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**Medical Students' Recognition of Core Knowledge
in a Supported Problem-Based Learning
Curriculum**

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SLTCHA001

A minor dissertation submitted in partial fulfillment
of the requirements for the award of the degree of

Master of Philosophy in Education

Faculty of the Humanities
University of Cape Town

March 2008

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ACKNOWLEDGEMENTS

I wish to express my sincere thanks to all those who have helped me while conducting and writing up this study. It would not have been possible without them. In particular, I wish to mention:

- My supervisors Professors Suellen Shay and Susan Kidson for their constant hard work and encouragement. Also, Dr Jeff Jawitz who supervised me in the preparation of the research protocol for this study.
- Carol Carr and Prof D Fraser from Chemical Engineering for their kindness in lending me their audio visual and DVD recording equipment.
- Lorraine Sivewright at the Sports Science Institute for back up digital audio-recording equipment.
- Nadia Hartman and Lameeza Jakoet from EDU for lending me their taping and transcribing equipment.
- Nadia Hartman for reading the first draft of the thesis and for her helpful discussions and suggestions.
- My colleagues in the Department of Human Biology who stood in for me on so many occasions.
- My wife Jane for her unfailing love and support and Peter, Andrew and Helen for putting up with a grumpy Dad for so long.

DECLARATION

This work has not been previously submitted in whole, or in part, for the award of any degree. It is my own work. Each significant contribution to, and quotation in, this dissertation from the work, or works, of other people has been attributed, and has been cited and referenced.

Signature:

Date: March 2008

Charles Patrick Slater

ABSTRACT

This study aims to achieve insight into how students identify core knowledge in a supported problem-based learning (PBL) medical curriculum. Self-directed learning and an emphasis on the clinical relevance of core knowledge are features of this curriculum.

The study was conducted on two PBL tutorial groups of ten students each during their second year of undergraduate medical studies. Each group was observed while conducting a PBL tutorial based on a case scenario following which they were interviewed about learning objectives they had derived. During the analysis it emerged that students' recognition of core knowledge might be influenced by the curriculum's design.

Bernstein's theory of educational transmissions provides a framework to describe the effects of curricular change and the consequent tensions that may affect student learning. Bernstein provides insight into curricular design and its consequences for teaching and student learning. Most students in this study are likely to have been exposed to visible pedagogic practices in the past where curricula are associated with relatively strong classification and framing and where teaching and learning are explicit. In contrast, the present MBChB curriculum is associated with an invisible pedagogic process where learning tends to be implicit. It is relatively weakly classified because of its interdisciplinary focus and encourages self-directed learning that is reflected in its relatively weak framing. Changes in classification and framing are associated with changes in how knowledge is recognised and transmitted. Recognition rules, operating at the level of the student, enable the identification of core knowledge that is valued by the curriculum. If inappropriate recognition rules are employed then the student may struggle with the recognition of core knowledge and with decisions about what to learn.

It was found that students have to cope with significant discursive challenges and often experience difficulty in defining clearly what they need to learn. This was thought to be because of the invisible pedagogic approach employed by the PBL system and the relatively weak classification of a curriculum that encourages the interdisciplinary integration of knowledge. Students who have difficulty in recognising core knowledge look to authority figures or structures for confirmation of their tentative decisions about learning, while those who are comfortable with their decisions reflect on their work in an interdisciplinary way to resolve their queries. Certain support activities, such as lectures, may paradoxically have an adverse effect on the development of self-directed learning for some students by undermining the PBL process.

A minority of students interviewed appeared not to struggle. They recognise core knowledge by determining its clinical relevance and integrating knowledge from several disciplines to understand its relevance to practice. All these students recognise the importance of knowledge that they perceive is asked often in assessments or that occurs repeatedly in teaching and learning activities.

In conclusion, some students struggle to recognise core knowledge because of the invisible pedagogic process. These students seem to try and shift responsibility for their learning decisions onto agents that would be viewed as authoritative in visible pedagogies. Such students are likely to have a limited understanding of applied knowledge, and hence of core knowledge, compared to students who seem to take responsibility for their learning and who thus appear to cope better.

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Chapter 1:

Introduction

1.1. The introduction of a supported PBL curriculum

Globalisation and technical advances have led to a surge of new knowledge and proliferation of ideas in all scientific fields. The medical profession has been part of a massive growth in knowledge, causing institutions and professional bodies world-wide to consider new ways of coping with knowledge and its application (General Medical Council 1993, 2003; Schwartz, 2001; Schwartz & Wojtczak, 2002). Some would argue that traditional, discipline-specific, lecture-based teaching appears to be progressively less relevant to the practice of medicine since multidisciplinary approaches are increasingly being used to solve problems, effectively blurring the boundaries between disciplines (Delanty, 2001). It has been suggested that different ways of presenting and acquiring information are needed to make learning more manageable. In the previous medical curriculum at the University of Cape Town (UCT) and in many institutions in the world, a foundation of theoretical disciplinary knowledge was laid during the preclinical years that was drawn upon in the clinical years. There is a perception that lecture-centred, didactic styles of teaching have been associated with problems in many medical schools causing educators to rethink their approach (see Chapter 3).

A different approach that enables a rational reduction in the volume of work is to focus on knowledge that is relevant to clinical practice. However, "simply shortening the syllabus is not the same thing as investing the pedagogy with a critical purpose" (Freire & Shor, 1987, p.86). Since the practice of clinical medicine draws on numerous disciplines, many educators have advocated an approach that facilitates interdisciplinary learning and places a practical emphasis on relevance to the needs of the society it serves. Problem-based learning (PBL) is one such approach "which can be responsive to the needs of the age" (Savin-Baden, 2000, p.15) in developing appropriate knowledge and skills.

A PBL approach is consistent with global trends in medical education. Medical schools, locally and internationally, have adopted this strategy for training their doctors (Albanese & Mitchell, 1993; Candy, Crebert & O'Leary, 1994; Kinkade, 2005; Maudsley, 1999a; Moust, Berkel & Schmidt, 2005; Taylor, 2004; Vernon & Blake, 1993). In addition to its suitability for interdisciplinary learning, PBL may be helpful in promoting self-

directed learning. Self-directed learning strategies require students to identify for themselves what needs to be learned in order to understand something. They stand in contrast to lecture driven, teacher-centred methods where students are told explicitly what to learn.

In 2002 the Faculty of Health Sciences (FHS) at the University Cape Town introduced a problem-based learning (PBL) curriculum for the Bachelor of Medicine and Bachelor of Surgery (MBChB) degrees in response to changing healthcare requirements in South Africa and the need for "integrated, student centred, community based learning" (Ncayiyana, 2000, p.307). This undergraduate curriculum presents significant learning challenges for many students as they have to take greater responsibility for decisions about what they need to learn compared to their learning experiences in school.

The present MBChB curriculum at UCT aims to emphasise knowledge that is relevant to clinical practice. This does not mean that everything taught in the previous curriculum was irrelevant but rather that what is learned in the present curriculum is understood in a particular way, i.e. in the context of its relevance to practice. This is a notable difference from the preclinical years in the previous curriculum where many students found it "difficult to apply the principles that they [learned] in the first three years of pure scientific theory to their last three years of clinical practice" (Faculty of Health Sciences, 2002).

The knowledge that students are expected to learn is referred to as "core knowledge" in the present curriculum and includes the information and principles that underpin medical practice (Faculty of Health Sciences, 2002). The curriculum emphasises self-directed learning, which means that students first have to be able to identify appropriate knowledge in order to learn it. Much has been written about what should be included as core knowledge in medical curricula although this varies among institutions (Bandaranayake, 2000; Editorial, 1991; Newble, Stark, Bax and Lawson, 2005). Some institutions define core knowledge in terms of facts while others do so in terms of the cases they use (ASME, 2002). Whichever definition is used, a lot depends on the tools and skills employed for transmitting core knowledge.

"Do we have to know this for the exams?"

The stimulus for this study arose from listening to second year medical students' concerns about deciding what to learn in the Integrated Health Systems (IHS) course in the second year of the MBChB degree. It is, perhaps, not surprising that students feel uncertain in a

curriculum where the learning skills demanded of them were encouraged sparingly, if at all, in their previous schooling. They have to find a way to think, to grow into a "way of being" (Gee, 1996) in a medical academic world that makes significantly different demands on them compared to the teacher-centred form of learning that most of them are likely to have experienced before.

Students frequently ask for explicit guidance on what constitutes core knowledge. The question heading above is partly an effort-sparing, disguised, negative interrogation – What do I not have to learn? – as well as a cry for some form of insight that enables them to recognise core knowledge. As an example, the investigator recently received the following email from a second year student who was not involved in this study. This message expresses a concern felt by many students:

"I am a bit concerned with the amount of depth that we need to go into and the direction to take for anatomy ... I know that the rehab students were able to buy books from Dr [W] that covered all that they needed to know in an easy to follow, sequential manner. Is it advisable to get these books? Or am I merely worrying about nothing? Thanks." (Anonymous student, personal communication, 2008).

Deciding for oneself is not easy for those who are used to being told what to do. Students have to evaluate information from a variety of sources and teaching/learning activities in the curriculum, decide what is relevant for their own purposes and commit themselves to working with those decisions. This takes courage and for some it is extremely stressful.

This study seeks to understand how students recognise core knowledge in the second year of the MBChB curriculum.

1.2. Layout of the thesis

Chapter 2 describes the background to the present MBChB curriculum. It describes the problem-based tutorial groups and the process that students use to generate their learning objectives.

Chapter 3 presents a brief review of the literature on what PBL means and its use in modern medical education. Issues related to core knowledge content of medical curricula are also raised.

Chapter 4 describes Bernstein's theoretical model on curriculum design and its implications for learning and teaching. Bernstein provides a framework for the analysis of data in this study. A generalised view of core knowledge in the curriculum is also presented and a definition is suggested.

Chapter 5 describes the methodology for this study, including ethical issues, and the approach used in the analysis of the data.

Chapters 6 analyses the findings and describes their significance.

Chapter 7 contains the discussion of the findings of this study and their implications for practice.

Chapter 8 contains concluding remarks.

Chapter 2:

The Present MBChB Curriculum

2.1. Introduction

The present medical curriculum for the MBChB degree was set up with the intention of introducing substantial changes in the approach to teaching and learning. The curricular changes were informed by the profile of the medical graduate (Faculty of Health Sciences, 2006) that UCT aims to produce in response to changing health care needs in South Africa (Ncayiyana, 2000), global trends in modern medical education (General Medical Council, 1993) and the burgeoning volume of new information with which doctors have to cope (Faculty of Health Sciences, 2002, 2006; Harden & Davis, 1995).

Prior to 2002, students in the first three years of the medical programme were taught in a subject-based manner focussing on individual disciplines that included basic sciences and the basic medical and clinical sciences. Each subject was taught and assessed separately by the relevant departments with little attention being paid to the integration of knowledge.

The present curriculum is grounded in problem-based learning methods focussing on common medical problems. The approach is aimed at promoting an integrated, multidisciplinary, student-centred learning approach that focuses on the core knowledge, skills and attitudes required to enter the pre-registration period¹ of medical training (Faculty of Health Sciences, 2002). The curriculum is underpinned by a Primary Health Care (PHC) philosophy that values the integration of basic sciences with clinical practice and population health, collaboration between healthcare professionals and the application of individual and population perspectives in teaching, plus research and health care delivery (Faculty of Health Sciences, 2002). The PBL approach and the PHC philosophy complement one another, particularly with respect to collaborative work and the application of knowledge to practice.

2.2. Outline of the MBChB programme.

The present MBChB degree is an undergraduate programme that runs over six years. The focus of this study is on the Integrated Health Systems (IHS) course which starts in the

¹ Commonly referred to as internship.

second year of the programme. A very brief outline of the MBChB programme up to and including the IHS course is presented, followed by a description of the PBL tutorial groups and the processes they use.

First year

The first year of the MBChB programme is comprised of Semesters 1 & 2 during which students are taught the principles of problem-based learning and how to manage PBL tutorials in order to derive learning objectives for subsequent study. During Semester 2 students are exposed to clinical case-based scenarios (also called 'cases'). Once students have derived their own learning objectives in tutorials, they are given a list of the Faculty's intended learning outcomes for the case for comparison with their objectives. Of note is that Faculty's list is not provided to students from second year onwards in order to promote reliance on their own decisions and to encourage self-directed learning.

Second year

The second year of the MBChB programme is comprised of Semesters 3 & 4 and includes the Integrated Health Systems (IHS) course, which is the focus of this study. Learning centres around twelve case scenarios that address clinically relevant healthcare issues. For example, cases concern patients who have myocardial infarction, tuberculosis, HIV/AIDS and prostate enlargement. Each case scenario forms the focus of teaching and learning for two weeks. IHS includes material from fourteen different disciplines² and continues into Semester 5 of the third year when students write their final assessment in IHS. There are other courses that form part of the second year but these are administered separately from IHS and do not relate to this study.

2.3. PBL tutorial groups

A PBL tutorial group consists of ten or eleven randomly assigned students, although the gender and cultural distribution in each group is adjusted to mirror that of the whole class. Students are reassigned to new groups at the start of each semester. They are expected to become increasingly skilled at running PBL tutorials as they progress from Semester 1 to 5. The expectations of student PBL tutorial skills are summarised in Table 1.

²Anatomical pathology, anatomy, biostatistics, chemical pathology, embryology, haematology, histology, human genetics, immunology, medical biochemistry, medical microbiology, pharmacology, physiology and public health.

Semester 1	Semester 2	Semester 3 (IHS)	Semester 4 (IHS)	Semester 5 (IHS)
Students are introduced to SPBL and begin to learn through practice	Students begin to consolidate learning how to do SPBL	Students consolidate learning and practice SPBL on the basis of experience	Students are experienced in SPBL *This study conducted here	Students are confident in SPBL and are self-directed learners

Table 1. Student progress in SPBL. An outline of anticipated student progress in the Supported Problem-Based Learning (SPBL) process (Faculty of Health Sciences, 2005, p.10). The present study took place during Semester 4.

Each case scenario is discussed over two weeks during which three PBL tutorials are held (PBL1, PBL2 and PBL3). Each group is monitored and guided by a facilitator who is a Faculty staff member or senior postgraduate student who has been trained in the PBL process. A facilitator's role in PBL tutorials is to ensure that problems are approached appropriately, assumptions are challenged and assertions justified (Woods (1994) cited in Maudsley (1999b)), but it is not to act as a dispenser of factual knowledge (Maudsley, 1999b).

2.4. The PBL tutorial process

The first tutorial in the two-week period of a case scenario is called PBL1. Here the students read a case scenario for the first time and the process culminates in the generation of learning objectives by the group. Learning is supported by lectures, practical work and other organised activities during the two weeks. In PBL2 and PBL3 students report back to each other on what they have learned and probe one another's learning. PBL1 is the focus of this study.

Students are required to derive their own learning objectives during PBL1 based on their determination of where their knowledge is deficient and what the course requires. Students analyse the case using specific steps outlined in Table 2.

Step 1	Clarify terms in the case scenario
Step 2	Identify key issues to be explained
Step 3	Record prior learning; interrogate and analyse
Step 4	Describe connections between issues and prioritise
Step 5	Identify gaps and formulate learning objectives
Step 6	Evaluate the group's interactions

Table 2: The approach used in PBL1 tutorials. Students use these steps to define their learning objectives (Faculty of Health Sciences, 2005). These steps are based on the seven step process used at the University of Maastricht (Schmidt, 1983).

On completion of a case, students should be able to identify and explain the phenomena encountered and demonstrate an applied and integrated understanding of the disciplinary knowledge involved.

2.5. Learning objective collation meetings

After PBL1, representatives from each of the PBL groups in the class meet to collate a list of agreed learning objectives that are made available to the whole class. Each group elects its own representative. The meeting is run by the students and the process involves discussion about the wording and relative importance of the learning objectives. The meeting is usually observed by the course convenor who may advise on the suitability of certain learning objectives. For example, while a certain topic may be relevant to the case, the course convenor may know that the same topic receives more prominence in a later case and can inform the students accordingly. They can then devote more time to other issues arising in the current case. The function of the course convenor is neither to "rubber-stamp" the objectives nor to override the meeting's decisions as they are the product of the students' hard work; but if a suggested learning objective was entirely irrelevant, something would be said by the course convenor to address the issue. In practice, this is rarely a problem.

Chapter 3:

Literature Review

The aim of this review is to present a brief overview of the use of problem-based learning (PBL) in modern medical education, to indicate the principles underpinning the PBL approach and to highlight issues pertaining to the definition of core knowledge in undergraduate medical curricula. The purpose is not to present an argument for or against the use of PBL in medical education but to indicate some of the debates around its use and to understand some of the demands that PBL places on students.

3.1. What is PBL?

There is no single definition of problem-based learning (PBL). It is an approach that is intended to allow the efficient acquisition of new knowledge by building on prior knowledge, critical thinking, reflection and application (Maudsley, 1999a). Moust et al (2005, p.680) consider PBL to be "a contextualist, collaborative and constructivist learning environment 'par excellence'." PBL "has the potential to prepare students more effectively for future learning because it is based on four modern insights into learning: constructive, self-directed, collaborative and contextual" (Dolmans, de Grave, Wolfhagen & van der Vleuten, 2005, p.732). In a medical curriculum, "the primary objective of problem-based learning is to accumulate the concepts of medicine in the context of a clinical problem" (Norman, 1988, p.282). The emphasis is thus on the meaningful acquisition and application of knowledge in a relevant context. By studying problems, students become aware of what they know and also what they do not know and hence they can determine what they need to study further (Dolmans & Schmidt, 1994)

Semantic difficulties concerning the use of the term "PBL" have resulted in it being used inconsistently and, on occasion, to mean something beyond generally accepted practice and philosophy (Maudsley, 1999a). The word "problem" appears in problem-oriented and problem-solving approaches to learning that have different meanings to problem-based learning. Use of the term PBL is now widely accepted in the literature and some authors feel it is preferable to continue using it in an explicit manner rather than replacing it with new or unfamiliar terms (Maudsley, 1999a; Walton & Matthews, 1989).

Walton and Matthews (1989) regard PBL as a general educational strategy rather than a teaching method, implying that all elements of a curriculum should cooperatively

reinforce the underlying principles of PBL. A change in one part of a PBL curriculum may have far reaching consequences for the rest, so it is important that PBL be seen as a coherent educational approach governing the whole curriculum (Barrows (2001) cited in Moust et al (2005)).

What are the criteria that permit a curriculum to qualify for the appellation "PBL"? A curriculum could be evaluated by the amount of time spent in PBL activities. The extent to which these activities are incorporated into medical curricula varies from school to school. Kinkade (2005) looked at contact time for PBL in 123 Liaison Committee on Medical Education (LCME)-accredited medical schools in the USA and reported a range from less than 10% up to 75% of preclinical-faculty student contact hours being spent on PBL. There appears to be no commonly agreed upon definition of how much time should be devoted to PBL-type activities before a course can be prefixed with the PBL label and such a distinction may not be very helpful anyway. Maudsley (1999a) gives a broad view of PBL as "both method and philosophy with the purpose of promoting efficient knowledge handling and transfer in a stimulating context" (p.181). This is an all-encompassing point of view that includes everything in the curriculum. It fits with the interdisciplinary integration that PBL promotes and emphasises the interdependency of one part of the curriculum on another.

Alignment with certain underlying principles is another way of seeking consistency in the understanding of the term PBL. A survey of the literature offers the following key principles that underpin the PBL approach (Albanese & Mitchell, 1993; Kinkade, 2005; Maudsley, 1999a; Newman, 2003; Norman & Schmidt, 1992; Taylor, 2004; Vernon & Blake, 1993; Walton & Matthews, 1989;):

1. It centres on carefully constructed problems in authentic contexts that require the interdisciplinary synthesis of new knowledge and skills in order to be understood or solved.
2. It requires the application of prior knowledge.
3. It is student-centred and requires self-directed learning strategies for which the student is responsible.
4. It depends on cooperative learning that typically takes place in small groups.
5. It fosters an active learning approach.

Students need to become confident about finding out what they need to know because "technological change is occurring at such a rapid pace that any given state of occupational preparedness can be obsolete in years" (Kraak, 2000, p.7). PBL is intended to

promote student self-directed learning (as opposed to teacher-directed) learning (Candy et al, 1994) and this may translate into the life long learning required in professionals (Norman & Schmidt, 1992).

Supported Problem-Based Learning (SPBL)

One of the key reasons for introducing PBL is that it promotes the learning of knowledge that is relevant to practice. However, changing over to a PBL-type curriculum calls for substantial teaching and learning adjustments by both lecturers and students and it is the nature of these adjustments that is of interest to this study.

The present curriculum has been termed Supported Problem-Based Learning (SPBL) because of its use of support activities, especially lectures, that PBL curricula often decried in the past (Berkson, 1993). Support activities are emphasised in the present MBChB curriculum as the Faculty anticipated that the demands of the curriculum might be very challenging for some students. Relatively small numbers of lectures (compared to the previous curriculum) were allocated to each discipline to support the teaching of conceptually difficult topics, to provide overviews, to emphasise the relevance of certain knowledge to clinical practice and to encourage students in the learning process.

3.2. PBL in medical education

PBL, as used in medical curricula today, originated at McMaster University over forty years ago (Berkson, 1993; Norman & Schmidt, 1992). It was introduced with the intention of remedying the shortcomings of existing medical curricula such as content overload, poor retention of basic science knowledge into the clinical years, poorly attended lectures, demotivation, inefficiency and ineffectiveness (Berkson, 1993). It was intended to allow the efficient acquisition of new knowledge by building on prior knowledge, critical thinking, reflection and application (Maudsley, 1999a).

It was felt by those at McMaster that if basic medical sciences were taught in a clinically relevant form that they would be better understood, remembered and applied and that self-directed learning and problem solving skills would be nurtured (Berkson, 1993). Advocates of PBL suggest that it works well if students take responsibility for their own learning (Taylor, 2004). Many medical schools throughout the world have subsequently adopted PBL strategies in developing their curricula (Albanese & Mitchell, 1993; Candy et al, 1994; Dolmans et al, 2005; Moust et al, 2005; Taylor, 2004; Vernon & Blake, 1993). In the United States of America the use of PBL appears widespread with 70% of medical

schools accredited by the LCME adopting a PBL approach in the preclinical years (Kinkade, 2005).

Evidence of the effectiveness of PBL in undergraduate medical education is generally equivocal (Berkson, 1993; Newman 2003; Smits, Verbeek & de Buissonje, 2002; Spencer & Jordan, 1999; Taylor, 2004). Protagonists favour PBL because it focuses on active, applied learning in context and they contend that students find it more enjoyable than traditional curricula (Norman, 1988). Antagonists of the PBL approach criticise it for being resource intensive and "minimalist" (Williams & Lau, 2004), prompting them to ask if the change is professionally safe or worth the effort as they argue there is insufficient evidence to show that it will produce better doctors. Some authors position themselves midway, calling for a variety of learning paradigms to be used (Talbot, 2004).

Colliver (2000) believes that the educational claims for PBL have been given undue prominence and its underlying theory is weak. Norman and Schmidt (2000) contest this assertion but agree that aspects of PBL deserve review. They believe "that the field will advance only by a systematic research programme which encompasses all aspects from theory building and testing to ... programme evaluations in realistic settings ..." (Norman & Schmidt, 2000, p.727). Irrespective of controversy, what can be acknowledged is that PBL is "an approach to reform that has international credibility" (Maudsley, 1999b, p.657).

3.3. Core knowledge

Another aim of PBL is the application of knowledge to particular fields of endeavour. In the present MBChB curriculum, this specifically includes knowledge that is relevant to clinical practice at internship level. Thus designers have to decide what knowledge needs to be learned by students and for what purpose. The knowledge that students are expected to acquire is termed "core knowledge".

In 1993 the General Medical Council (GMC) in the United Kingdom called for reform in British medical education, including a reduction in the volume of work to be learned and the establishment of 'core curricula' (Editorial, 1991; General Medical Council, 1993). Extensive changes followed the GMC's call, although " ... there remains no national agreement on the content of a core curriculum" (Newble et al, 2005, p.680).

Deciding what constitutes core knowledge in an undergraduate medical curriculum is controversial (Editorial, 1991; Harden, 1994). In the past, the content to be taught and learned was defined largely by what the individual disciplines or departments in an

institution decided. The knowledge that was learned tended to be discipline- or subject-based and served the interests of those disciplines. Charlton (1991) depicts the traditional medical curriculum as an "accidental result of multiple collisions between vested interests in a variety of departments, held in check by the inertia of tradition" (p.21). This tradition frequently held that theory had first to be learned before attempting practice. Charlton (1991) proposes the converse as being more appropriate: "A truly vocational training must start with the job, and move back to the basics needed to understand what happens in good practice" (p.21). This type of approach has been adapted to suit the present MBChB curriculum at UCT where knowledge that is relevant to practice is valued and where it serves the interests of the curriculum as a whole rather than those of individual disciplines. A core curriculum is thus based on core knowledge selected with a practical purpose in mind and the contributing disciplines' role is to support that purpose. The relationship between contributing disciplines and the curriculum they serve is explored further in Chapter 4.4.

Harden and Davis (1995) refer to a range of methods in the literature for determining what should be included in an educational programme. In UCT's present MBChB curriculum, which values the interdisciplinary integration of knowledge, the Faculty first agreed on the description of the kind of doctor that it wished to produce. This enabled the negotiation of each discipline's contributions to core knowledge and thereby determined what needed to be taught. The identification of core knowledge and the decision about what to include in a curriculum is an iterative one demanding constant review (ASME, 2002). "[C]ore curricula are not absolute, like the structure of insulin, nor are they fundamental truths ... It is important to recognize in determining the core curriculum that it will change with time" (Harden & Davis, 1995, p.136).

In this state of flux, there are many competing interests for curricular space that are influenced by disciplinary pressures, local health care demands, national priorities and minimum global standards for safe practice (Bandaranayake, 2000; Institute for International Medical Education Core Committee, 2002) that have to be balanced against what is achievable. It is to be anticipated that consensus about core knowledge may be very difficult to reach in the face of so many competing interests (Editorial, 1991) and that all these influences will be encountered by students in the various discourses to which they are exposed in the curriculum.

Chapter 4:

Curriculum Design: A Theoretical Approach

4.1. Introduction

This study is concerned with how second year medical students recognise core knowledge. The present curriculum follows a problem-based learning (PBL) approach that encourages different teaching and learning strategies compared to the previous curriculum. It emphasises knowledge that is relevant to clinical practice at internship level, such knowledge being referred to as "core knowledge". Although much of the knowledge from the previous curriculum is still relevant, the teaching and study methods have altered and there is an emphasis on interdisciplinary integration of knowledge relevant to clinical practice (Faculty of Health Sciences, 2002). The present curriculum promotes self-directed learning, rendering students more responsible for identifying knowledge to be learned than in the previous one. It is how students recognise core knowledge in the present curriculum that is of interest in this study.

The present PBL curriculum aims to develop clearer links between theory and practice than in the past. The hope is that students will better understand the relevance of what they learn and thereby encourage deep-level learning processes "directed towards the intentional content of the learning material" (Marton & Säljö, 1976, p.7). The capacity for students to realise deep-level learning processes depends partly on the environment or context in which the learning occurs (Ramsden, 1992). Ramsden has described a model of learning in context that provides a possible theoretical basis for exploring student learning approaches in this study. He describes deep, strategic and surface learning approaches adopted by students that depend on the context of learning, the student's orientation to studying and previous educational experience. While Ramsden acknowledges the importance of the learning context as one factor influencing student learning approaches, he does not provide a substantial mechanism for examining the structure of learning contexts nor the knowledge valued by them.

The learning context and the knowledge valued in the present curriculum are the objects of significant change compared to the previous one. The investigator felt that these changes might hold clues to students' decisions about what they learn. Since the work of Basil Bernstein addresses curriculum structure and the knowledge to be learned through it, it was decided to use Bernstein's theory to describe curricular change and how it might affect student learning (Bernstein, 1975, 2000). The aims of this chapter are to:

- Present aspects of Bernstein's theoretical framework and its descriptors relevant to this study, including the concepts of collection and integration; the concepts of classification and framing and their relationship to visible and invisible pedagogies; the concepts of recognition and realisation rules that students use to identify and apply core knowledge; and the notion of "knowledge structures" (Bernstein, 2000, p.52) called singulars and regions;
- Apply Bernstein's theory to characterise the features of the present and previous MBChB curricula that determine the knowledge valued by each and to describe the relational idea in the present curriculum;
- Define what core knowledge means with reference to Bernstein's theoretical framework.

4.2. Bernstein's theory of coding of educational transmissions

Basil Bernstein was Professor of the Sociology of Education at the University of London Institute of Education and his work deals "directly with issues of curriculum teaching, evaluation and social relations (collectively, pedagogy) in education" (Davies, 2000, p.485). Moore (2001) states that Bernstein's "aspiration to build a theoretical system, with pedagogic discourse at its centre, was one of the most ambitious intellectual projects of twentieth-century social theory" (p.369). This study draws on Bernstein's work to provide a theoretical basis for describing the structure of the MBChB curriculum and how it is taught. Bernstein's work provides tools for the articulation of the nature of change between the previous and present MBChB curricula, how knowledge is presented to students and the implications for how they might perceive it and produce the required output. His theory helps to explain how different curricular structures emphasise particular knowledge, how knowledge is taught and learned and who has the responsibility for driving the process. The present curriculum emphasises the integration of knowledge from multiple disciplines and its relevance to clinical practice, as opposed to knowledge learned predominantly from an insular disciplinary perspective. This emphasis is mediated through the structure of the curriculum and its implementation which Bernstein's theory is well positioned to illuminate.

4.2.1. Collection and integration codes

"Code is a regulative principle, tacitly acquired, which selects and integrates relevant meanings, the form of their realisation and evoking contexts" (Bernstein, 2000, p.110). Bernstein describes two broad types of curricula: a collection code type and an integrated

code type. Both code types are comprised of units, a *unit* being a period of time that contains *contents* (Bernstein, 1975). For example, in a medical curriculum one unit may be devoted to anatomy and another to physiology.

In the *collection code type*, the boundaries of the units are clearly demarcated which, in the example above, means that only anatomy is taught in an anatomy unit and only physiology in a physiology unit. The consequence is a high degree of autonomy for a discipline taught in a unit of a collection type curriculum, where the teachers of those disciplines have authority over what they teach and what they assess.

In an *integrated code type*, the units are not as clearly demarcated since there is blurring of the boundaries that separate them. Bernstein describes such units as standing in open relationship to one another, which implies that contents in the anatomy and physiology units can overlap. To permit boundary blurring in a way that makes appropriate sense in a curriculum, the units have to be "subordinate to an idea which reduces their isolation from each other" (Bernstein, 1975, p.80).

In an integrated code type curriculum, this idea is called a general or *relational* idea. It is this idea that regulates how disciplines interrelate. A department that teaches a particular discipline in an integrated code type is not the sole authority for what it teaches as that authority is subject to the relational idea that governs it and all other disciplines in the curriculum. An explicit understanding of the relational idea is central to integrated curriculum design as it brings "teachers and pupils into their working relationship" (Bernstein, 1975, p.107). Furthermore, Bernstein notes that in integrated type curricula the relational idea focuses on general principles – education in breadth rather than in depth. *Ways of knowing* rather than *states of knowledge* are emphasised (Bernstein, 1975, pp.83 & 102). Also, in integrated codes, "the underlying pedagogic theory is likely to be self regulatory ... [which] is likely to transform the teacher-pupil-lecturer-student authority relationships, and in particular increase the status and thus the rights ... of the student" (Bernstein, 1975, p.83).

Integrated code types encourage self-directed learning approaches where the student has more apparent freedom over how and what to study than under collection codes (although the student still works within the boundaries of the curriculum – see the analogy of the child-at-play in Chapter 4.2.2) (Bernstein, 1975). The apparent freedom and its associated responsibility under integration code types are particularly relevant to the analysis of the data in this study because authoritative resources seem to help some students to recognise core knowledge.

4.2.2. Concepts of classification and framing

Bernstein introduces the concepts of classification and framing for describing the structure and pedagogy of any curriculum. Classification is a reflection of the degree of integration between contents in a curriculum and the relationships between them while framing is concerned with the teaching/learning process and the degree of control students and teachers have over that process. Summarised briefly:

Classification refers to the "... degree of boundary maintenance between contents".

Framing refers to "... the selection, organisation, pacing and timing of the knowledge transmitted and received in the pedagogical relationship".

(Bernstein, 1975, p.89).

Classification is concerned with *what* meanings are legitimate in the context of the curriculum, while framing deals with *how* those meanings are put together in a valid way (Bernstein, 1975, p.85; 2000, p.12).

Classification

Bernstein states that the classification principle "always refers to relations between contexts, or between agents, or between discourses or between practices" and how they differ from one another (Bernstein, 1995, p.17). A collection code type of curriculum, where there are well defined boundaries between contents, is termed strongly classified (+C) while integrated code types, where the boundaries are blurred, are termed weakly classified (-C). For strong classification "the rules is: things must be kept apart", while for weak classification the converse is implied: "things must be brought together" (Bernstein, 1975, p.11; 2000, p.144). In weakly classified curricula, legitimate meaning is something that needs to be constructed by bringing information together in accordance with the relational idea that influences classification.

Classification provides the limits of any discourse (Bernstein, 2000, p.12) and "the key to the distinguishing feature of the context [that] orientates the [student] to what is expected" in a curriculum (Bernstein, 1995, p.17). The logic governing the nature of integration between contents in an integrated code type curriculum is contained within the relational idea. Thus for students to be able to *recognise* core knowledge, they will require insight into the relational idea that helps to define broadly the limits of the discourse of the curriculum (see later in this chapter). In the absence of such insight, a student will struggle

to recognise legitimate text. The term "text", as used here by Bernstein, "is anything which attracts evaluation" (Bernstein, 2000, p.18). In a medical setting this may be anything that a student thinks could be significant such as a patient's itch, a pathologist's report, a mother's tone of voice or an x-ray of a knee joint.

Framing

Framing deals particularly with the pedagogical relationship between the teacher and student (Bernstein, 1975, 2000). While classification regulates how the acquirer's recognition rules operate, framing affects the acquirer's realisation rules for the production and transmission of legitimate text. "If the principle of classification provides us with our voice and the means of its recognition, then the principle of framing is the means of acquiring the legitimate message" (Bernstein, 2000, pp.12 & 17) and the means for making it public. Framing regulates the ways that render discourse apparent in a curriculum. Failure to observe these ways may impair a student's ability to realise legitimate knowledge. This point is particularly relevant to the present medical curriculum where weakened framing, compared to the previous curriculum, has necessitated different ways of learning.

Strong framing (+F) infers firm control by the teacher over how content is taught whereas weak framing (-F) implies the student has more apparent control over how content is learned. When the *framing is strong* Bernstein says there is likely to be a *visible* pedagogic practice (that is explicit). Where *framing is weak*, the pedagogic practice is likely to be *invisible* (Bernstein, 2000, p.14). In invisible pedagogic forms the student appears to be "the author of the practice and even the authority" on what to learn (Bernstein, 2000, p.110) and the pedagogy is implicit, meaning that the learning process is not readily apparent to the student. "The basic difference between visible and invisible pedagogies is the manner in which criteria are transmitted and the degree of specificity of the criteria" (Bernstein, 1975). The ways of recognising and realising core knowledge in a weakly classified (-C) curriculum that employs an invisible pedagogy (-F) are different to those of a relatively strongly classified curriculum using relatively strong framing (+C, +F). For visible pedagogies, the criteria for transmission are specific (Bernstein, 1975) and explicit and they indicate clearly what the priorities are. For invisible pedagogies the criteria are diffuse (less specific) and the manner of transmission is implicit (Bernstein, 1975) so that the student has to decide what the priorities are in order to structure learning.

The analogy of the child-at-play

An appreciation of the implications of weak framing is relevant to the analysis of the data in this study when looking at what students consider as authoritative learning resources and their chosen methods of learning. Bernstein provides a helpful analogy that typifies invisible pedagogic practices in preschool/infant pedagogy that includes the characteristics of invisible pedagogies that have been listed below. The list has been shortened slightly and the word 'student' has been substituted for 'child' to enhance its applicability to a weakly framed university course:

1. The control of the teacher over the student is implicit rather than explicit.
2. The teacher arranges the context which the student is expected to explore.
3. The student has apparently wide powers over what he/she selects to learn, how he/she structures the learning and the timescale thereof.
4. There is reduced emphasis on the transmission and acquisition of specific skills.

(Based on Bernstein, 1975, p.116).

Assume, for the purposes of Bernstein's analogy, that the child has freedom to do what he or she wants (weak framing, -F) within a safely designed environment from which the child cannot stray. Play is the means by which the child learns and the more it plays the more the child learns. Playing is not a goal in itself although it provides insight into the learning process should the child be observed. "Play does not merely describe an activity, it also contains an evaluation of that activity" (Bernstein, 1975, p.117). The level of activity is a reflection of the child's engagement with the environment.

As mentioned above, "text" in Bernstein's terms means anything that attracts evaluation. "Text" for the child-at-play is anything to which the child turns its attention during play. The more the child plays, the more it learns but it does so following its own decisions. The child implicitly contextualises and makes meaning of what it encounters and then applies that knowledge in the form of increasingly elaborate play. After a while an observer will notice that the form of play is more sophisticated although the child is unlikely to be aware of this development since learning is implicit.

Bernstein cautions that while the child-at-play's "learning is a tacit, invisible act ... its progression is not facilitated by its explicit public control" (Bernstein, 2000, p.119). Thus if parents constantly instructed their child on what and how to play, the child would be denied the opportunity of recognising for itself what a suitable play activity is

(classification) and for deciding on the best way to play (framing). A child's learning is likely to be most productive when the child itself initiates play, i.e. the child is the authority on what to learn because it makes the decisions on what to engage with in the environment. In reality, the child is only *apparently* in control (cf. point 4 above) because it is restricted to an environment that has limits and is known to be safe. This analogy finds sympathy with PBL where the curriculum creates the limits within which the students pursue their learning activities but where they still can decide how to go about learning. One could consider a relatively weakly classified (-C) curriculum to be analogous to the open environment that the child-at-play explores. Students in such a curriculum employing a relatively weakly framed (-F) pedagogy learn more with increasing levels of engagement in the curriculum. Explicit interference with this freedom by the teacher may impair learning in PBL curricula as it is " ... undesirable to carry out the learning processes on students' behalf" (Moust et al, 2005, p.678). Thus for effective learning students need relative freedom to engage with the process on their own terms.

4.2.3. Recognition and realisation rules

This study focuses primarily on the recognition of legitimate text, which is regulated by classification. However, it may only be in the failure to realise (produce) legitimate text that problems originating from misrecognition become manifest. It is therefore relevant to consider matters relating to both classification and framing when looking at how students recognise core knowledge.

Classification and framing procedures act selectively on the recognition rules and on the realisation rules [which] ... at the level of the acquirer, enable that acquirer to construct the expected legitimate text (Bernstein, 2000, p.18).

In the MBChB curriculum the production of legitimate text, such as during assessment, is a function of both classification and framing. Students use recognition and realisation rules to achieve these processes concluding with the production of legitimate text. Realisation rules are regulated by recognition rules (Morais & Neves, 2006) as a student must identify what to learn before realising appropriate output.

In Bernstein's theory the classification principle defines the context in which interactions occur and so orientates the student to legitimate knowledge within that context. Students use recognition rules, which may be partly a product of their learning experience and are regulated by classification, in order to create meanings that are relevant to the curriculum. If a student uses recognition rules that are inappropriate to the classification, "ambiguities in textual recognitions" can arise (Bernstein, 2000, p.17). The

student will then fail to produce text legitimate to the context of the curriculum because of inability to recognise appropriate knowledge. In the MBChB curriculum, appropriate knowledge is the "core knowledge" and contained within the recognition rules would be an appreciation of its clinical relevance.

Realisation rules determine how valid knowledge and its meanings are realised (put together) in a legitimate way to be transmitted to others. Bernstein's concept of framing refers to how transmission of knowledge occurs and hence how new knowledge, once recognised, is realised and put together in a legitimately meaningful way. While both recognition and realisation rules are essential to the learning process, this study is concerned with what students recognise as meaningful learning, i.e. how they recognise legitimate text.

4.2.4. Singulars and regions

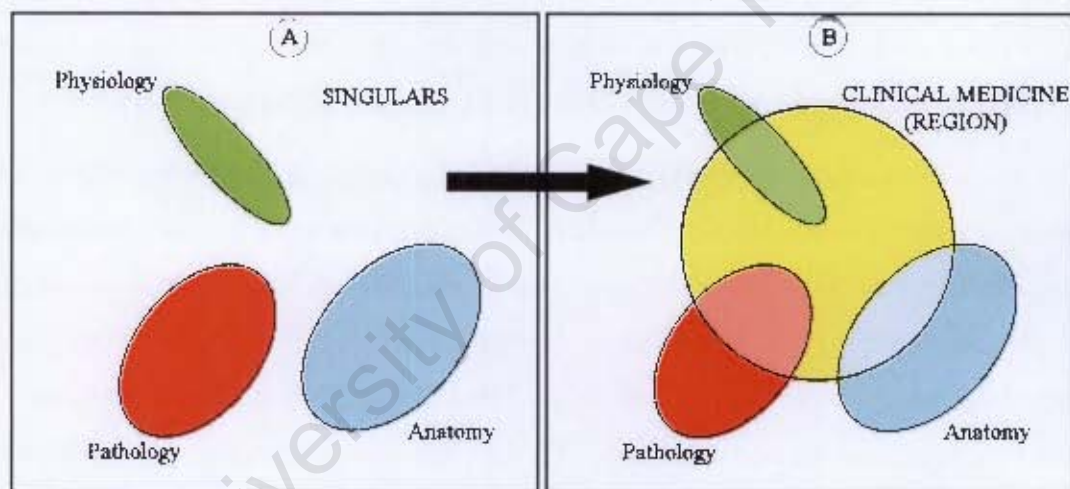
"A truly vocational training must start with the job, and move back to the basics needed to understand what happens in good practice" (Charlton, 1991).

The way that knowledge is included and presented in a curriculum depends partly on the purpose for which it was intended. Bernstein defines two structures in which knowledge is packaged differently: singulars and regions (Bernstein, 2000, p.52). *Singulars* are unique, specialised and discrete discourses that are "oriented towards their own development [and] protected by strong boundaries and hierarchies" (Bernstein, 2000, p.52). Singulars are inward looking, focussing on themselves with their knowledge domains, their own ways of thinking and their own ways of doing things. In the previous MBChB curriculum, the first three years were composed mostly of singulars (e.g. anatomy and physiology) that functioned separately in a relatively strongly classified curriculum.

Subsets of knowledge from several singulars can be appropriated to create *regions*. "Regions are recontextualisations of singulars" (Bernstein, 2000, p.55) into units where they function cooperatively in order to achieve a purpose that may not necessarily promote the development of the singulars themselves. A region thus weakens the "autonomous discursive base[s]" of its contributing singulars (Bernstein, 2000, p.52). "Regions are the interface between disciplines (singulars) and the technologies they make possible" (Bernstein, 2000, p.52). Bernstein refers to medicine as a "classical' university region" that is able to look inwards towards its contributing singulars while also looking "outwards towards fields of practice" (Bernstein, 2000, p.55). While regionalisation weakens the disciplinary/discursive authority of a singular within a region, it permits

entirely new knowledge to be realised to achieve a common purpose. Singular knowledge is thus appropriated in service of the region rather than the singular.

The present MBChB curriculum claims to be an integrated curriculum and is thus a form of regionalisation that draws disciplines together for their intended relevance to clinical medical practice (see Figs.1(A & B) below). Singulars are not assimilated in their entirety into a region; they are weakened so that they can contribute part of their knowledge that is required to fulfil the need that stimulated the formation of the region in the first place. The region's function is to integrate that knowledge to achieve the purpose for its existence. In the preclinical years of the previous curriculum, singulars maintained their identities (-C) as suggested by Fig.1(A), but in the present curriculum at the same stage there is a shift towards weakening of the classification (-C) by the merging into the clinical medicine region depicted in Fig.1(B).



Figures 1 (A & B): Depiction of singulars and a region. These diagrams show the investigator's depiction of singulars and regions in the second year of the previous and present MBChB curricula. (A): Representation of the previous MBChB curriculum made up of singulars. (B): Representation of the present MBChB curriculum. The singulars of Physiology, Pathology and Anatomy contribute to the formation of a region called Clinical Medicine (to which many other singulars will also contribute). Areas of overlap in the diagram between the singulars and clinical medicine represent the core knowledge contributions of those singulars, subject to the relational idea governing the curriculum.

Competent medical practice depends upon the acquisition of several discourses from contributing singulars appropriated into the discursive region of clinical medicine. Since discourses are acquired and not learned, acquisition happens subconsciously whereas learning is the intentional process of obtaining knowledge through teaching or conscious reflection (Gee, 1996). The acquisition of discourse necessarily takes time and cannot be acquired by the memorisation of knowledge alone. This point is particularly relevant in weakly classified curricula where *ways of knowing* (implying discursive knowledge) are

emphasised rather than *states of knowledge* (Bernstein, 1975, pp.83 & 102). The time that the acquisition of discourse takes will be seen to be relevant in the analysis where students who work hard (by memorising) do not do as well in assessments as they feel they ought. Such students have failed to recognise core knowledge appropriately since memorisation, being a "state of knowledge", cannot substitute for a "way of knowing" that has a discursive dimension to it.

Bernstein (2000, p.15) states that changes in classification and framing are accompanied by changes in discursive practices, transmission practices, concepts of the teacher and of the pupils, and in concepts of knowledge. The foregoing discussion of Bernstein's work will now be applied broadly to the previous and present MBChB curricula to identify where changes in classification and framing seem to have occurred so that the implications for the recognition of core knowledge can be explored.

4.3. Application of Bernstein's theory to the previous and present MBChB curricula

Previous curriculum

The previous medical curriculum at UCT was divided into the preclinical years and the clinical years. In the preclinical years subjects were taught in a linear, segmented fashion that was lecture-centred with each discipline keeping itself as the focus of its teaching. Disciplinary knowledge was assessed independently by the departments responsible for those disciplines. Disciplines emphasised their own ways of thinking and doing things that primarily served the discipline's own interests. Each discipline was responsible for its own content and each decided what was to be taught, and how it was to be taught and assessed. These disciplines are the singulars referred to above. (This description is based on the investigator's own experience both as a student and lecturer in the previous curriculum).

The curriculum was therefore relatively strongly classified (+C), being a collection code type. The teaching was lecture-centred and didactic with most material to be learned by students being identified by the teachers and taught during lectures. The framing was thus relatively strong (+F), being typical of a visible pedagogic practice described by Bernstein.

Present curriculum

The intention of the present curriculum is to integrate knowledge across several disciplines (Faculty of Health Sciences, 2002). The goal of the curriculum is "to produce a basic undifferentiated doctor with the requisite attitudes, knowledge and skills to enter the pre-registration period with confidence" (Faculty of Health Sciences, 2002).

"Undifferentiated" implies being based on general principles and broadly educated rather than highly specialised, features that Bernstein says are associated with integrated type curricula (Bernstein, 1975). The curriculum design follows "an integrated, systems-based approach to the study of the sciences basic to medicine, the key to which is early clinical contact in the form of clinical scenarios with the patient as the focus of learning" (Faculty of Health Sciences, 2002). The teaching/learning approach aims to be student-centred, using "supported problem oriented learning strategies" (Faculty of Health Sciences, 2002).

The *relational idea* (although it may not have been referred to as such) used during the initial design of the present curriculum has been derived from several parts of a lengthier document (Faculty of Health Sciences, 2002) by the investigator as follows:

The curriculum follows a multidisciplinary, supported problem-based, integrated systems based approach with the patient as focus, underpinned by a Primary Health Care philosophy that will produce graduates with the appropriate knowledge, skills and attitudes for competent practice at internship level in South Africa.

The term "problem-oriented" was used in the original document but has been replaced by "problem-based", a term that is now in common use by the Faculty of Health Sciences. In the investigator's opinion the present curriculum adheres to the key principles of PBL referred to in Chapter 3.1 and can legitimately be referred to as a problem-based curriculum.

Disciplines are studied simultaneously in an integrated manner that values knowledge relevant to clinical medical practice at internship level. The present curriculum would be termed an *integrated code type*, having a *relatively weak classification* compared to the previous curriculum as disciplinary boundaries have been blurred by the relational idea. Students have more control over their learning than in the previous curriculum. Learning is expected to be *self-directed* with students taking the initiative in deciding what to learn, in making meaning of it for themselves based on the curriculum's teaching/learning activities and resources. Thus the *framing is relatively weak* compared to the previous curriculum.

The usefulness of Bernstein's work here has been to show where shifts in classification and framing have occurred between the present and previous curricula and what that means for the kind of learning required and the knowledge that is valued by each. In the analysis, this framework will be used to gain insight into how these shifts affect students' attempts to recognise what they need to learn.

4.4. Core knowledge

In this section the concept of core knowledge will be described in a generalised form by drawing on the work of Scheffler (1965) and Bernstein (2000). The concept will then be expanded upon and the section concludes with a suggested generalised functional definition of core knowledge.

Towards a generalised understanding of core knowledge

The relational idea in the MBChB curriculum described above emphasises knowledge that is relevant to clinical practice at internship level and fulfils the aims of the profile of UCT's medical graduate. This knowledge is referred to as core knowledge in the curriculum with which students have to become familiar during the course. Students would be helped by an appreciation of the relational idea to assist in the recognition of core knowledge in order to know what to learn. Students would also require a different approach to studying and learning in a relatively weakly classified (-C) curriculum that employs an invisible pedagogy (weak framing, -F) compared to a (+C, +F) curriculum.

Since the emphasis of the present curriculum is on integration of knowledge that is relevant to clinical practice, core knowledge includes factual knowledge and "ways of knowing" that factual knowledge that are important in practice. Scheffler (1965) has described kinds of knowing by distinguishing knowing *that* from knowing *how*. The former is referred to by Scheffler as propositional knowledge and the latter as procedural knowledge. Scheffler suggests that discovery and problem-solving methods used in education, which have some affinity with PBL, may be "operating upon the general presumption that such methods lead to strong knowing as an outcome" (Scheffler, 1965, p.10).

Propositional knowledge includes elements of the truth of that knowledge, belief in it and having supportive evidence for it so that it can be known in a strong sense and not merely assented to by the student (Scheffler, 1965). Procedural knowledge "... represents the possession of a skill, a trained capacity, a competence, or a technique" (Scheffler, 1965, p.95) in a particular context. Core knowledge contains both propositional and

procedural elements that need to be contextualised and known in a particular way in order to be applied to clinical medical practice. At this point Bernstein's concept of singulars and regions now becomes helpful (see Chapter 4.2.4).

The idea of singulars and regions encapsulates both propositional and procedural knowledge described by Scheffler. To function efficiently within a region, it would be helpful, but not sufficient, to be broadly grounded in the propositional and procedural elements of the contributing singulars. Students have to identify and learn relevant propositional and procedural knowledge (i.e. core knowledge) from the contributing singulars and then recontextualise that knowledge in light of its relevance to clinical medicine.

In terms of Bernstein's theory, core knowledge could be viewed as the legitimate text that has to be recognised by a student. The propositional and procedural knowledge contributed to a region by its singulars forms the core knowledge requirements of those singulars that students need to recognise and acquire. This core knowledge is represented graphically by the areas of overlap shown between the singulars and the clinical medicine region in Figure 2. The areas of the singulars outside the overlaps remain relevant to clinical medicine in that they contribute to the foundation and construction of the singulars. (A limitation of this graphical representation is that, in reality, disciplines cannot be divided up as precisely as the diagram suggests. Nevertheless, it serves to illustrate the dependency of regions on subsets of singular knowledge.)

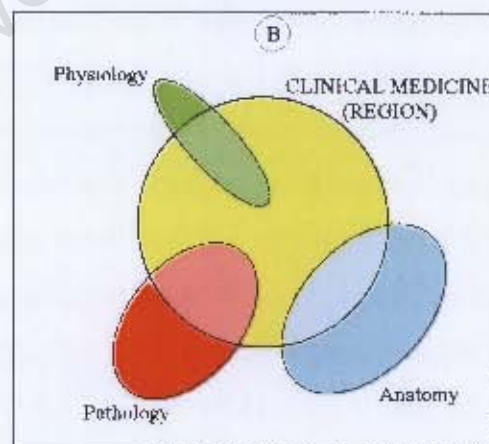


Figure 2: (This is Fig 1(B) repeated). Depiction of a region. This is a representation of the present curriculum. Areas of overlap in the diagram between the singulars and clinical medicine (region) represent the core knowledge contributions of those singulars, subject to the relational idea governing the curriculum.

In the Integrated Health Systems (IHS) course, students have to handle up to fourteen singulars, each with their propositional knowledge and distinctive discourses. The knowledge from each singular has to be understood initially from that singular's discursive perspective. Knowledge that is relevant to the region of clinical medicine has then to be extracted from the singular and reinterpreted from the region's discursive perspective. Although Fig.1B above makes no serious attempt to quantify the levels of overlap between the singulars and clinical medicine or between the singulars themselves, Fig.3 below illustrates how complex the inter-relationships might be with areas of multiple overlaps.

As students progress through the MBChB curriculum their acquisition of discursive insight into clinical medicine will increase and the apparent boundaries defining the overlaps will become more porous in sympathy with the relational idea governing the curriculum. Until the boundaries can be negotiated with ease, students will find clinical medical tasks complex as they try to define the areas of overlap representing the core knowledge contributions from each singular that are relevant to clinical medicine. In second year these boundaries are likely to be perceived as fairly well defined, reflected by the tendency of beginners to use facts and rule-based ways of thinking (Flyvbjerg, 2001).

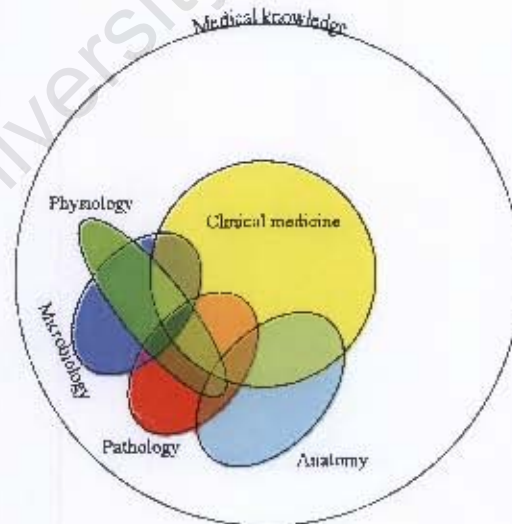


Figure 3: Complexity of overlaps between singulars and a region. Each overlap contributes to the discursive load with which a novice student has to cope.

A functional definition of core knowledge

The investigator suggests the following working definition of core knowledge in the present curriculum:

Core knowledge in the MBChB curriculum encompasses the knowledge, skills and attitudes required for confident practice as defined by Faculty (Faculty of Health Sciences, 2002). It includes propositional and procedural knowledge (Scheffler, 1965). It is identified through the operation of appropriate recognition rules regulated by classification of the curriculum, informed by a relational idea, and by the framing of its pedagogy (Bernstein 1975, 2000). It resides at the sites of intersection of the singulars that contribute to the formation of regions (Bernstein, 2000).

This understanding of core knowledge reflects the complexity of interactions that medical students encounter in the present curriculum. The analysis of the data will use the descriptors and apply the theoretical concepts discussed in this chapter to obtain insight into how students recognise and access core knowledge.

Chapter 5: Methodology

5.1. Introduction

This study aims to provide insight into how students recognise core knowledge in an integrated, supported problem-based curriculum, an important aspect of which is an appreciation of the relevance of knowledge to be learned. This study uses the PBL tutorial as a site of student engagement with the curriculum where students are involved in the process of identifying core knowledge. The PBL tutorial was considered the site of choice for observation in this study because students are explicitly required to articulate what they think they need to learn in a defined form as learning objectives that they are going to use further. It has therefore been assumed in this study that the process of generating and listing their learning objectives in PBL tutorials reflects the students' attempts at recognising what they consider to be core knowledge.

The choice of a case study for this investigation will now be described. The method of selection of the subjects and details of the data collection process will be given, followed by a theoretical and practical explanation of the approach used in the analysis of the data.

5.2. The choice of a case study

This investigation aims to understand how students recognise core knowledge. Case studies are suited to the type of enquiry that seeks an explanation for *how* things are done (Yin, 2003, p.7) and permit a closeness to real-life situations that enable a "nuanced view of reality" (Flyvbjerg, 2001, p.72) to emerge.

Case studies can be strong reflectors of reality and they permit the identification of exceptional or unique features that might otherwise be overlooked in larger data collections such as in surveys (Cohen, Mannion & Morrison, 2000). However, the results of case studies may not be generalisable "except where other readers/researchers see their application" (Nisbet & Watts (1984) cited in (Cohen et al, 2000, p.184)). Individuals who stand out from a group by their contrasting behaviours may provide insight into the ways that others function. While unique features may be difficult to generalise, Cohen et al (2000) point out that case studies can provide the key to understanding what is being observed. Flyvbjerg addresses the issue of generalisability, commenting that "the

'generalizability' of case studies can be increased by strategic selection of *critical cases*" (sic) (Flyvbjerg, 2001, p.77).

Nisbet & Watts (1984) (cited in Cohen et al (2000)) refer also to issues of subjectivity and selectivity that can be difficult to cross-check in case studies. In this study the investigator acknowledges being, in a sense, "part of the study" in that he knows and has taught all the students who were interviewed. However, his involvement and experience in the IHS course brings with it insights which are an advantage that can enhance the validity of the findings.

5.3. Study design

This is an ethically approved case study of twenty students in the IHS course conducted during Semester 4 on the second year MBChB class consisting of one hundred and ninety-two students.

5.3.1. Method of selection of the students

The subjects in this study were selected with the intention of including students spanning a range of academic abilities in the class in the belief that this would most likely reveal different approaches to the recognition of core knowledge. It was also considered desirable to keep students together in their established PBL groups for the efficient functioning of the tutorials as they would be used to working together as a unit to identify their learning objectives.

The twenty students selected were members of two PBL tutorial groups, referred to as Group A and Group B, each consisting of ten students. In order to select these two groups, all the PBL tutorial groups in the class were ranked according to each group's mean percentage score calculated from the students' May assessment results in Semester 3. All groups in the class had mean scores above 50%, and there was a 12% difference between the highest and lowest ranked groups. The PBL groups with the highest and lowest mean scores were approached to participate. The facilitator of the first group to be approached declined to participate because that group had previously refused to be video-recorded for another study. However the next two groups that were approached agreed to participate.

5.3.2. The data collection process

The data collection took place as follows: each PBL tutorial group and its facilitator were observed by the non-participant investigator while the group was conducting a routinely

scheduled first PBL tutorial (PBL1) in the manner described in Chapter 2. Each PBL1 tutorial lasted about three hours (Step A in Fig. 4) and was video recorded. However the data was not used in this study.

After a refreshment break of thirty minutes, each group then participated in a semi-directed interview with the investigator to discuss how they had chosen their learning objectives (Step B in Fig. 4). The interviews were video and audio recorded. The investigator made only brief handwritten notes, preferring to give full attention to the interview and not appear distracted to the students. The interviews were initiated with a broad invitation to the group to explain how they thought their group had decided on their learning objectives. The investigator used open-ended questioning and occasional prompting to facilitate free flowing discussion, focussing mainly on learning objectives related to anatomy, physiology and anatomical pathology. These specific disciplines were chosen because they contribute substantially to the volume of work in IHS; they have considerable areas of knowledge overlap with one another which might be useful when looking at interdisciplinary thinking; and they are among the disciplines in IHS with which the investigator is most familiar. When the investigator felt it appropriate, he prompted discussion about lectures, reference literature and assessments, which are among the factors that Dolmans & Schmidt (1992) explored in assessing what drives students in problem-based learning. The recordings from Step B were subsequently transcribed by the investigator (Step D).

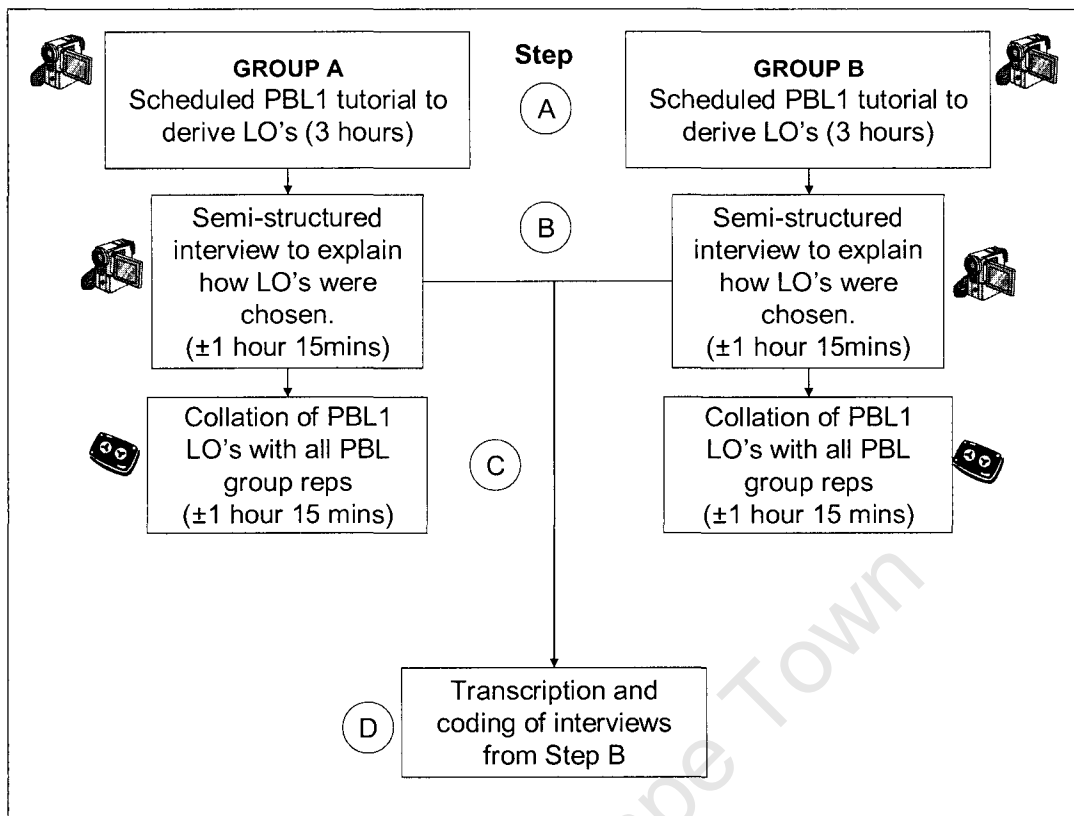


Figure 4. Outline of the data collection process. The conversations in Step B were transcribed for analysis. PBL1 = problem-based learning tutorial 1. LO's = learning objectives.

The following day the interviewed group's representative attended a learning objective collation meeting (see Chapter 2.5) with representatives from all the other groups in the class to consolidate their learning objectives. This meeting was observed and audio recorded by the investigator who did not participate in the meeting (Step C in Fig. 4). These meetings were less structured and run more informally than the PBL tutorial meetings. Transcription of the collation meetings was attempted but subsequently abandoned as the audio recordings were extremely difficult to follow. Students tended to speak simultaneously and frequently interrupted one another. The collation meetings' data was therefore not used in this study.

Each group had to be observed and interviewed by the investigator in Steps A and B on separate occasions; consequently Group A used a different case scenario to Group B. Since the data collection and analysis did not depend on the case content *per se*, this was felt not to be a problem.

5.3.3. The influence of the investigator and use of recording equipment

The investigator teaches students in IHS and is a member of the assessment design team in the setting of IHS assessments. He also deals with student assessment queries and, at the time of the interviews, maintained the records of all marks in the IHS course.

The investigator is aware that he holds a position of power in the student/lecturer relationship and is sensitised to the possibility of influence over students. To minimise this influence, the facilitators of the tutorial groups that took part in the study were asked to approach their groups so as to avoid any sense of pressure to participate that the presence of the investigator might cause. Should a group decline to participate, the investigator would be unaware of who made that decision.

An additional safeguard for the students against undue influence of the investigator is that the investigator does not work in isolation but shares responsibilities with other staff members in the assessment design team and with the course convenor. There is also transparency in the way students' marks are recorded and used, and students are kept fully informed about this as a matter of course.

It is desirable for the observed groups to feel as free as possible to conduct matters in their usual way. The presence of recording equipment could inhibit the frankness of discussion, particularly video recording which is more intrusive than audio recording as participants are more readily identifiable. The presence of the investigator has the potential to affect the behaviour of the participants who may try harder than usual to do things "properly" or may want to please the investigator, or at least not upset him with curious comments.

The investigator explicitly acknowledged these issues in discussion with the groups to be interviewed by emphasising measures to protect participants' identities (described below under Ethical issues) and that the investigation was being carried out from a non-judgemental perspective, driven by a desire to enhance the quality of student learning. Recording equipment, though visible, was placed as unobtrusively as possible.

5.4. Ethical issues

The ethical issues relate to consent, confidentiality and anonymity. Ethical approval for this study was granted by the Research Ethics Committee of the Faculty of Health Sciences (Ref. No. 319/2005), University of Cape Town and endorsed by the School of Education in the Faculty of Humanities.

The course convenor and the head of the department responsible for administering Semester 4 were asked for permission to conduct the study. All participants (students and facilitators) were informed in writing about the aims of this investigation and were told that data would be used by the investigator for purposes of obtaining a degree (see Appendix 3). It was emphasised that agreeing or declining to take part in this investigation

would have no influence (positive or negative) on any student's standing, reputation or assessment result in the IHS course. Participants would also be free to withdraw from the study at any point, for any reason, without prejudice.

All participants were asked to sign informed consent forms granting permission to record visual and auditory data during the PBL tutorial sessions, interviews and learning objective collation meetings. An undertaking was made to safeguard the anonymity and protect the identity of each student and facilitator while storing, using and reporting on the data. Transcription was done by the investigator using pseudonyms for the participants. The electronically recorded data is to be kept for as long as necessary in order to respond to queries arising from the study, whereupon it has been agreed to destroy it.

5.5. Approach to the analysis of the data

In this section the theoretical approach to coding is described followed by an account of the actual coding process used. Initially an approach based in grounded theory tradition was employed during which time it appeared that the work of Bernstein on curricular change could provide insight into the students' ways of learning.

5.5.1. Theoretical approach to coding and analysis of the transcripts

The interviews were transcribed verbatim by the investigator. The transcripts were analysed using a method of constant comparison and coding that draws on grounded theory tradition. The aim of pure grounded theory is to allow ideas to emerge from the data in an unforced way leading to the development of an hypothesis (Dick, 2002; Glaser, 1992; Miles & Huberman, 1994). It assumes that concealed within the data is a logic that can bring coherence to the data but it has to be allowed to emerge. Grounded theory is not used to "test a hypothesis" (Dick, 2002) but to generate one (Yin, 2003). Indeed, according to Glaser (1992), true emergence may be impaired by asking too many preconceived questions.

However Miles & Huberman remark " ... that data collection is inescapably a selective process, that you cannot and do not 'get it all' even though you think you can and are" (Miles & Huberman, 1994, pp.55). The implication is that the observation of any data collection is going to be selective one way or another, depending on the observer's perspective. Yin (2003) recommends referring back constantly to the original purpose of the study in order not to drift from the topic of interest. In this study, coding was done while keeping the research question in mind: how do second year medical students recognise core knowledge?

The investigator acknowledges the existence of subjectivity from the perspective of a lecturer, of which the reader needs to be aware in the interpretation of the results. However, as mentioned at the beginning of this chapter, the investigator's many years' experience in teaching medical students in the previous and present MBChB curricula and being involved in the design of the present MBChB curriculum brings with it the advantage of insight into the pressures and intricacies of learning in the HHS course. It is therefore unrealistic for the investigator to believe that unbiased coding will result. Hence this study draws only on what is helpful in grounded theory tradition.

Initially, while constantly comparing themes and looking for links between them, the investigator considered drawing on the work of Ramsden (1992) on learning in context, looking for evidence of deep and surface learning approaches. However it appeared to the investigator during the analysis that some students were looking for ways that relieved them of the responsibility of deciding what to learn – the reader is reminded of the generic student query in the introduction that prompted this study: "Do we have to know this for exams?" This question expresses the antithesis of the self-directedness and relevance to practice that the present curriculum aims to promote. It seemed to the investigator that some students were missing the point of their learning, i.e. to become doctors and not just to study for assessments.

The investigator had recently read some of Bernstein's work and noted how changes in curriculum structure could affect the ways that students learn. In Bernstein's theory of the coding of educational transmissions, he describes the notion of recognition rules and what counts as useful knowledge in a curriculum (Bernstein, 2000), prompting the investigator to explore the theory's relevance to this study. His work explains how differently structured curricula encourage the learning of different knowledge that requires different kinds of recognition rules for successful learning. Bernstein's theory provides a framework of descriptors and concepts that can be applied to the data and used as a tool to look for evidence of shifts in classification and framing that occur when moving from a collection code type curriculum with a visible pedagogic practice (relatively strong classification and framing (+C,+F)) to an integrated one with an invisible pedagogic practice (relatively weak classification and framing (-C,-F)). Where these shifts occur, certain learning practices are favoured, to which some students may have difficulty adjusting. The analysis draws on Bernstein's theory to describe these shifts and links them to students' perceived success in identifying core knowledge.

5.5.2. The coding process

Each transcript was read through allowing themes to emerge that appeared to be related to students' ways of identifying core knowledge. After a first reading to get a general idea of themes, the transcripts were re-read with the purpose of looking for links between them. The themes were recorded on the transcripts together with notes suggesting links or new ideas. During this iterative process some themes were found to be sub-themes of a broader overarching theme and so could be grouped together.

As coding progressed, several themes emerged, with overlap between some of them becoming apparent. The themes and sub-themes were entered into a mind mapping software programme called MindManager[®]X5 by MindJet. This was particularly helpful as it allowed for a visually accessible graphical representation of the themes, their groupings and connections (see Fig. 5). The themes were annotated and linked to relevant text extracts from the transcripts, thereby facilitating access to them for analysis purposes (see Fig. 6). The number of quotations from the transcripts captured under each theme gave an idea of the possible importance of the theme, i.e. the greater the number of quotations, the greater the possible relevance.

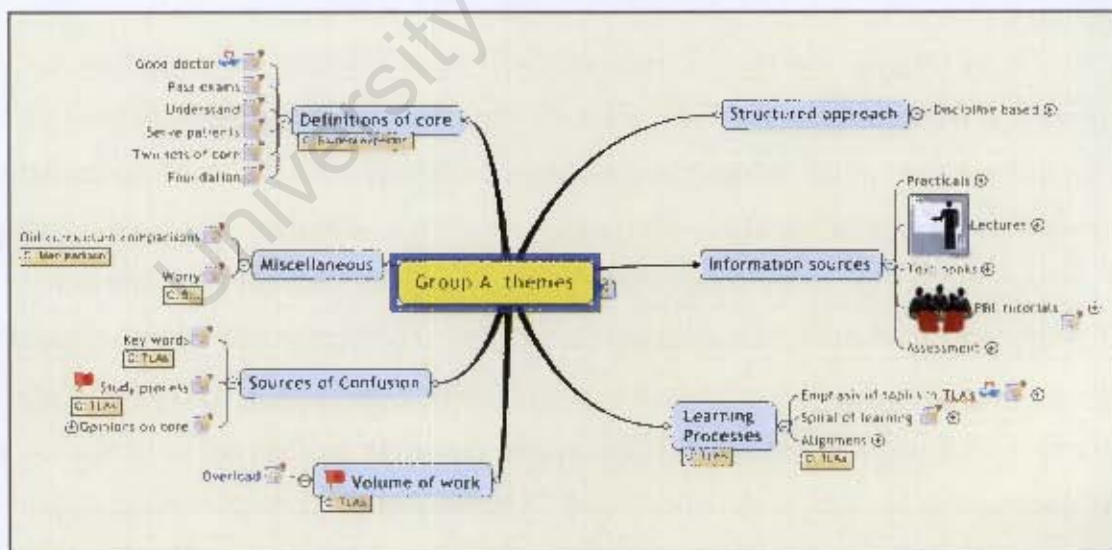


Figure 5. Screen shot of Group A's initial coding themes. The + signs indicate further sub-theme branches that have been collapsed in this view. The pencil and notepad icons next to the themes indicate the presence of hyperlinked text.

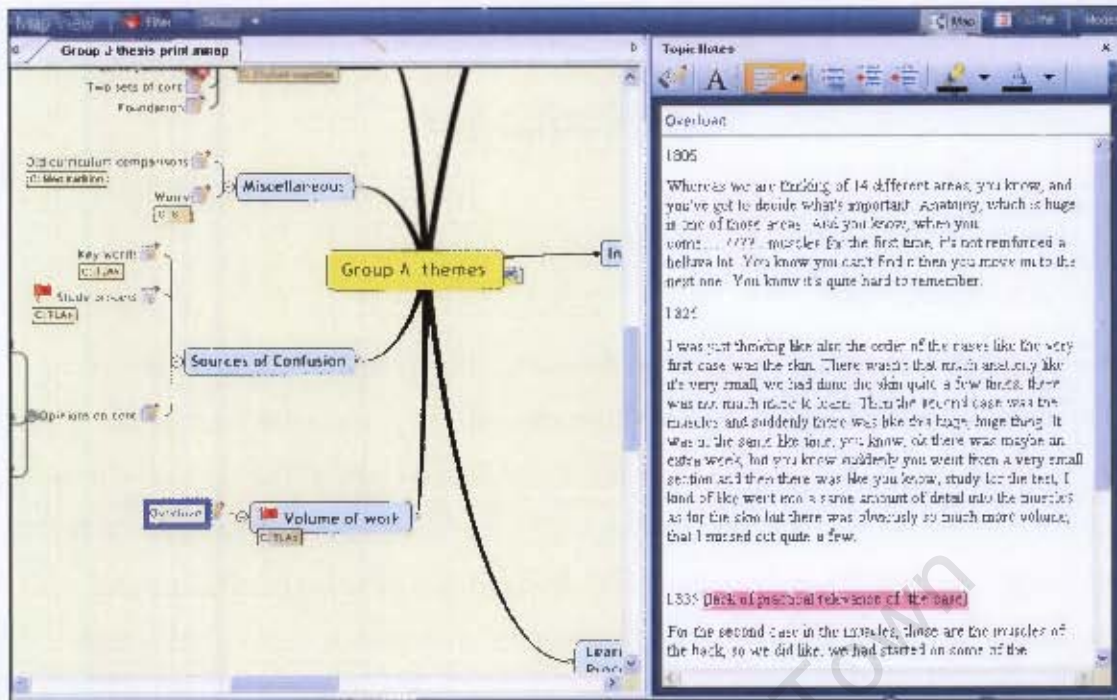


Figure 6. Screen shot of Group A's themes and transcript links. Extracts from the transcript relate to the coding which, in this picture, is a theme concerning Overload.

In the analysis, not all transcription extracts relating to a theme or demonstrating a point of view are necessarily quoted. Representative extracts encapsulating the meanings of the extracts in the themes are given but where outlying/exceptional comments are made these are indicated by the way they are described.

In summary, two PBL tutorial groups consisting of twenty students were interviewed about how they chose their learning objectives during PBL tutorials. The interviews were analysed using a method of constant coding and comparison to define themes. The work of Bernstein was drawn on to explain the connections between the themes in order to understand how students may recognise core knowledge.

Chapter 6: Data Analysis

6.1. Introduction

The aim of this analysis is to understand the recognition rules referred to by Bernstein (2000) that are operating when students attempt to identify core knowledge in the Integrated Health Systems (IIS) course during the second year of the MBChB curriculum. The relatively weak classification and framing of the IIS course has resulted in a change in the knowledge that is valued compared to the previous MBChB curriculum and responsibility for learning has been shifted towards the students, making them more accountable for their own learning decisions.

It is helpful to picture oneself as the student being confronted with case scenarios, packs of readings and other resource material, lectures, practicals and PBL tutorials with the novel pressure, for many, of having to decide what to learn for oneself in an invisible pedagogy. The interviewed students' experiences in the IIS course, mediated through teaching and learning activities, will be described and reflected on from the perspective of Bernstein's work.

The theoretical descriptors and concepts discussed in Chapter 4 enable recognition rules (Chapter 4.2.3) to be proposed that students employ when deciding what they have to learn. Representative views of the students who seemed to struggle with the identification of core knowledge will be contrasted with the minority views of those who seemed to adapt more easily because of the different ways their recognition rules operate.

A note about the naming of students in the analysis

In this study two groups of students were selected with the intention of observing differences between them since one group was presumed to be academically stronger than the other. It turned out that differences between the groups were not significant with respect to how they recognised core knowledge. Differences were observed between individuals and these form the focus of this analysis. This is most likely because students are assigned randomly to PBL tutorial groups at the start of each semester without regard to academic ability and there was a spectrum of academic ability within each group. The naming of the students in this analysis still reflects their group membership (A or B) for

On occasions when staff members intervened in collation meetings, Student 5B finds one staff member's participation to be helpful. "I was a collation member last semester and I felt there that there was a lot of guidance that I enjoyed and I felt that by going to collation I gained that extra understanding and insight into what we should be getting. ... [The facilitator] tends to put you straight [if] you are going off the rails. I enjoyed that a lot." It is not clear from the interview if the "enjoyment" was because of a strengthening of the framing (the facilitator told us what to do) or whether the student gained discursive insight into how to make meaning of what was to be learned by using appropriate recognition rules. These students' comments reinforce the impression of a desire for, and even expectation of, explicit guidance from an *authoritative* figure in collation meetings.

6.3. Lectures

An activity in which the authority of a staff member is visibly manifest is the lecture. A common view of the students is aptly summarised by Student 2B when asked what advice would be helpful for first year students starting medicine: "Tell them to concentrate on lectures!".

Students seem to undervalue their work in PBL tutorials as it seems to lack authoritative endorsement. They prefer to listen to the authoritatively positioned lecturer because " ... LO's don't cover everything that is mentioned in lectures," according to Student 1A. It is understandable that the learning objectives from the first tutorial session of a case scenario are unlikely to be *identical* to Faculty's intended outcomes as students' learning objectives are based partly on their personal knowledge gaps of which Faculty may be unaware. Students are aware of this deficiency and many students prefer to rely on what lecturers say rather than trust in their own efforts. Although students are told that PBL relies on deficient knowledge as a stimulus to self-directed learning and problem solving (Norman & Schmidt, 1992), this seems to be an unconvincing argument for them.

It is not only the apparent perception of a lecturer's authority that influences the students' approach but the associated perception that a subset of core knowledge taught during lectures appears to be asked during assessments. Student 3A commented: " ... I've come to realise that, actually, the lectures are most important ... in terms of, like, the core that we mentioned," because, adds Student 4A, it is " ... mainly what you need to pass; it's mostly, like, from the lectures and that's how I feel". Student 6B agrees: " ... [O]ur exams are based on lectures and not really [PBL tutorials]." Student 1A reinforces this impression and highlights the dependence some students have on lectures for their

learning: " ... [I]f you just went by what the LO's say, you wouldn't cover half the work you need to know for medicine and also for your assessments". Having minimised the study time spent on learning objectives derived in PBL, students try to produce the legitimate text in assessment by paying particular attention to the words of the authoritative lecturer. This saves students from having to identify core knowledge for themselves. If the recognition of core knowledge is impaired by the weakening shift in classification and framing of the IHS course, then seeking out authority in an attempt to strengthen framing is a logical and apparently rewarding response for them, especially for the purpose of passing assessments.

Students are aware that lecturers are likely to focus on core knowledge aspects of their disciplines in the limited lecture time available. Material is usually presented concisely and does not have to be distilled from the extraneous ideas contained in bulky textbooks or that permeate discussion in PBL tutorials. Student 5B comments:

"Sometimes in the exams and tests they test you mostly on what they have covered in the lectures ... There's a lot of stuff in the book that you have tried to understand but it's not really tested so you don't focus on it as much, but you tend to focus on what's in lectures."

Lectures are usually discipline-based which is reflected by the official timetable of lecture topics. This gives the impression of a relatively strongly classified curriculum that its designers did not intend, based on the curriculum's claim to value integration (Faculty of Health Sciences, 2002). Student 4B comments that when deciding what learning objectives to draw up " ... [w]e also look at the time table of lectures and that kind of thing". Lecture titles are published by the Faculty and they are pedagogically visible evidence of what it considers important. Lectures seem to provide students with a familiar vehicle that complements a tendency to seek endorsement or direction from someone or something authoritative about what to learn by creating an island of strong framing in an otherwise relatively weakly framed pedagogic sea.

6.3.1. Lectures and assessment

It appears that students consciously divide core knowledge into knowledge relevant to assessment and other knowledge that seems less likely to be asked in assessments.

"There's the core that's necessary to pass the exam, then there's the core that's necessary to become a good doctor ... ", comments Student 4A. The former, according to the students, comes mostly from lectures that are delivered in a strongly framed manner, while the latter, which is more diffuse in quality, derives from other resources encountered under more weakly framed circumstances that are less familiar to students and require greater

effort to learn. While students do not deny that the latter is important, it is clear that the former is more imperative to them. When asked by the interviewer where "the core that's necessary to become a good doctor" comes from, the same student (4A) replied, "That one would be like going deep ... like using the learning objectives that you got [in PBL tutorials]. But for mainly what you need to pass, it's mostly, like, from the lectures and that's how I feel". Student 10B confirms this strategic tactic of learning lectured material and ignoring the learning objectives, although " ... [the 'non-lectured' information] is good for the individual but at the end of the day you need to pass your assessment to get into the next year and that's what we all want to do, pass".

Student 9B observes that one staff member always asked questions in assessment based on lectures. "Most of the things, like, they come out of the lectures. Like, I can tell you [Staff member X asks] all the questions [from lectures]; like, you have to listen in [those] lectures". In this extract, the framing would be considered strong because what the lecturer taught is asked in assessments that the same lecturer sets and the pedagogy is highly visible. Staff member X is perceived as a reliable authority figure in this discipline who appeals strongly to students who use authority as a recognition rule for core knowledge.

Student 4A demonstrates extreme reliance on lectured material for directing study, to the point that if the authority figure is missing, direction is lost: "Some subjects, I mean, we might not even get a lecture in a case ... so if we get no input from that then we don't know what to learn." While the investigator is not convinced that all the members of this group are as dependent on lectures to the extent that this comment suggests, it reinforces the impression that lectures are viewed as a highly authoritative resource that students rely on to identify and define core knowledge.

In contrast, Student 9A characterises the opposite extreme by demonstrating a sophisticated use of lectures that suggests a broader focus than just the desire to pass. The extract needs to be read in its entirety to appreciate the progressive thinking Student 9A employs.

"But [core knowledge] is sometimes not exactly what the lecturer says but what he or she sparks you to go and find out. Like, maybe it doesn't have to be, like, precisely, like, told in a lecture ... But sometimes people only learn, like, the words written on the slides or they say, Oh I don't need to go to that lecture

because I'll just print the slides off WebCT³. Then they sometimes miscall because they missed maybe a sentence that a lecturer said that, like, sparked an interest in something that made you go, 'Ooh, I should actually understand that kind of thing, I should go and read up on that'."

(Student 9A)

Student 9A's clearly self-directed learning approach contrasts with that of students who are highly dependent on the lecturer for direction and detail. Student 9A's learning is based on self-directed enquiry. This student has responded to the relatively weak framing of IHS by using the implicit freedom to explore and test new knowledge through the teaching/learning activities of the course. Student 9A's approach to learning is similar to the manner of learning described in Bernstein's child-at-play in Chapter 4.2.3 - the "tacit, invisible act" of weakly framed, invisible pedagogies (Bernstein, 2000). There is no single teacher-like authority to which Student 9A appeals, but there is an iterative probing and testing of new information to see how it integrates with existing knowledge and how it can be applied to new situations. The recognition rule for Student 9A operates on the principle of knowledge's *relevance to application* that recognises core knowledge through its relationship to other disciplines and its incorporation into regions such as clinical medicine.

6.3.2. Lectures and the relational idea – conflicting authorities

Integrated curricula, which are weakly classified in Bernstein's model, permit blurring between contributing disciplines consistent with the curriculum's relational idea. Lecturers who teach the various disciplines in IHS have an inherent interest in ensuring that their disciplines receive appropriate exposure. Differences in interpretation of the relational idea can arise between staff who teach the various disciplines. One such incident was noted by Student 5A in the following conversation during the interview:

Student 5A:

" ... Some members of staff may have their own core which is different to other people's core. And they sort of get mixed up or something."

³ WebCT is an online software system used to deliver and administer parts of the IHS course. Some lectures / lecture notes are posted on WebCT.

Student 4A:

"An example ... is ... about [a disease], how [that disease] acts and stuff. And we spend a whole lecture doing that and then another lecturer comes and says, 'No that's not core'. So that could be sort of confusing and stuff."

Student 6A:

"Apparently [that] discipline was told that there was too much detail ... [and that] ... it was covered [by another discipline's] lectures."

Student 5A:

"It still confuses people in the sense that this is what the lecturer wants. So how come one person sees it as core and others don't?"

It is understandable that a student who is inclined towards dependency on lecturers for direction in learning might be confused by disagreement arising between lecturers. The interruption by a highly visible pedagogical process on an ostensibly invisible one could lead to confusion for students. In the disagreement described, a lecturer from Department X taught material that seemed appropriate to their topic. However, another lecturer from Department Y considered some of that material to be part of Department Y's core knowledge "territory". Some students apparently became confused by the contrary opinions expressed by the lecturers. Irrespective of the source of the lecturers' disagreement, the fact that significant student confusion arose in the first place is evidence that some students identify lecturers as authoritative figures from whom they expect to hear the "truth". On this occasion, the "truths" were discrepant so that students, whose recognition rules reflect their dependency on authority figures, were bewildered as the perceived reliability of those figures came under threat.

This incident illustrates a violation of the negotiated interdisciplinary nature of the curriculum's relational idea that embraces integration. It probably represents an unwitting attempt by a lecturer to strengthen the classification of the curriculum that maintains the boundaries between disciplines and guards the identities of both discipline and staff. (The issue of academic and institutional identities in weakly classified curricula is a very important consideration when introducing integrated programmes (Becher, 1987; Bernstein, 1975). However, these interesting aspects will not be discussed further in this study).

In a relatively weakly classified system the directive is, "things must be brought together" while a strongly classified system operates according to the premise that "things

must be kept apart" (Bernstein, 2000, p.11). The interruption of a relatively weak classification by an unexpected strengthening can be very disruptive because of the violation of the integrative nature of the relational idea. Students with low dependency on authority figures, such as Student 9A, would be more likely to tolerate disagreements by acknowledging that differences of opinion can exist and attempting to resolve them by further engagement, based on the recognition rule of seeking out relevance to application.

Student 5A demonstrates similar learning attitudes to Student 9A by accepting responsibility for decisions about learning when saying:

" ... I don't think lecturers should tell us what is core. Part of knowing what is core, or understanding the core, is the art of finding it ... If someone has to tell you, 'This is core and you need to go and study that', you miss the point of getting there yourself."

The point that Student 5A makes is that learning through the resolution of ambiguous meanings can be realised by testing them out in the learning environment. This student emphasises that core knowledge comes from "getting there yourself" and it is preferable to being told to learn something and not really understanding why. Core knowledge is a product not only of classification, which defines what meanings are permitted, but also of framing which is concerned with how things are learned, how those meanings are put together and then realised through application.

In Bernstein's child-at-play analogy (Chapter 4.2.2), he says that "play does not merely describe an activity, it also contains an evaluation of that activity" (Bernstein, 1975, p.117). Bernstein's imaginary child is situated in a weakly framed system with freedom to play in and hence learn about its environment. The child constantly evaluates its environment although it may not be aware that it is doing so. If a parent frequently instructed the child on what and how to play, the quality of learning would be very different compared to the child who directed its own play. So too, students like Students 5A & 9A, engaging on their own terms in a weakly framed pedagogy, have a very different quality of learning compared to students who are continuously told what to learn by the lecturer.

Student 5A's recognition rule appears to be that of relevance to application: "Maybe my idea of core is not what you get in the assessment. It's like anything that is clinically relevant to you or in practice". Student 5A determines the relevance to practice by reading clinical textbooks " ... to know that [something is] clinically relevant". As Bernstein's child-at-play's learning is implicit, so too is Student 5A's method of deciding what to

learn. Whatever seems to be important, or merely demands attention, is evaluated. The more the child plays on its own terms, the more it learns; the more Student 5A engages with the curriculum in a self-directed manner, the more Student 5A learns.

The self-directed learning of Students 9A and 5A based on relevance to application contrasts with that of other students in the interviews who seem to place uncritical reliance on information derived from sources they assume to be authoritative.

6.4. The role of the internet, text books and other publications

The IHS learning environment includes resource materials such as recommended textbooks, Faculty produced material and the internet. The use of the internet as a resource is referred to only twice in the interviews, Student 9A's attitude being, "I don't really like using ... a source like the internet ... as a core source ... I really like the internet sometimes, like extra, but I won't consider that as core".

The manner of the internet's dismissal as a potential core knowledge resource by Student 9A gives insight into this student's interpretation of core knowledge, i.e. it is specifically what the student thinks that UCT's Faculty of Health Sciences demands and not that of some other institution. While this student was shown earlier to apply the progressive recognition rule of relevance to application, Faculty's authority is also heeded. The curriculum specifically focuses on local healthcare needs as the priority (Faculty of Health Sciences, 2002). As described in Chapter 3.3, the emphasis of core knowledge content of curricula varies among institutions throughout the world depending on local and national healthcare demands (Bandaranayake, 2000). Since the internet is a global resource, sifting out locally relevant information from international websites may be very demanding on student study time. Although the recognition rules of relevance to application and appealing to authority were presented earlier as opposites, in Student 9A they appear to have acted synergistically in the sense that the student appreciates the implications of Faculty's perspective. Faculty's authority is respected, not just for what Faculty represents but because Faculty's emphasis reflects what is relevant to local healthcare demands.

Student 9A refers to Faculty recommended textbooks and Faculty produced handouts in the following extract, emphasising their relevance to core knowledge:

" ... I get my core from, like, the prescribed text books ... But I kind of feel, like, you know, [for] what is core, that the lecturers make sure that everyone has access to that source so it would be a prescribed text book or if it's not actually in any of the text books that are prescribed, they usually give us, like, handouts."

Strictly speaking, Faculty does not prescribe textbooks but a selection is recommended (Faculty of Health Sciences, 2007a) in the belief that by providing choice, students retain autonomy to decide on a book that suits their preferences. (This distinction aims to reinforce the relatively weak framing of IHS.) The term 'prescribed' has a connotation of submission to Faculty's authority that 'recommended' avoids.

Handouts that are provided by a lecturer appear to be invested with Faculty's authority. Their effect is to strengthen the framing of the pedagogy as they complement lectures, which are perceived as highly authoritative by students. Some students invest significant energy in memorising almost any text that appears to carry the authority of Faculty's recommendation in the hope that they will acquire sufficient knowledge to pass the assessments. Student 10B studies by "reading all the books in the library, prescribed text books ... I try to know everything that I don't know and not just what the lecturer said ... "

Having briefly illustrated the operation of recognition rules of appealing to authority and relevance to application in relation of the internet and Faculty handouts, the contrasting descriptions of the student use of textbooks will now be described. An example of a Faculty handout will then be described, one that plays an intentional role of strengthening framing in order to compensate for students' incomplete grasp of aspects of clinical medical discourse in IHS.

6.4.1. The text book as an example of visible pedagogic practice

In gross anatomy a practical instruction manual of dissection is provided for use in practical work. It is written by a staff member and is intended as a guide to core anatomical knowledge. Student 3A states explicitly: "Then from [the dissection manual] I actually go and, like, I try and see how it looks like and use the Atlas. That's how I normally deal with the anatomy. Like ... sometimes I don't really use the learning objectives [from PBL] that much because it is too broad". The student also comments, "... I think that the [dissection manual] is a good guide because it is, like, from the lecturer's point of view, not, like, just going there by yourself and just reading about things that might not be that relevant".

The dissection manual is recognised as an authoritative document by this student, not only as a guide to anatomical knowledge but particularly because it renders visible the department's opinion on what propositional knowledge is relevant to the curriculum. The student suggests that this perspective obviates the need for "going there by yourself", which is indicative of the dependency of this student on the perceived authority of

lecturers. Student 3A reinforces this opinion by relying on the manual's information in place of the learning objectives derived by students in PBL.

The dissection manual contributes to a more visible pedagogic approach that strengthens the framing and provides explicit information about what to learn. However, anatomical propositional knowledge also needs to be learned in a relevant context (such as dissection and PBL tutorials) that encourages "ways of knowing" the knowledge. Students who memorise the dissection manual without consideration for its relevance to clinical medicine are unlikely to be able to produce the legitimate text.

6.4.2. The text book as an example of invisible pedagogic practice

Student 9A demonstrates a contrasting approach to Student 3A's use. Student 9A uses textbooks in an interdisciplinary manner to establish core knowledge requirements. A textbook from pathology was used by Student 9A to reflect on the core requirements of a separate discipline, gross anatomy. (Knowledge of both gross and microscopic anatomy is essential for anatomical pathology).

" ... [A]t the beginning of each chapter [in the pathology book] they usually give, like, a brief anatomy [summary]. What's really nice about that anatomy is that it is usually very linked with the pathology ... So like [we will be asked] ... sometimes in exams ... "What's the clinical significance of this feature?" or something ... [T]hose are usually things that they highlight quite nicely."

(Student 9A)

The student confirmed the gross anatomical knowledge that was necessary from a pathologist's perspective rather than learning the gross anatomy from a purely anatomical perspective. The pathology textbook was used to reflect upon the application of anatomy to pathology. In Bernstein's model, integrated curricula emphasise ways of knowing rather than states of knowledge (Bernstein, 1975). Student 9A's way of knowing about anatomy as applied to pathology is very different to that of a student who merely memorised the same information from an anatomy textbook. The student's knowledge is integrated across disciplinary boundaries in a manner that reveals its clinical significance and it has not required explicit input from a staff member. The learning environment, with broad limits constructed by the curriculum, has been explored on the student's own terms.

The sophistication of Student 9A's approach took fellow group members by surprise during the interview. This surprise reaction suggests that Student 9A was learning in a way that was different to many other students in the group who tended to look for explicit

guidance from external sources they deemed authoritative. When asked for the detail of how such learning was done, Student 9A elaborated:

"Well like ... you would know that [the anatomy book] is not covering something core if, maybe, in a pathology lecture [the lecturer] would mention ... something like, this would affect this part of the organ and you say, 'Ooh, well actually I didn't read about that in the [anatomy] textbook. So then obviously you've missed something that is core. You can't understand something if you haven't, like, looked at that."

Student 9A has reflected on material in the pathology textbook in an interdisciplinary manner, recognised the significance thereof and inferred what to learn from another discipline. Student 9A even argues that the anatomy text may not contain all that discipline's core knowledge because of what has been encountered in the pathology book! This is a fine example of interdisciplinary reasoning that the investigator has not encountered frequently at second year level. Student 9A's recognition rule is one of relevance to application which contrasts with the operation of the rule of seeking out authority when it is employed as a substitute for failure to engage with new knowledge. Reasons for such failure may be associated with inadequate discursive insight, a perception of overload and a sense of feeling lost (see later under Chapter 6.6).

6.4.3. Faculty-issued learning objectives

A Faculty publication that lists the learning objectives for the disciplines of pharmacology and medical microbiology is given to students at the start of the IHS course. These disciplines are referred to as clinical sciences rather than basic medical sciences because clinical practice forms part of these disciplines' *raison d'être*. The departments responsible for teaching these disciplines facilitate their early introduction into the MBChB curriculum by publishing a list of learning objectives for all the case scenarios at the start of the IHS course. This means that students in PBL tutorials are directed to explicit core knowledge requirements.

About five lectures are given in these disciplines during IHS and medical microbiology has three additional practical sessions. Student 8B reflects the attitude of several students when asked about how they decide what to learn if material is not covered in lectures: "I think what I am trying to say ... is that a lot of the times it's still the blind leading the blind. We do get it right when we have that past experience to guide us. For example [lecturers] refer to pharmacology or the med micro lectures where you've read med micro notes and that's what it should be". The expression "blind leading the blind" is

Student 8B's description of how lost students feel at times while trying to teach one another in their PBL groups.

Student 8B seems to have the expectation that all teaching should be done with reference to lecturers' notes because then, "we do get it right ... and that's what it should be". In clinical sciences, it can be difficult for a second year student to appreciate the relevance of knowledge in those disciplines without a measure of clinical medical discursive insight. It is only when an authoritative guide with "past experience" is provided (in the form of published pharmacology and medical microbiology learning objectives), that a suitable direction for learning is found and the students "get it right". "Pharmacology LO's are always referred to [in PBL tutorials]", says Student 7B.

Students appreciate the Faculty learning objectives. However, in making them available, Faculty has employed a temporary, visible pedagogic device that strengthens the framing and which enables the students to function more efficiently in discursively challenging areas. The availability of the Faculty-sanctioned learning objectives enables students to focus on issues they might not otherwise have interpreted as relevant because of inadequate clinical medical discursive insight. In practice, the volume of medical microbiology and pharmacology in IHS is small compared to other subjects.

6.5. Repetition as an indicator of core knowledge

When similar topics arise repeatedly in teaching/learning activities and recommended resource materials, students recognise such repetition as a signifier of core knowledge. Student 9A, who was shown previously to make use of relevance to application as a recognition rule, uses repetition as a marker of the significance of new information. "Some things you just start hearing over and over again, so you know that those are things that are obviously, like, really important, if they keep coming up." Student 6A also confirmed that if something is "... repeated I always try and find out why it is like that or how I am going to use it in the future ... That sort of instils it". Student 9A explains that when "... you read up on something and you don't hear it again in, like, a lecture or if it doesn't come up in the discussion then I would not, like, regard it as core ..." These two students use the repetition rule to include new knowledge with the intention of pursuing it further.

Student 4A applies the same rule with a different intention - to exclude topics rather than include them, presumably in the hope that they will not be asked in assessment. "... [T]here are some things that I find ... are just too complicated for me and then I usually forget those, ok? ... If a [topic] doesn't come up again during the course of the two weeks

[of a case scenario] it's probably not important ... " The rule is thus being used by this student as a hedge against overload and is not used with the intention of evaluating knowledge further.

Student 6A comments: "It's a scary thought because, like, even though for me, personally, I somehow get to core but I don't know how I get to cover core in exams". Repetition is an important part of learning. Doctors, like any professional, gain expertise through repeated exposure to problems encountered in daily practice. Similarly, with increasing exposure to teaching/learning activities in the IHS course, students encounter medical ways of thinking. At the start of the IHS course, such ways of thinking are unclear to students. Student 9A was initially "not quite sure what to cover". Student 1B complained: "[Subject specialists] develop a sort of logic of their own. But we don't understand their logic; we are just beginners in their particular field, so it's very difficult to understand what they are thinking". This last comment is evidence of the significant discursive barriers that students encounter in IHS.

Student 9A discovered that " ... as you move through the year you do realise ... [that what to learn] does start becoming more obvious". Student 8B agrees that, " ... at the end of the year when we've done twelve cases ... , we are far less blind than we were because we're sort of aware of almost the direction of what the Faculty wants us to go in or what is necessary for us to know. We have that sort of background idea of some sort".

Use of the phrase "background idea of some sort" is suggestive of an implicit form of learning born of repeated exposure to knowledge and ways of thinking that the student finds difficult to characterise. "I guess nobody knows really where the core is but you sort of work your way through it," admits Student 5A. Again, this is like Bernstein's child-at-play whose self-directed development progresses implicitly through repeated, similar engagements with its environment. What eventually becomes obvious to the child was utterly unobvious in the beginning. *Repetition* seems to be a useful marker that most of the students interviewed used in recognising core knowledge.

6.6. Memorising propositional knowledge in an invisible pedagogy

Some students struggle with decisions about what to learn in IHS and defining the appropriate level of detail. Students may rely heavily on memorisation of propositional knowledge from textbooks when they are uncertain of what to learn and especially if they feel overloaded. When students memorise knowledge without appreciating its relevance,

they are at risk of not recognising the core knowledge intended by Faculty that emphasises interdisciplinary integration and relevance to practice.

Students were asked in the interview how they knew what material to learn. Student 4B replied, "I don't. I just learn everything ... which is difficult ... especially if you don't understand all of it". This comment is highly suggestive of memorisation as a result of the operation of recognition rules that are discursively inappropriate to the course. Student 8B agreed: "[R]ather than making [the] mistake of not knowing exactly what to do, I sort of just do everything", which is a rather indiscriminate shotgun-type approach that may still miss the target. Student 5B is uncertain of precisely what to learn: "[In IHS] you have, like, a whole book and this is the thing, you don't know how much depth". With the relatively weak classification and framing, students must decide for themselves what their priorities are, which they may see as cramming as much propositional knowledge as possible. Such a response will likely increase the volume of work to be remembered and risks worsening the overload.

One of the reasons for the Faculty's introduction of a problem-based learning curriculum was to decrease the volume of work by reducing it to knowledge relevant to clinical practice. Yet some students are unselective in what they chose to learn because of their inappropriate recognition rules and they attempt to "learn everything", thereby intensifying their overload problem. Suitable ways of knowing things may not be apparent to these students, in which case their learning will not be oriented appropriately to the context of the course. Such students are at risk of being overwhelmed by seemingly meaningless volumes of information.

Student 6A expresses a sense of overload that comes from the complexity of work associated with integrating the different subjects in the present curriculum: "[W]e are thinking of fourteen different areas, you know, and you've got to decide what's important. Anatomy, which is huge, is one of those areas. And you know, when you [encounter all those] muscles for the first time, it's not reinforced a helluva lot! ... You know it's quite hard to remember." Student 1A feels the same stress and implies that in the previous curriculum the method of teaching was not associated with such stress as one was told what to do: "All [work is] important with the anatomy, that's the thing ... [Students in] ... the old curriculum ... did anatomy ... [for] the whole of second year ... You know, it's kind of drummed into your head and it's reinforced the whole time, it's reinforced ... That's all you are thinking about ... " This extract is a clear reference to the relatively

stronger classification and framing of the previous curriculum where "swotting" was the order of the day and the lecturer stipulated what had to be learned.

The students quoted here feel overloaded for a variety of reasons that may include the volume of work, the level of conceptual difficulty and coming to terms with the discourses of fourteen subjects. Whatever the cause of that sense of overload, these students quoted above resorted to memorisation to see them through. If done indiscriminately, this will likely exacerbate their apparent overload problem.

6.7. Summary

The present MBChB curriculum, exemplified by IHS, is intended to be an integrated course which is taught using a supported PBL methodology that emphasises relevance to application and self-directed learning. As described in Chapter 4, shifts in classification and framing bring about changes in the way things are recognised, taught and understood. In more strongly framed and classified systems (e.g. in the previous MBChB curriculum), a sense of security derives from a tighter structure where knowledge is taught more explicitly. In the present curriculum, many students struggle to negotiate their learning priorities and to establish learning direction.

A variety of activities identified by second year medical students has been examined. Because of the weakened framing of the PBL approach in the present curriculum, many of the students interviewed appear to be looking for an authority of some sort to affirm explicitly their decisions about what to learn. This tendency may be seen in the way a text is used, or the kinds of assumptions made about lecturers. Some students also seek security by memorising propositional knowledge indiscriminately.

The recognition rules of appealing to authority structures or figures for affirmation and a tendency to memorise propositional knowledge (at the expense of understanding its relevance) seem to operate at points when students feel lost or overwhelmed by the diffuseness of the integrated curriculum. These points appear to coincide with where the effects of the weakened classification and framing in the curriculum are felt most by the students, i.e. the points at which the integration of knowledge is required for understanding and when having to decide for oneself what to learn.

In contrast, another rule appears to operate that exemplifies engagement with the curriculum – that of appreciating knowledge's relevance to application. This recognition rule signifies a deeper form of engagement with the curriculum that is proactive and searching, that seeks justification for whatever is learned. While this rule seemed to

operate in only a small minority of students in this study, it illustrates a way of functioning that is probably employed by more students than this study suggests, since the investigator is aware there is a significant number of high achievers in the class. This is an example where generalisability of an observation in the study cannot be made to the whole class but it nevertheless gives plausible insight into how the higher achievers might be functioning.

"Common things occur commonly" is a familiar axiom of medicine when teaching students the clinical significance of things. If a condition occurs frequently or repeatedly in a clinic, the implication is that it is significant and worth knowing about. So too in IHS, if something comes up repeatedly during the course, the chances are that it is significant and should not be ignored. Repetition is a useful rule, but one that may not always be easy to apply as the absence of repetition does not automatically imply insignificance.

The confidence of Student 9A's approach to learning in IHS has been striking not only in itself but also because many of the interviewed students seemed unable to approach learning in a similar way. The discussion that follows will focus on possible reasons for this observation and try to explain why so many students seem to have experienced difficulty in recognising core knowledge.

Chapter 7: Discussion

Many of the students interviewed in this study found the recognition of core knowledge problematic at some point. They displayed features suggestive of a surface approach to learning, such as rote memorisation, while the minority displayed features of a deep approach, such as understanding the applicability of the knowledge being learned (Ramsden, 1992). As noted in Chapter 4.1, the drawback of the approaches to learning framework is that it is limited in terms of its ability to analyse the *context* of learning. Bernstein's theory has therefore been useful in identifying and describing changes in curriculum structure and pedagogy that influence the learning approaches that students adopt.

The majority of students interviewed in this study do not seem to have a clear idea of core knowledge and how to learn it. One of the central arguments of this thesis is that this is because of the curriculum's relatively weak classification and invisible pedagogic approach, in which the discursive challenges confronting students are not readily apparent to them.

This discussion looks at issues related to the invisible pedagogy of the PBL approach in the present curriculum, the discursive challenges facing students in IHS and their consequences for students feeling overloaded. The chapter concludes with comment on the implications for practice and further study.

The invisible pedagogic approach in IHS

In an invisible pedagogy the student has to decide what his or her priorities are in order to structure learning. Since the inception of a PBL-type medical curriculum at UCT, the curriculum made provision for scaffolding to support student learning, for example, in the form of lectures. This is why the term "supported" appears in the Faculty documents (Faculty of Health Sciences, 2002). Support was considered necessary because of concerns that students who are recently out of high school, and particularly those from historically disadvantaged educational backgrounds, might struggle with the (invisible) pedagogic approach employed. Such concerns seem to have been justified as the majority of students interviewed in this study felt uncertain about how to use available resources effectively; for example, Student 8B felt like " ... the blind leading the blind".

When students in the first year of the present curriculum are introduced to the PBL process, they are given the Faculty's learning objectives in tutorials so that they can start to understand what knowledge Faculty values. Then towards the end of Semester 2 they generate their own learning objectives which they compare with a list of those intended by Faculty. It is evident, however, that the drive for students to determine their own learning objectives in first year may be somewhat attenuated by the knowledge that the "answers" are going to be given by Faculty anyway. During IHS in the second year, students are not given Faculty's learning objectives and they are expected to derive their own, which places significantly increased demands on them to negotiate order and priorities for themselves in a more weakly framed environment.

Students need to recognise core knowledge for successful learning to occur. However, having the ability to recognise what is practically relevant requires some knowledge of medical practice, which is limited in second year students. Students thus seem caught between needing the discourse of medical practice to recognise what they have to learn, and acquiring that discourse until they have had some exposure to clinical practice issues. It almost sounds like students have to pull themselves up by their own boot straps. So what options do students explore in order to engage with clinical medical discourse to be able to recognise core knowledge? In this study they try to discover Faculty's authoritative opinion on the matter, which is not always clear to them considering the curriculum's invisible pedagogic approach. One option is to rely on lectured material but this seems to be both a help and a hindrance to the learning process as will now be discussed.

Lectures seem to have assumed an importance in student eyes beyond that which was originally intended by Faculty. Their purpose was to highlight issues related to clinical relevance, to explain difficult concepts, to enthuse and to provide a measure of discursive insight that would help students recognise what to learn. Lectures permit a brief interval of strengthened framing, rendering the pedagogy temporarily more visible in a curriculum that ostensibly employs an invisible pedagogic approach.

However, this study reveals that the framing of lectures seems stronger than Faculty envisaged as they are apparently replete with propositional knowledge that frequently comes up in assessments. Thus lectures "spare" students the effort of engaging with new knowledge during PBL tutorials thus having the opposite effect to that which Faculty intended to achieve. Increasing reliance on lectures, seemingly at the expense of PBL tutorials, has been observed in this study as students feel that PBL tutorials are

superfluous because the "answers" to assessments come from the lectures anyway. A similar observation about increasing reliance on lectures causing an undermining of the quality of PBL has been reported by Moust et al (2005). They recommend that lectures be given only after students have spent time studying the relevant topics so that the teacher then plays a clarifying role and helps students to integrate knowledge that they have already considered.

Against the curriculum backdrop of an invisible pedagogy, lectures are grasped at by students as a visible pedagogic device that explicitly directs their learning in a way that is familiar to them; hence lectures provide a window that renders Faculty's authority temporarily visible. Ironically, however, lectures in this study appear to undermine the PBL tutorial process by reducing students' incentives to explore the IHS environment. Unlike Bernstein's child-at-play, students do not have the luxury of indulging themselves indefinitely while exploring the curricular environment as they have to make conscious learning decisions at some point. Having been guided by lectures, many students are probably just going through the motions in a surface-like manner during PBL tutorials rather than looking for meaning. Although not documented in the interviews, the investigator is aware, from personal experience, that the apparent undermining of the PBL process by lectures has led to tutorial groups reducing the time spent on discussing learning objectives and students leaving early.

One authoritative resource that students in this study seemed not to have exploited fully is the PBL facilitator. Initially this was a little surprising since facilitators are in a position of authority, having been appointed by Faculty. The role of the facilitator is to make sure that students do not merely go through the motions in PBL tutorials but that they engage with appropriate knowledge. In this study the role of the facilitator was not specifically probed by the investigator as there had been a recent turnover in facilitator staff. PBL curricula are known to be heavily demanding on staff time (Spencer & Jordan, 1999) and the staff changes may have affected student readiness to comment.

Facilitators are a potentially influential means by which knowledge may be transmitted in the relatively weakly framed pedagogy of IHS. They are integral to developing students' self-directed learning strategies (Hadwin, 1996) and they should ideally be knowledgeable about content and be skilled in the PBL process (Maudsley, 1999b). This does not mean that facilitators in IHS have to be doctors but they do have to be proficient in scientific reasoning and able to follow scientific medical discussion. Moust et al state that "the emphasis is on a gradual transfer of control over thinking and

learning processes from the teacher ... to students. The underlying regulation conception assumes that it is impossible, but also undesirable, to carry out the learning processes on students' behalf and to seek to exert maximum control over them" (2005, p.678).

Schmidt (1994) says that when students' "prior knowledge falls short or when the environment lacks structure, students will turn to their tutor for help and direction" (Schmidt, 1994, p.656). Prior knowledge is a necessary but not sufficient condition for learning to take place (Norman & Schmidt, 1992), and it gives new information significance that indicates how it might be explored further. However, one of the most frequent practices which facilitators are cautioned against is teaching students in PBL tutorials in a way that "does their learning for them" or prevents them drawing on prior knowledge, as self-directed learning may be hindered. The facilitator's role is not to resolve content specific issues for students, which may be exactly what the students want the tutors to do. Thus, in this study, because the students might not have got what they wanted from their facilitators, they may have dismissed their usefulness and declined to comment on them.

Good facilitators can help students acquire the discursive insight needed to be able to engage the invisible pedagogy of the curriculum effectively. Several disciplinary discursive influences in IHS that students need to reconcile in order to learn successfully are discussed below.

Discourses and overload

Novices in any field of learning endeavour may resort to fact and rules-based learning in order to function (Flyvbjerg, 2001) but the impression from the interviews is that some students are unclear about what "rules" to use. This is evident in this study from their use of memorisation and their feelings of stress and overload. However, Student 9A (Chapter 6.4.2) was an exception who appeared to be able to read and produce the legitimate text in IHS in a way that most of the other interviewed students did not. Two months after the interviews, in a chance meeting, the investigator asked the student informally if he/she had been aware of the integrated, applied approach the student had used but the student was oblivious to this. This observation fits with the implicit learning process that Bernstein describes in invisible pedagogies where the student appears to be "the author of the practice and even the authority" on what to learn (Bernstein, 2000, p.110) and where the student is a self-directed learner.

In the investigator's opinion, Student 9A's quick adjustment to PBL methods is notable in a student at second year undergraduate level as it reveals a level of insight that most students take longer to acquire. This opinion is reinforced in the literature where reliance on "authoritative" lists for beginners appears to be the norm. For example, Morcke, Wichmann-Hansen and Nielsen & Eika (2006) looked at the spectrum of learning methods from junior medical students to senior doctors. They demonstrated that the earlier students are in their training, the more they resort to "context-free, theory-based guidelines" for defining their learning objectives compared to senior doctors who chose specific practice-based learning objectives. This happens presumably because the novices have to compensate for their initial lack of discursive insight. Dolmans and Schmidt (1994) reported a similar kind of learning in first-year students who relied more on reference lists and content covered in tests and lectures compared to more senior students. Relative to other students in the class, Student 9A seems well ahead in ability to determine core knowledge and its relevance to practice.

It is interesting to speculate on the nature and effects of the discursive insight exercised by Student 9A as this seems to hold a clue as to why some students have more difficulty than others in recognising core knowledge. Discursive insight is important for ways of knowing about knowledge in the present curriculum. In the previous curriculum, overload was frequently a consequence of the volume of actual work to be learned, whereas in the present curriculum the volume of work has been reduced but there is an added discursive load from the new pedagogy and from the multiple disciplines with which students must engage. Given the apparent complexity of core knowledge as described in Chapter 4.6, this is not surprising. Core knowledge appears to be a multilayered concept that depends on acquiring knowledge that is both propositional and procedural across many disciplines at the same time in a way that is relevant to clinical practice. This implies that students require discursive skills in order to be able to direct their studies appropriately.

Students thus seem to have to negotiate a number of discursive "barriers" in order to recognise and realise core knowledge. These barriers relate to the new pedagogic discourse arising from the relatively weak classification of IHS and its relatively weak framing, the discourse peculiar to each discipline (singular) to which the student is exposed, and the discourse of clinical medical practice (the region to which the singulars contribute) that requires the recontextualisation of knowledge from the singulars. In the investigator's opinion, the sense of overload in students that derives from the cumulative discursive burdens is substantial.

the investigator's ease of referencing the transcripts, e.g. Student 1A, Student 2B etc. However, no significance should be inferred from the naming system.

6.2. The PBL tutorial process

PBL tutorials are occasions where students speak and listen to one another and are required to produce learning objectives from the case scenario for further study. Students identify triggers to core knowledge in the case scenarios although they express uncertainty about how to use them. Student 8B refers to such pointers as triggers: "There is a lot of confusion as to whether something is a trigger or whether it is not a trigger and if it is a trigger, what is it triggering towards, where is it heading and how much depth does that require?" The term 'triggers' implies the initiation of a direction of learning but uncertainty remains about the depth to which a topic should be studied. Depth is a discursive quality that relates to the level of detail that is relevant to clinical medicine.

Student 8B responds: "It's not a very clear indication but I think [the case scenario] is what is supposed to be getting our minds rolling". According to Student 9A the case scenario "... is sort of based around a [body] system and to understand ... what's gone wrong, we sort of need to know ... what the actual organ or system is that we're doing". The case scenario is seen as a device that contextualises information that is explored during the tutorial. Student 4A, being aware of this role of the case scenario, describes the anxiety around making contextually inappropriate decisions about learning arising from the imprecise identification of triggers: "[You may] get to an assessment and you find out you've been focussing on entirely the wrong track".

Student 5A indicates a willingness to engage with new knowledge and fellow students using "... the PBL group itself as a bouncing board because ... sometimes there's things in your learning objectives that we're not so quite sure of, so if you use your group to see how much detail they've got, it gives you an idea of what you need to know". Student 5B describes an iterative process of reflection and modification that helps identify gaps in knowledge: "I would do my work and come to PBL, but I look at what the rest of the group is doing and judge, have I done too much, have I done too little and then go back if necessary".

It appears that students use PBL tutorials as a tool to identify learning objectives that reflect their perceptions of core knowledge that may be reinforced by what their peers think. The process allows them to situate the new knowledge in a context that makes its relevance clearer for some, but the required depth is unclear. However, some students (e.g.

Student 4A above) seem not to trust their or their peers' judgement and it is possible that they are looking for stronger authority structures to affirm their decisions.

The role of learning objective collation meetings

After the first PBL tutorial session of a case scenario, each group's learning objectives [LO's] are presented at a collation meeting (see Chapter 2.5.) attended by other group representatives in order to compile a commonly agreed upon list for use by the whole class. A Faculty staff member observes this process.

"I think also that collation meetings could be handled a bit better ... ", says Student 6B who proceeds to question their usefulness. "We find a lot of repetition and we find very arb [LO's] and we're not sure if ... a Faculty member [is] saying, 'This is important or it's not important'". The presence of the Faculty staff member seems to create the expectation among some students that the product of the collation meeting should be a complete and reliable document. Student 6B's criticism that some learning objectives turned out to be repetitious, adds support for the idea that a "perfect" document was indeed expected. Student 9B reinforces this impression about the collation meeting's learning objectives: "[Y]ou see this is a repetition as it wasn't supposed to be like that", i.e. the student expected the list of learning objectives to be better suited to its perceived purpose – telling the students exactly what to do.

Student 6B functionally defines the perceived purpose of the collation meeting's objectives as that which was likely to be asked in assessment, complaining: "We spend so much time doing LO's and sitting in PBL and it's not in the test at all - all that time!" Perhaps the phrase "sitting in PBL" is a clue to the nature of this student's engagement in PBL tutorials; "sitting" suggests a degree of passivity or involuntary reluctance to engage in the process. Reluctance is understandable if the student presumes that the collation meeting would produce "assessment-oriented" learning objectives that appear to have the (tacit) approval of a staff member.

If certain students invest staff members with authority and habitually seek affirmation from them, this implies that the students have certain expectations of them. When those expectations are not met, the students become disquieted as they realise that they are going to have to assume responsibility for learning and make their own minds up about how best to use the collated learning objectives. It seems there is a subconscious appeal to the perceived authority of the observing staff member in an attempt to strengthen the framing of the PBL process.

Engaging with discourses in IHS

The pedagogic discourse referred to above relates to how knowledge is valued by an integrated curriculum with relatively weak classification. Learning in IHS requires students to be self-directed and to integrate knowledge across disciplinary boundaries in keeping with the relational idea. Exercising this responsibility, when one is used to being told what to do, requires confidence and an intention to engage actively with new knowledge.

Students, particularly those who come from a background where memorisation of propositional knowledge was advocated on the explicit direction of an authority figure like a teacher, have significant learning challenges presented to them by IHS. These students need to start thinking in ways to which they are not accustomed.

Fourteen disciplines (singulars) contribute to the clinical medical region in IHS that some students (for example Students 1A and 6A) found overwhelming at times. It is demanding to learn new knowledge from fourteen individual disciplines and additionally so to determine how they integrate with one another in the curriculum. Student 8B remarked that " ... rather than making [the] mistake of not knowing exactly what to [learn], I sort of just do everything". This statement reflects a sense of being overwhelmed and struggling for direction causing the student to resort to memorisation of information at a surface-level type of learning where text is memorised without regard for its underlying meaning (Marton & Säljö, 1976; Ramsden, 1992).

The discourses of each of the fourteen disciplines contributing to IHS present additional learning challenges to that of the pedagogic discourse described above. Each discipline consists of its propositional and procedural knowledge (see Chapter 4.4) with which the student has to engage actively if that knowledge is to be mastered. Procedural knowledge, which contains the ways that a disciplinary specialist thinks about and uses propositional knowledge (Scheffler, 1965), gives a discipline its distinctiveness that sets it apart from others. Aspects of the discourses from each of the fourteen disciplines in IHS have to be acquired by a student to have facility in the disciplines that underpin clinical practice. Since discourses are acquired rather than learned consciously (Gee, 1996), acquisition requires sufficient time for exposure to the discourses of the fourteen disciplines as well as the effort of learning the disciplinary propositional knowledge.

Once a basic knowledge and understanding of the disciplines in IHS has been acquired, this knowledge has then to be recontextualised and appropriated by the region of clinical medicine. For example, anatomy learned from an anatomical disciplinary

perspective has to be applied in a way that is meaningful to clinical practice. In the previous curriculum most of the effort centred around teaching and learning the disciplines from a disciplinary perspective and then drawing on that knowledge in the later clinical years. In the present curriculum these steps occur simultaneously although the level of discursive skill expected is less in IHS than in final year.

A picture thus emerges in which one can see concurrent discursive demands being placed on students that need time to be acquired and for which rote learning or memorisation cannot substitute. If the discursive barriers described above are not negotiated successfully, then students run the risk of not being able to recognise core knowledge for which they compensate by channelling their efforts into more memorisation.

The positioning of the disciplines of medical microbiology and pharmacology in IHS provides an interesting insight into this discursively intense process (see Chapter 6.4.3). At a level suitable for second year students, these are not exceptionally demanding disciplines academically but their relevance to medical practice only becomes evident once a measure of clinical medical discursive insight has been acquired. However, it is likely that if students were not given the learning objectives for these disciplines in IHS, they would spend too much time trying to retrieve the discursively relevant threads with little academic return and run an increased risk of being overloaded. The functional gains anticipated to flow from this small window of strengthened framing are considered pragmatically worthwhile by Faculty given the present curriculum structure.

The question thus arises as to whether the present curriculum with its weak classification and invisible pedagogic approach is appropriate if students in IHS seem to find the recognition of core knowledge problematic. That is not to say that any stress is undesirable but a sense of feeling lost from distress could lead to demotivation. On the one hand there are the deficiencies noted about the previous curriculum (see Chapter 3.1.) that required urgent attention, many of which can be addressed by a PBL approach. On the other hand, a new teaching and learning system has been introduced that is discursively complex, especially for students at undergraduate level. The system requires innovative learning skills and many staff to administer it. Nevertheless there is anecdotal evidence that the learning skills gained in the early years of the present curriculum are perpetuated in the later years as some clinical instructors have the impression that students identify and engage with new problems in the wards in a more confident way at an earlier stage compared to the students in the previous curriculum (Hift & Seggie, 2006, personal

communication). A similar observation has been commented on by Colliver (2000) but he suggested that this may be partly because of the types of skills that are being encouraged earlier in the present curriculum than they were in the previous one.

This study provides a means of exploring some of the strengths and weakness of the previous and present MBChB curricular designs. Inevitably compromises have had to be made between what is desirable and what is feasible in responding to changing healthcare demands. The present curriculum's emphasis on integrated knowledge and its application are highly appropriate to a vocation such as medicine but further change will be necessary to improve its efficiency, while being aware that the effects of change in one part are likely to influence other parts of the system. In the interests of both learners and teachers, what, then, might be done to reduce meaningfully the discursive gap that appears to hinder students at the start of IHS and leaves them feeling overloaded and their learning restricted?

Implications for practice and further study

It is important for students to understand how the curriculum is structured so that they can recognise the knowledge that it values. For example, the relational idea is a key concept that governs classification, which in turn determines what is taught. The implications of it should be clarified for students when they are introduced to PBL for the first time e.g. the relevance of knowledge to clinical practice. Moust et al comment that student understanding of the principles underlying PBL may be "even more important than extended skills training in chairing meetings or finding articles in the library" (Moust et al, 2005, p.677). Being explicit about what is to be learned is not the same as realising core knowledge (i.e. making it real to oneself and others), but students may benefit from a clearer understanding of the relational idea and other concepts valued by the PBL process.

The possibility of introducing direct clinical contact with patients at an earlier stage in the curriculum, for example in IHS, may be beneficial to students for their earlier acquisition of clinical medical discourse that might improve their ability to identify core knowledge. The feasibility of this suggestion would need to be examined in light of the demands on staff and resources that the present curriculum already requires.

A further suggestion for indicating what knowledge is relevant is an electronic curriculum map that is accessible to students and staff and which displays core elements of the curriculum (Harden, 2001). At present a document outlining core knowledge topics for the whole of the MBChB course is available which has the potential to be expanded and rendered more accessible electronically (Faculty of Health Sciences, 2007b). The

development and evaluation of such a tool and ways in which students will use it would need to be evaluated. The software, MindManager, described under Methodology (Chapter 5.5.2) has been used by the investigator with a view to designing such a map.

Students have commented that assessments are frequently based on lectured material although this assertion remains untested in this study. The perceived emphasis on propositional knowledge in lectures that is frequently asked in assessments can undermine the PBL process. A follow-up study to evaluate this student claim could provide useful information about the alignment of assessment demands with the curriculum's PBL philosophy that could lead to modification of lectures and assessment setting practices.

The consequences of introducing new ways of teaching and learning in the present curriculum do not have effects limited to curriculum design alone. There are also far reaching social and academic consequences affecting the professional identities of Faculty staff and departments involved and for students perceptions of themselves in the new learning environment (Becher, 1987; Becher & Trowler, 2001; Bernstein, 2000). It is therefore suggested that a palatable, relevant approach to staff development would help staff to assist their students in recognising core knowledge and encouraging student self-directed learning. The investigator himself has walked this road and appreciates how helpful an understanding of curricular structure and its implications can be in explaining why some students and staff stumble along while others streak on ahead.

Chapter 8:

Conclusion

This study aimed to achieve insight into how medical students recognise core knowledge in a supported, problem-based learning curriculum. It was found that students have to cope with significant discursive challenges and often experienced difficulty in defining clearly what they needed to learn. This was thought to be because of the invisible pedagogic approach employed by the PBL system and the relatively weak classification of a curriculum that encourages the interdisciplinary integration of knowledge. Students who had difficulty in recognising core knowledge looked to authority figures or structures for confirmation of their tentative decisions about learning, while those who were comfortable with their decision reflected on their work in an interdisciplinary way to resolve their queries. Certain support activities, such as lectures, may paradoxically have an adverse effect on the development of self-directed learning for some students by undermining the PBL process.

The motivation for this study arose out the distress that the investigator perceived in certain students when he felt that they should be enjoying their learning experience more. While all the students cannot be clearly characterised as efficient or inefficient recognisers of core knowledge, suggestions for future practice have been made that might help render the process more explicit, indicating to students what direction to follow. For as Berkson says, "PBL and traditional curricula are tools. Their power has and will continue to lie in the vision, the skill, and the commitment of those who use them" (Berkson, 1993, p.88), which in this case includes both the student and the teacher.

Appendix 1: Abbreviations and medical terms

Abbreviation/term	Meaning
Anatomical pathology	Diagnosis of disease based on gross and microscopic changes in the body and its tissues
Clinical	Having direct or practical application to dealing with patients
FHS	Faculty of Health Sciences (at the University of Cape Town)
GMC	General Medical Council (of Great Britain)
Gross anatomy	Study of the structure of the body as visible to the naked eye (cf. Histology)
Histology	The microscopic study of the form and structures of the tissues of the body
IHS	Integrated Health Systems – a course including the basic medical and clinical sciences and applied social sciences extending over three semesters in the second and third years of the MBChB programme at the University of Cape Town
LO's	Learning objectives
Macroscopic anatomy	See Gross anatomy
MBChB	Bachelor of Medicine & Bachelor of Surgery degrees. At the University of Cape Town this is a six year undergraduate course.
Microscopic anatomy	See Histology
PBL	Problem-based learning
Practicals	Practical work – in IHS this is typically in a laboratory or dissection room setting
SPBL	Supported problem-based learning
TLA	Teaching/learning activity
UCT	University of Cape Town

Appendix 2: The new MBChB Degree: 2002

Since the start of this study, this document has become no longer available. As it is referred to frequently in this thesis, it has been copied here verbatim for reference (Faculty of Health Sciences, 2002).

New MBChB (Bachelor of Medicine and Bachelor of Surgery Degree): 2002

The Faculty of Health Sciences at UCT is in the process of transforming its undergraduate educational curricula. Until this process of curriculum change began to spread through medical schools the world over in the 1990's, little change or modernization of medical education had occurred since the 1920's. UCT's medical curriculum was last revised in the early '70's. It is highly likely that the international recognition which UCT's medical school and its graduates currently enjoy would be lost if we were not to follow the global trend towards student centred, group based learning that other leading institutions have adopted.

UCT's process of curriculum reform began in 1998. All our undergraduate degree programmes have been under review, but the most profound educational changes are occurring in the MBChB curriculum, which has been introduced in 2002. These changes incorporate both the Faculty's 1994 decision to undertake a comprehensive curriculum review and reform with the Primary Health Care (PHC) philosophy as its basic tenant and to implement the kinds of changes to medical curricula recommended by a number of international bodies. These include the World Federation for Medical Education and national bodies such as the General Medical Council of the United Kingdom which controls medical education in British medical schools and which presently recognizes the UCT MBChB. Members of our curriculum reform team have visited medical schools in Britain and Canada which have already adapted their curricula in line with new international trends, thus enabling us to draw on their expertise and experience.

In our own context, the Health Professions Council of South Africa (HPCSA) published guidelines to assist the eight SA medical schools in their medical curricular reform. We believe that our new MBChB curriculum will satisfy the HPCSA. This is important because future accreditation by the HPCSA of UCT's Faculty of Health Sciences as a training institution depends upon successful curriculum transformation and the introduction of teaching methods that reflect a modern understanding of how adults learn.

Through curriculum transformation, and in keeping with the PHC approach, UCT's Faculty of Health Sciences aims to produce health professionals whose training, whilst continuing to enjoy international recognition, will be both excellent and relevant for service to the whole South African community.

Two leading themes characterise our curriculum change:

Firstly, there will be a shift in emphasis from the purely biological and scientific model of illness to the one in which the individual is viewed within their biological, emotional and sociological context (the bio-psychosocial model). An appreciation of the impact of the illness upon the patient's life and that of his/her family will be regarded as important as a scientific understanding of a patient's disease. It will no longer be sufficient for the doctor to diagnose and treat illness, but also to prevent illness, to promote health and to participate in the rehabilitation of people with chronic disease and disability.

Secondly, community-based learning opportunities will increase. This is aimed at complementing academic hospital-based learning so that students develop competency to practice at primary, as well as secondary and tertiary levels of health care. In fact, modern health care the world over is no longer based mainly in hospitals but is much more likely to occur closer to peoples' homes in community clinics and in general practitioners' offices.

Other educational principles that will underpin the new curriculum are:

- It will be **OUTCOMES-ORIENTED**.
The attached Profile of the Graduate was drawn up in 1999 to reflect the knowledge, skills and professional values required of the UCT MBChB graduate. We have a description of what is expected of a doctor at the end of undergraduate medical education and training !
- It will ensure student-centred learning, the key to which will be the development of **SUPPORTED PROBLEM ORIENTED LEARNING (POL) STRATEGIES**. These acknowledge that the adult learner prefers to select their own learning objectives, will typically apply knowledge that s/he already possesses in order to understand and acquire new information, and will gain a deeper understanding if the learning has an authentic professional context, that is based upon actual real life problems.
- It will employ **ACADEMIC SUPPORT STRATEGIES**, where necessary. Students who struggle will receive additional tuition, provided they continue to meet certain minimum performance criteria. Academically strong students will receive additional opportunities to pursue new interests and develop new skills.
- It will exploit **MULTI-DISCIPLINARY AND MULTI-PROFESSIONAL LEARNING OPPORTUNITIES**, whenever educationally feasible and appropriate. Modern medical practice and health care delivery requires teamwork, so this approach encourages that co-operation from early.
- It will employ an **INTEGRATED, SYSTEMS-BASED APPROACH TO THE STUDY OF THE SCIENCES** basic to medicine, the key to which is early clinical contact in the form of clinical scenarios with the patients as the focus of learning (see above). This has the beneficial effect of eliminating the pre-clinical / clinical divide which characterizes traditional curricula. Currently many students find it difficult to apply the principles that they have learnt in the first three years of pure scientific theory to their last three years of clinical practice. An integrated approach from the first year will allow students to assess a health problem much earlier on, and draw on the full range of both scientific and clinical knowledge and skills in developing a management plan for the patient's condition. Students will be able to see the clinical utility of the scientific concepts that have to be learned and understood at a much earlier stage.
- It will require students to have **CORE KNOWLEDGE AND CORE SKILLS** whilst also offering **SPECIAL STUDY MODULES AND ELECTIVES/SELECTIVES** to facilitate learning in depth. This will enable students to develop special interests, higher level competences and research expertise.

Both the integrated systems-based approach and identification of a core of learning, deemed essential to medical practice, benefits the student in reducing the factual overload that has crept into traditional curricula with the burgeoning of scientific knowledge. The ability of the student to choose from a menu of special study modules allows for learning in depth and, if desired, for the student to develop a certain level of expertise in a particular subject such as Women's Health or Sports Medicine, albeit at a graduate, and not postgraduate level.

- It will make use of **COMPUTER-BASED TECHNOLOGIES** where appropriate, whilst ensuring continuation of the close tutor/student interaction that is our Faculty's strength.
- It will include teaching of **CLINICAL SKILLS, CLINICAL REASONING AND DIAGNOSTIC AND MANAGEMENT SKILLS** to ensure development of clinical competence. UCT has always prided itself on the strong clinical skills acquired by its students, culminating in strong diagnostic and patient-management abilities. This will continue and, if anything be reinforced, through the teaching of clinical skills in the early semesters of the curriculum and the application of these skills laboratory environments.
- It will facilitate the acquisition of **GENERIC COMPETENCES** such as study skills, IT skills, communication and second language (Xhosa and Afrikaans) skills, interpersonal skills, problem-solving ability and decision-making ability. No professional in this new century can risk being computer illiterate and incapable of exploiting information technology. Computer laboratories are being set up to enable all students to acquire IT skills. Successful and healing doctor-patient relationships (whether the patient be an individual, a family or a community) also demands acquisition of a broad range of communication skills, which will be taught and encouraged.
- It will have a strong commitment to **HIGH ETHICAL STANDARDS AND PROFESSIONAL VALUES**. The Faculty is fortunate in having a well-established Bioethics Centre whose staff will continue, to teach students the moral and ethical responsibilities that a fundamental to being a member of the Health Care professions.

THE "SEMESTER APPROACH"

A number of curriculum design teams are responsible for developing the educational content of each of the 12 semesters in what is presently anticipated to be a 6-year, post-high-school-entry, curriculum. The design and implementation process, infrastructural changes necessary to increase small group learning and community-based learning, as well as the re-orientation and development of teaching staff, are taking place under the direction of a new Educational Development Unit, staffed by a Director of Medical Education, other medical education experts and an IT expert.

Semesters 1 and 2 have been designed around two themes, and we are at the stage of training teaching staff in problem-oriented teaching methods. The first semester serves to introduce "Basic Health Sciences" in relation to the human life cycle; the second focuses on "Becoming a Health Professional" which, importantly, will promote our ambition for multi-professional learning at the critical entry phase of our students' learning. Semesters 3-5 will be an integrated, systems-based approach to the study of the vocation-specific sciences (Anatomy, Physiology, Medical Biochemistry, Anatomical Pathology, Chemical Pathology, Medical Microbiology) and will include Primary Health Care and Public Health and develop integrated clinical skills. The focus of learning at core and special study levels are patient-cases selected for their relevance to the South African environment. This will ensure early clinical contact.

The clinical clerkships, which will comprise semesters 7-12, will encompass the clinical disciplines of Medicine, Public Health, Primary Health Care and Family Practice, Pharmacology and Therapeutics, Surgery (incorporating the surgical sub-specialities such as Orthopaedics), Paediatrics, Obstetrics and Gynaecology, Psychiatry, and Anaesthetics.

It is envisaged that Semester 6, which will serve as the "bridge" between semesters 5 and 7 will be Primary Care- and community-based.

Community-based education is not new to UCT. Much of the clinical experience offered to our current traditional curriculum students is already community-based and has been for many years. Examples are Obstetrics, Primary Health Care and Family Practice. However, in line with our ambition to graduate doctors capable of mature and effective clinical practice in tertiary, secondary and primary hospital settings, the Faculty is forging additional partnerships with provincial health authorities, non-governmental organizations and other agencies to secure primary care teaching/training sites, and to expand our existing teaching platform still further.

UCT has a long and respected tradition of community service. The Health Sector clinics of The Students' Health and Welfare Centres Organization (SHAWCO) have been run by medical and other health professions students, under supervision of clinical staff who operate at our teaching hospitals, since the 1930's. In addition a number of medical students have formed the Rural Support Network and volunteer to serve rural communities during university vacations.

As is presently the case, students will be able - and in fact encouraged - to pursue an intercalated degree. This is not necessarily health sciences oriented, and will be completed over one year between semesters 5 and 6. The purpose is to broaden the individuals education and permit development of their expertise within a specialized clinical or research area. Students who successfully pass course work assessments during this year will obtain an additional, BSc(Med) degree, before continuing their clinical studies.

GRADUATE PROFILE FOR THE NEW MB ChB CURRICULUM

Curriculum Goal - To produce a basic undifferentiated doctor with the requisite attitudes, knowledge and skills to enter the pre-registration period with confidence.

The Context

The Faculty of Health Sciences will continue to strive to be an outstanding faculty within the University of Cape Town. It will offer educational programmes to a diverse and talented student-body, equipping students with the attitudes, knowledge and skills required for life-long learning and competent clinical practice. The educational principles laid out in the University's Academic Planning Framework (APF), against which our programmes have been measured, will be integrated into the educational process.

The change of name from Faculty of Medicine to Faculty of Health Sciences indicates a substantial shift in the Faculty's understanding of its role in the training of health professionals. The emphasis on health rather than disease requires a comprehensive educational approach. This approach would have to create a balance between preventive, promotive, curative, protective and rehabilitative health care in order to meet the health needs of the country.

This comprehensive approach is encapsulated in the principles of Primary Health Care (PHC). The PHC philosophy incorporates:

1. Integration of basic sciences with clinical practice and population health
2. A team approach to health care involving the various health disciplines

3. Interfaculty and intersectoral collaboration
4. Application of individual and population perspectives in teaching, research and health care delivery.
5. A comprehensive approach at all levels of health care namely: quaternary, tertiary, secondary and primary.
6. An awareness of complementary and informal health systems in South Africa.

Due regard will be afforded to the cultural, economic, political, social and scientific context within which our graduates will work. The University of Cape Town and the Faculty of Health Sciences have clearly defined their role in participating in the reconstruction of the country. There is a stated commitment to contribute to redressing past imbalances of race, gender and class and to developing a culture of human rights.

THE GRADUATE

The MB ChB graduate should acquire and must be able to demonstrate the following characteristics:

Attitudes

Attitudes necessary for the achievement of high standards of medical practice, both in relation to the provision of care to individuals and to the wider South African community. These should include:

1. Intellectual curiosity, initiative and a willingness to assume responsibility for the acquisition of knowledge, the development of skills for self-education, and the continued development of clinical skills and critical analysis of information for the life-long learning demanded by a career in the health field;
2. Willingness to work effectively as a member of a multidisciplinary health care team to ensure the highest possible quality of patient care at all times;
3. The awareness of one's own limitations and the need to seek help where necessary;
4. Willingness to be self-critical and to develop the capacity for self-audit and participation in the peer review process;
5. Traits that all clinicians dealing with patients, their families and professional colleagues should possess. These must include empathy; caring; compassion; patience; gentleness; cultural and gender sensitivity; acceptance of diversity; respect for patients' dignity, privacy and confidentiality; personal honesty; open communication with and responsiveness to patients of all ages;
6. The need to develop a professional and respectful patient-doctor relationship based on mutual understanding and trust, which includes the recognition of the patient's right to take part in management decisions;
7. Appreciation of ethical principles in the provision of health care to individual patients, families and communities;
8. Willingness to adapt to change and tolerate uncertainty;
9. A holistic approach to individual patients and their health problem within the context of family and community;
10. An understanding of the total spectrum of health needs of the country and a recognition of their duty to commit themselves to the service of society.

Knowledge

The following core knowledge:

1. Normal and abnormal human growth and development, the structure and function of the human body and mind, in health and disease;
2. The principles of health promotion, disease prevention and management of illness in the context of the individual, the family and society;
3. The pattern, aetiology and natural history of common diseases and disabilities in rural and urban South Africa. The influence of environmental, socio-economic, political and class determinants on health and disease and their particular effect on women and children;
4. The structure, organisation and function of the healthcare system in South Africa, including the medico-legal context.

In addition each student will be required to participate in special study modules.

Skills

Competence in the ability to:

- Communicate effectively, clearly and courteously, both verbally and in writing, with patients and their families and with other health professionals;
- Conduct a complete examination of a patient appropriate for age, gender and clinical presentation, which will include physical, mental and psychological status;
- Make a reasoned diagnosis or differential diagnosis;
- Develop a management plan;
- Compile a structured medical record;
- Recognise acute life-threatening emergencies and initiate appropriate management;
- Carry out basic clinical procedures and side-room investigations;

To continue developing intellectually, into clear and independent thinkers who can make informed decisions and provide leadership. These would encompass the following:

Analytical and critical thinking skills.

Problem-solving

Numeracy

Computer literacy

Appropriate language proficiency

Versatility and the ability to adapt

Love of learning and search for new knowledge

Basic understanding of research methods.

For more information contact the Admissions Officer at +27 21 4066347.

Appendix 3: Information letter and consent form

Information letter to potential participants in the study and consent form.

Investigator:

Dr Charles P Slater
 Room 2.08, Anatomy Building
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 University of Cape Town
 Observatory 7925
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To: Semester 4 PBL tutorial groups and facilitators

"HOW DO I KNOW IF SOMETHING IS CORE KNOWLEDGE?"

This question is probably the most frequent one that I am asked and I would like to find out the reasons why.

"What is this about?"

I am conducting an investigation into how students in the new MBChB curriculum determine what they believe is "core knowledge". I wish to investigate this issue at the point where students decide on their learning objectives – i.e. the PBL-1 tutorial. This investigation will be conducted as part of the requirement for the degree of Master of Philosophy(Education) at UCT for which I am registered and for which ethical approval has been granted. The course convenor and PBL group facilitators have been approached for their permission to involve their groups.

I am looking for a PBL group in Semester 4 to volunteer to be observed during a PBL tutorial.

Note that you are under no obligation to become involved. Whether you agree to participate in this study or not, it will not influence (positively or negatively) your standing, reputation or assessment results in the MBChB course. Even if you agree to be in the study you are still free to withdraw at any time without any disadvantage to yourself.

"What would I have to do?"

You will be asked to participate in one regular, timetabled PBL-1 session of one of the cases in Semester 4 during which the group will derive its learning objectives, as usual, with your facilitator (who also needs to agree to this).

I will sit in and observe the PBL tutorial without comment or interference. This process is not an evaluation of how well or how badly PBL is being conducted. There are no right or wrong learning objectives. This is an honest attempt to follow the route you take in defining your learning objectives because in the end you do come up with them.

There will then be a break for tea and refreshments (to be provided) followed by no more than 1 hour (probably less) of discussion which I will chair, related to how and why the group decided on the learning objectives that it did. This means that the whole session will last about 4 to 4½ hours (including tea break) compared to the 3 hours it would normally take you.

I would like to record the PBL tutorial and the subsequent group discussion, preferably on video.

I also wish to attend the usual Learning Objective collation meeting with the other PBL representatives, as an observer taking notes, This meeting will be tape recorded with the permission of all participants. It is possible that I will need to clarify some issues with the PBL representative arising from the collation meeting and possibly, briefly with the PBL group.

Commitment to confidentiality:

This study is concerned with the processes around group learning, not with any individual. The personal identity of all individuals in the recorded activities and transcripts will be protected as follows:

- Only the investigator will have the recorded data. This material will not be played or shown to others (exception below).
- Only the investigator will transcribe the recorded data for which substitute names will be used in the transcript. Any identifying items in the transcript will be altered to protect an individual's identity.
- My degree supervisors may need to see or listen to parts of the recordings to advise me academically or to help resolve an interpretation of the transcription. During write-up of the study, individuals' identities will not be disclosed.
- Quotations from the transcripts will not reveal the personal identity of any individual.
- The transcript data from the recordings using pseudonyms may need to be viewed by my supervisors and examiners if they request this.

"What's in it for me?"

Your involvement will not have any effect on your status, assessment or marks. However you may benefit from becoming more aware of how you are deciding on what core knowledge is and what it is not.

From a more community-point-of-view you will be contributing to the growing knowledge of the new curriculum and thereby help to improve it for others.

I will give the group feed back on my findings.

I am prepared to answer openly any questions relating to this study or your potential involvement.

Dr Charles Slater

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