physiological processes in black and white boxes. Where Rang uses boxes with rounded corners, all the shapes in Oxford's diagram are rectangles with sharp corners. According to Kress and Van Leeuwen, rectangles are "the elements of the mechanical, technical order, of the world of human construction" (2006:54) while curved forms are

associated with an organic and natural order. Thus, “unlike circles, which are self-contained, complete in themselves, rectangular shapes can be stacked, aligned with each other in geometrical patterns: they form the modules, the building blocks with which we construct our world” (2006:54). Their angularity expresses “a world that we have made ourselves, and therefore a world we can, at least in principle, understand fully and rationally” (2006:55). In this diagram, they undermine the mysterious quality of the disease process by suggesting that its components may be rationally identified, understood, and manipulated. These rectangular shapes can be seen as modalizing features, suggesting a traditional attitude towards knowledge as ‘truth’.

Rang’s curved shapes, colours and icons serve to ‘conversationalize’ its diagram; its design constructs science as ordinary and entertaining, whereas Oxford’s design constructs science as a no-nonsense, chronological series of events and interventions. Within this conversationalized approach, Rang designs notions of science into the diagram by using abbreviations and replacing verbs with symbols. Oxford, in contrast, uses its diagram’s structure and appearance to construct ‘scientific-ness’. A diagram, as visual nominalized writing, posits its information as objective and dispassionate, and therefore as ‘scientific’. Oxford accentuates this effect by avoiding features that may relate to a non-scientific world, such as cartoons. At the same time, it imports the dominance of the written mode into the diagram by avoiding science short-hand in favour of clauses that contain words. Oxford uses transactional clauses, for example “nitrates reduce preload” rather than Rang’s minus-symbol. Physiological processes are nouns or nominalizations (for example “increased ventricular pressure and size”) where the word ‘increased’ is used in the place of Rang’s ‘up’ arrow. The use of verbs affords more salience to the actions of drugs. Each action is placed in a box and turned into an agent which ‘targets’ either another

agent or a process between two agents. The targeting action is represented by straight bold red arrows. These arrows are narrative vectors, linking the participants in a causal relationship. In contrast to Rang's curved arrows, Oxford's vectors are straight or angular, supporting the notion of a world of knowledge which can be deconstructed, made explicitly known and reconstructed as ordered, rational and transparent. Apart from signalling a technical and scientific approach, Oxford's absence of curves, colours and images advocates restraint and discipline, constructing a discourse that associates learning with academic rigor, and professionalism with sobriety.

In contrast to Rang, Oxford's lay-out does not support skip-reading practices. In the same way, Oxford's diagram also conveys a more strict directionality than Rang's. The arrows denote a vertical navigational path which starts at the top left hand column with risk factors, and ends at the bottom with acute, irreversible myocardial infarction. This column can be seen as representing the 'given' reality. It is that with which the patient presents, starting out with generalized risk factors in the beginning and progressing to a specific and irreversible disease. This structure reminds of the information value model found in texts from public lifeworld such as advertising (Kress and Van Leeuwen 2006). They suggest that diagrams that represent a timeline on the vertical axis often present the "good old days" (2006:188) as the Ideal. The top thus represents the generalized risks which should ideally be treated before the patient becomes sick. In reality, many patients progress to having an infarct (the Real). The designers further expand the meaning potential of the information value model by combining horizontal and vertical structuring. On the right side of this vertical axis, the treatment options represent the 'New'. However, the directionality of the vectors is from left to right, in that the 'New' impacts on the 'Given' at various levels. This means

that the disease process is now seen as a target, or goal, rather than an agent. Once again, Ideal is placed at the top and Real at the bottom. It is more ideal to manage risk factors with a combination of drug and lifestyle changes, such as altering the diet. However, once the patient is ill, reality dictates the necessity of drug treatment.

The information value model is not common to the genre of textbooks, and even less so in the field of science, which tend to rather favour highlighting signs or the positioning of signs in a particular sequence (Bezemer and Kress 2008). The use of a traditional information value model in Oxford's diagram is therefore surprising. Oxford seems like a traditional kind of text. Its densely printed pages, its lack of borders, symbols, icons and eye-catching shapes and colours (all salience markers) discourage skim reading and information selection, and reinforce the traditional dominance of language as a written mode. Its strict directionality constructs a discourse that is associated with notions of hierarchy, word literacy and the truth-value of knowledge. It "takes the reader by the hand, guiding them firmly through the text" (Kress and Van Leeuwen 1996:220). Therefore, the use of the information value model within such an instructional discourse may reflect the increasing marketization of the academic and scientific discourses. These hybrid texts "share some common features with ordinary commodity advertising, but these are combined with generic features which are specific to the particular domain in question" (Fairclough 2000:164). Marketization of traditionally hierarchical discourses usually tends to distribute power more equally among participants; it "entails a shift in social relations and social identities which result in ambivalent and contradictory authority relations" (2000:164). This shift is strongly opposed in Oxford's written text, as was seen in the linguistic analysis. Thus, even though Oxford's linguistic and visual design both

construct a particular ideological view of Pharmacology, they open up a new terrain of struggle in other areas.

In contrast to Rang's naturalistic cycles of life and death, Oxford's diagram depicts reality as logical and orderly, where the correct pharmacological knowledge enables the reader to target disease processes in a very specific, step-by-step manner. In this scientific world, there is no place for frivolity or games. The absence of emotive features has a transitive function, in that it highlights the diagram's role as a strategy or plan of action. Its linear, vertical reading path and weak highlighting place participants (disease and treatment options) within a particular time/ space framework, and its inclusion of non-drug measures reiterates the concept of a more holist view of therapy. In other words, Oxford constructs pharmacology as 'doing the correct thing in the correct order' rather than 'choosing from a selection of drugs'.

Similarly to Rang, Oxford constructs two relationships in its diagram. One is the ideational cause-effect relation between drugs and disease, which is technical and amenable to direct action. The other is the interpersonal relationship between the authors and readers. The diagram appears less authoritarian than the written text, but the diagram's undisguised business-like appearance and abstract scientific distancing still suggest an instructional and unequal relationship, which may be more suited to traditional pedagogic environments. Kress refers to this as "forms of factuality" (2000:202) which is encoded in the text, alongside indications of social distancing. Oxford's preference of the written mode over other, multimodal forms of meaning-making certainly supports Oxford's image of an older, more traditional science text. However, even within the confines of this traditional pedagogic approach there are

intertextual clues of other texts and discourses, such as marketization strategies, and these betray the struggle for and rearticulation of discursual boundaries within text.

In terms of the new medical curriculum, Oxford's visual construction of Pharmacology is at once its strength and its weakness. Its strength lies in the fact that the diagram's step-wise and ordered 'instructions' may facilitate access for students who have a weak knowledge of physiology. By including only those processes that are important to an undergraduate student, Oxford defines clear boundaries and levels. Its preference for the written mode also ensures that disadvantaged students, who may not have had sufficient experience with science shorthand and abbreviations, are not left behind. Oxford also recognizes that the written mode, like any other, has particular inherent limitations. Rang's written text contains chains of complex physiological processes. In Oxford, this information is represented in the diagram. A diagram may thus be seen as a 'visual algorithm', and may represent a better way of constructing the complex nominalizations and causal relations which are so common to a science discourse. According to Kress, this is a fundamental change to earlier forms of textbook, in which language was the dominant medium, and images served to illustrate (to 'repeat visually') what has already been verbally communicated" (2000:199). This particular blend of writing and visual schema is an example of 'specialization', where one mode is used for directing and organizing, and the other is used to convey the central information. This feature contradicts the notion that Oxford's design is old-fashioned or simply 'traditional'.

However, Oxford's weakness lies in the fact that its visual design is very unlike the modern texts that students are growing up with. Students are being enculturated into multimodal ways of communicating, and visual design forms a significant part of

meaning-making in their personal, public and even working lives. New technologies have led to “iconographic, text and screen-based modes of interacting” (Cope and Kalantzis 2000:12) with information. They have also led to unprecedented access to different kinds of information, resulting in a change in the way knowledge and the knowledge transmitter is viewed. These changes necessitate a literacy pedagogy that is relevant to this new world. A textbook is part of this pedagogic approach. Oxford uses its authoritarian voice to spread a very modern gospel: that of holistic, patient-centred management of disease. However, it is only able to do so if the reader/consumer buys into its philosophy.

## **6 Chapter Six: Conclusion**

This study originated from a dispute about which textbook was more suitable for fourth year pharmacology students. This question led to a journey of discovering and interrogating design as a process of meaning-making. Fairclough's notion of discourse (1992) allows a textbook to be seen as a combination of design choices from a range of semiotic modes, serving particular discursive and social interests. A Pharmacology textbook can be seen as a tutor, which provides access to drug knowledge and different forms of capital. It also sends out particular 'messages' about its ideological view of pharmacology and about social relations, in this case, between the doctor-patient and the teacher-student.

### **6.1 Overview of the analysis**

I use social semiotics and Halliday's metafunctional view of text (1985) to analyze sections of Rang and Oxford's texts, and I relate it to specific practices characteristic of the discourses of the workplace, such as medicine, science and pedagogy, as well as public and private life-worlds, such as the marketplace, media and entertainment. Both text and discursive practices are then placed within a diverse, technological post-Fordist society (Cope and Kalantzis 2000). In order to construct the discourses that inform the subject of Pharmacology, as represented by each of these textbooks, I use a 'toolkit' of semiotic modes to actualize the grammatical systems of transitivity and modality, as well as textual coherence. Transitivity realizes the world and systems of knowledge, while modality maps the writers' attitude towards their message and towards their readers (Fairclough 1992, Kress 1996).

Both of the textbooks are analyzed from three perspectives. The cover and table of contents represent the reader/consumer's first impressions, while the preface serves as the authors' 'voice'. The topic angina sees the text from the teachers' perspective, in that it requires pre-knowledge of the subject as well as of the discursive practices of clinical medicine. Three particular themes emerge in this research: that of ideology, access and critical engagement. As such, both textbooks are analyzed according to the degrees in which they serve the interests of the new medical curriculum, and according to their role within a pedagogy of Multiliteracies.

Rang's visual design marks the textbook as being modern, dynamic and scientific. Its cover and contents construct the subject of Pharmacology as drug or 'product' knowledge. Oxford's cover foregrounds Clinical Pharmacology, situated in a real and natural world of patients and tablets. Its table of contents focus on therapy or 'process' rather than product, presenting drugs only in context of particular disease management.

In the preface, Rang's authors indicate indirectly that the textbook is aimed at a wider audience that includes medical and non-medical interests, as well as different levels of experience. They express high affinity or solidarity with their readers, positioning them as colleagues and peers, as fellow intellectuals and as 'consumers' of knowledge and of text. They state clearly that the book is concerned with drugs and drug mechanisms.

Oxford's authors leave no doubt about the fact that their textbook is intended primarily for undergraduate medical students. Oxford is concerned with clinical management, and they see all the content as 'core knowledge' while emphasizing the importance of

accountability. At the same time, the authors' 'voice' is formal and instructional, constructing a more distanced and unequal relationship with their readers.

Linguistic analysis of the topic angina provides the detail of both Rang and Oxford's respective worlds and relationships. Rang's world is an artificial, non-human environment of drugs and physiological processes. When people are mentioned, they exist as historical data or are portrayed as passive and generic. Rang uses explicit headings, transitive clauses and an illustrated metaphor to construct an 'identity' for nitrates. The foregrounding of drugs in theme and layout contribute to internal and external textual coherence. Readers and authors look at this world of science from the outside. Through abstraction and nominalization techniques, as well as by lowering modality in terms of responsibility and blame, the authors' are distanced from their subject matter. They see engagement with the information as optional and dependent on the particular reader's interest. However, they express solidarity with readers with a conversational tone.

Oxford's world, on the other hand, is focussed primarily on the patient as goal. While patients are expected to take some responsibility for their therapy, it is the doctor who is given the burden of encouraging, prescribing and educating the patient. Oxford is grounded in the real, naturalistic world of doctors and individualized patients, where the doctor's instructions contribute to and even determine the drug's effect. By contextualising information, constructing a naturalistic reality and phrasing information as warnings, Oxford 'cloaks' drug knowledge in clinical relevance. On an interpersonal level, Oxford constructs a traditional consultant-student relationship with the reader, where authority is more one-sided and readers are not given much room to make their own knowledge selections and treatment decisions.

In the visual domain, Rang's drug-centred point of view is reiterated by colourful boxes that foreground key points and clinical uses, while providing opportunities for skip-reading. As a modality marker, it positions the information as optional and the reader as a consumer with 'buying power'. Oxford sees its main text as 'key and clinical information' and rather presents a small, almost insignificant drug table which refers the reader to the Pharmacopoeia at the back of the book. The absence of skip-reading options marks the content as 'absolute truth' and constructs an unequal and didactic pedagogic relationship.

Rang uses its diagram to position its artificial world of drugs and systems as naturalistic cycles of life and death by introducing curved vectors and shapes that express affect, such as pain. Colour, round shapes and curves convey a sense of fun; the subject of Pharmacology is constructed as non-threatening and even 'easy'. Features that provide optional reading paths and information selection realize low affinity towards the topic, and solidarity with the readers as fellow scientists. The humoristic tone of the preface is echoed visually as a cartoon-like skull-and-crossbones icon. As a result of its sharp, rectangular shapes and angular vectors, Oxford's diagram represents a technical, scientific plan of action, rather than a naturalistic cycle. However, by incorporating risk factors and non-drug management in a time/space frame, it grounds the events in the real, naturalistic world of patients and doctors. The diagram's directionality and absence of skip-reading options expresses high commitment towards the topic. The use of words, rather than images, reaffirms Oxford's formal and business-like tone.

## **6.2 Constructing Pharmacology within the new medical curriculum**

As a teacher of Pharmacology, I have to look at these textbooks in terms of their respective ideologies and in terms of how accessible and suitable their content is for medical students in the new problem-based curriculum. Ideology signifies particular views (of the physical world, social identities and relationships) which are built into discursive practice and which contribute to relations of domination (Fairclough 1992). Normalizing these ideologies into common sense is an important part of a discourse's struggle for dominance within wider orders of discourse.

Both Rang and Oxford bear imprints of particular ideologies that are valued in different fields. Rang's ideology centres on Pharmacology as scientific knowledge about drugs. It serves a wide range of interests which include but do not foreground clinical medicine, and as such construct relations that reflect a modern and diverse society. Oxford is written to serve the interests of undergraduate medical students; therefore it constructs pharmacology as drug knowledge within a particular therapeutic process. It also constructs the unequal and instructional social relations that are characteristic of traditional medical pedagogy. These ideological strategies have consequences for medical education. Rang excludes content that is essential for medical students and it teaches drug knowledge outside the context of accountability and consequence. Because it does not cover therapy as such, it negates the role of patient communication, thereby retarding the naturalization of the new medical curriculum's ideologies. Oxford emphasises patient-centeredness and accountability, but may frustrate and hamper students who attempt to study drugs outside of a particular disease context.

Because Rang's placement within a wider scientific community necessitates a wider range of content, it uses design features that allow for knowledge selection and a more neutral attitude towards knowledge. This aspect of its design may be problematic for undergraduate medical students in a problem-based learning environment, as they may not possess the maturity and pre-knowledge to identify omissions and select appropriate levels and information. Oxford, on the other hand, presents only core knowledge at a specific, appropriate level; therefore, its didactic instructional voice may facilitate access to both the content and the ideologies of the new medical curriculum. In spite of its spartan appearance, Oxford's choice of particular modes may also play a role in facilitating access, for example, foregrounding patient information through verbal text and deconstructing complex physiological processes in a visual algorithm rather than in writing.

Even though Oxford seems more appropriate for medical students of the new curriculum in terms of content and ideology, one cannot ignore the role and influence of the social world beyond the classroom. In a post-Fordist world medical students are enculturated into new ideas about knowledge, social relations and the knowledge transmitter (Kress and Van Leeuwen 1996). Rang's multimodal design and social relations are reminiscent of Kress' description of 'new science' textbooks where students of science "are addressed, seemingly, as people whose interests need to be solicited and won, who need to be entertained, humoured" (1996:30). The medical student of today habituates a new authority position because of modern trends such as consumerism and the marketization of academic discourses (Fairclough 1992). Oxford's more dated pedagogic approach and formal design may cause conflict at a deeper, more sub-conscious level, even if it contributes to a holistic, patient-centred view of Pharmacology. The designs of both Rang and Oxford expose aspects of the

hegemonic struggle and boundary shifts between the discourses of public life-worlds, pedagogy and clinical medical practice.

### **6.3 The way forward**

It seems that when it comes to choosing textbooks, there are both losses and gains. This research opens up new questions and areas that require critical reflection on teaching and assessment practices. The first step is to critically review one's learning objectives, as simple and explicit descriptions of what 'counts' as cultural capital may assist students in negotiating texts that straddle discursal domains. Students also tend to focus their studying according to past assessments and exam papers. The learning objectives should be aligned with teaching/learning activities and with assessment, and these three components should serve the interests and ideologies of the new medical curriculum.

Another consequence of this research is a critical awareness of design as a resource for meaning-making. Formalizing a methodological framework that interrogates different ways of constructing the world, social identities and social relations makes it possible to engage medical students in the 'how' of a Multiliteracies pedagogy. Instead of concentrating purely on medical content, the 'regularities' of a metalanguage of design may be applied to a patient information leaflet during a group discussion. Students have the opportunity to grapple with 'critical framing' and 'transformed practice' as they design their own leaflets. At the same time, students are immersed in critical reflection on topics such as their ideological interests, the social identities of doctors and patients and the communicative act's ability to challenge or maintain discursal authority relations (Fairclough 1992). The process of engaging with and

acquiring a metalanguage of design prepares the way for students to become not only doctors, but also critical citizens.

To conclude, this research emphasizes that even though the choice of a particular textbook may be important, it is the critical reflection that accompanies all our actions as teachers that makes the real difference to students. By addressing the “twin goals of access and critical engagement” (Cope and Kalantzis 2000:13), the research succeeds in its aim of contributing to a pedagogy of Multiliteracies.

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