

**The display and negotiation of expertise and  
uncertainty in problem-based tutorials in  
medicine: a discourse analytic approach**

Anne M. Storey

A thesis submitted in fulfilment of  
requirements for a Doctor of Philosophy

July 2012

## **Summary**

This dissertation examines interaction in a hybrid educational and clinical medical context, specifically how students and tutors negotiate and display expertise and uncertainty in problem-based learning (PBL) tutorials in the final years of an undergraduate medical curriculum. I take a broad view of expertise and uncertainty, one which includes scientific knowledge, evidence-based explanations, warrants for uncertainty, personal experience and communicative performance.

Taking a discourse analytic approach, I analyse what constitutes expertise in this tutorial setting and how it is negotiated and displayed through the participating students' and tutors' interactional dynamics. I examine the nature of the various tutorial activities, the educational and clinical context, and how factors associated with the ethos and approaches of both PBL and traditional clinical curricula influence the display and negotiation of expertise and uncertainty.

The data were collected during 2008 in two teaching hospitals in Hong Kong. Participants were selected by convenience sampling. Eight tutorials were video or audio recorded, and the interactions were transcribed.

The discourse analytical approach (activity analysis, Sarangi 2010a) is based on the notions of activity types (Levinson, 1992[1979]) and discourse types (Sarangi, 2000) as well as notions of participant structure, roles, frames, and alignment. The analysis is conducted in three stages. First, the structural mapping indicates that the tutorials were composed of three main elements – presenting a patient history, presenting clinical reasoning, and presentation of the findings of the physical examination and

that these were recursive. Second, the interactional mapping shows that the dominant participants were the presenter of the patient history and the tutor, and that the main discursive device is questioning. Third, the thematic mapping shows that implicit throughout the interaction is the display of expertise through role performance, and the hybrid clinical and educational frames associated with these roles. Role, frame and activity characteristics interact to contribute to a complex setting within which participants could display degrees of expertise and uncertainty.

To my mother, June Davina Gleed

### **Acknowledgements**

I should like to thank my supervisor Srikant Sarangi for his patient and insightful guidance through the sometimes intimidating but always compelling experience of completing this Ph.D. My thanks also to my co-supervisor Frances Rock for her sensitive and illuminating feedback.

I am most grateful to the staff and students who participated in this study. I am also grateful for the generous support of the Leung Kau Kui Research and Teaching Endowment Fund.

My Hong Kong colleagues Tse Lai Kun, Joanna Lee, Parco Wong, Natalie Fong, Sam Cole, Clarence Wang, Ken Lau, Tsang Wai Lan, Lara Lam and Dora Pao gave me support throughout the process and I thank them most sincerely.

I am also grateful to my sister Emma for her support at home in Wales, and to my friend Jane Kajimoto, who put me up – and put up with me – during my many visits to Cardiff.

I could not have completed this dissertation without the support of my son Tom and my daughter Elen. And, finally, my thanks to my partner Nigel for his constant support.

# Contents

<b>Chapter 1: Introduction .....</b>	<b>12</b>
<b>1.1 Introduction .....</b>	<b>12</b>
<b>1.2 Problem-based learning in medicine.....</b>	<b>12</b>
1.2.1 Perceived advantages of PBL .....	15
1.2.2 PBL and constructivist learning.....	16
1.2.3 A PBL case example.....	17
1.2.4 PBL and collaborative interaction .....	19
<b>1.3 PBL research: a brief summary .....</b>	<b>20</b>
1.3.1 Comparison with traditional curricula .....	20
1.3.2 Focus on PBL processes .....	21
<b>1.4 Professional expertise and socialisation through participation.....</b>	<b>23</b>
<b>1.5 The current study .....</b>	<b>25</b>
1.5.1 Background to the study .....	26
1.5.2 Scope of the study.....	27
1.5.3 Orientation of the study .....	28
<b>1.6 Background to PBL at The University of Hong Kong .....</b>	<b>30</b>
1.6.1 Clerkships and PBL .....	31
1.6.2 Bedside PBL tutorials .....	31
<b>1.7 The development of the research focus of this study.....</b>	<b>32</b>
1.7.1 Role of the communication skills teacher in the PBL curriculum.....	32
1.7.2 PBL research project findings .....	32
<b>1.8 The research focus of this study .....</b>	<b>35</b>
<b>1.9 Chapter overview.....</b>	<b>37</b>
<b>1.10 Summary .....</b>	<b>41</b>
<b>Chapter 2: Conceptualising expertise and uncertainty and perspectives from                     medical education .....</b>	<b>42</b>
<b>2.1 Introduction .....</b>	<b>42</b>
<b>2.2 Expertise, Knowledge and Evidence .....</b>	<b>43</b>
2.2.1 Conceptualising expertise .....	43
2.2.2 Expertise and knowledge as social phenomena .....	44
2.2.3 Professional socialisation.....	47
2.2.4 Professional vision and language.....	48
<b>2.3 Developing knowledge/expertise.....</b>	<b>51</b>
2.3.1 Medical students' attitudes to knowledge and expertise .....	51
2.3.2 Voice of medicine and expertise.....	52
2.3.3 Expertise and role .....	54
2.3.4 Expertise and evidence .....	56
<b>2.4 Conceptualising uncertainty .....</b>	<b>57</b>
2.4.1 Key perspectives on uncertainty in medical training.....	58
2.4.2 Sources of uncertainty in medical education .....	61
2.4.3 Uncertainty as a dimension of clinical reasoning .....	64
<b>2.5 Reasoning and case presentation.....</b>	<b>65</b>
2.5.1 The case presentation as display of expertise and uncertainty .....	66
2.5.2 The discursal display of expertise.....	68
2.5.3 Student problems in mastering the case presentation .....	70
2.5.4 Tutor management.....	72
<b>2.6 Summary .....</b>	<b>74</b>
<b>Chapter 3: Participation, frames and alignment, and classroom talk.....</b>	<b>76</b>
<b>3.1 Introduction .....</b>	<b>76</b>
<b>3.2 Participation frameworks .....</b>	<b>77</b>

3.2.1 Relationality.....	78
3.2.2 Frames .....	79
3.2.3 Footing and alignment .....	81
3.2.4 Roles and role-sets .....	82
<b>3.3 The notion of activity type .....</b>	<b>87</b>
<b>3.4 Participation and roles in educational settings .....</b>	<b>89</b>
3.4.1 Social constructivism and classroom research .....	90
3.4.2 Group interaction in the classroom setting .....	91
3.4.3 Learning through talk .....	95
<b>3.5 Classroom discourse .....</b>	<b>97</b>
3.5.1 IRF Sequences and Questioning .....	97
3.5.2 The Teacher's Role .....	98
<b>3.6 Summary .....</b>	<b>100</b>
<b>Chapter 4: Research Design, Methodology and Analytical Framework.....</b>	<b>102</b>
<b>4.1 Introduction .....</b>	<b>102</b>
<b>4.2 Brief Background to the present study .....</b>	<b>103</b>
4.2.1 Setting .....	104
4.2.2 Student activities.....	104
4.2.3 Tutorial objective and format .....	105
<b>4.3 My interest in PBL.....</b>	<b>106</b>
<b>4.4 Ethical approval.....</b>	<b>107</b>
4.4.1 Ethical considerations .....	107
4.4.2 Ethics application procedures .....	107
4.4.3 Informed consent .....	108
<b>4.5 Stages and methods of data collection .....</b>	<b>109</b>
4.5.1 Stage 1: Recruitment of participants.....	109
4.5.2 Stage 2: Pilot study .....	111
4.5.3 Stage 3: Main analytic study.....	114
4.5.4 Duration and number of tutorials in the main study .....	115
<b>4.6 Data collection .....</b>	<b>116</b>
4.6.1 Transcription .....	117
<b>4.7 Limitations and strengths of the data .....</b>	<b>118</b>
<b>4.8 Analytical framework: activity analysis .....</b>	<b>119</b>
4.8.1 Structural, interactional and thematic mapping .....	122
4.8.2 Components of activity analysis .....	124
<b>4.9 Summary .....</b>	<b>126</b>
<b>Chapter 5: An Overview of a PBL Tutorial as an Activity Type .....</b>	<b>127</b>
<b>5.1 Introduction .....</b>	<b>127</b>
<b>5.2 Mapping a PBL tutorial for this study .....</b>	<b>128</b>
5.2.1 Structural mapping.....	129
5.2.2 Interactional mapping .....	135
5.2.3 Thematic mapping .....	142
5.2.4 The role of questions .....	148
<b>5.3 Summary .....</b>	<b>153</b>
<b>Chapter 6: Case history presenting: the negotiation and management of expertise in clinical problem-based learning tutorials.....</b>	<b>155</b>
<b>6.1 Introduction .....</b>	<b>155</b>
<b>6.2 Studies on the case history as a professional genre .....</b>	<b>156</b>
6.2.1 The case history as an expert account.....	157
6.2.2 Adopting a professional voice .....	159
6.2.3 Discoursal marking in case presentations.....	159
6.2.4 Providing and evaluating evidence in case presenting .....	163
6.2.5 Roles and hybridity in case presenting .....	165

<b>6.3 Data Analysis.....</b>	<b>166</b>
6.3.1 Structural mapping.....	167
6.3.2 Interactional mapping .....	169
6.3.3 Thematic mapping .....	172
6.3.4 Case presenting as a PBL activity .....	172
6.3.5 Section Summary.....	180
<b>6.4 Managing the challenges of PBL case presenting.....</b>	<b>181</b>
6.4.1 Managing student questioning.....	187
6.4.2 Section Summary.....	197
<b>6.5 Summary .....</b>	<b>198</b>
<b>Chapter 7: The role of evidence and uncertainty in the marking of expertise in diagnostic reasoning.....</b>	<b>201</b>
<b>7.1 Introduction .....</b>	<b>201</b>
<b>7.2 Studies on diagnostic reasoning and uncertainty .....</b>	<b>203</b>
<b>7.3 Mapping of the data .....</b>	<b>209</b>
7.3.1 Structural mapping.....	209
7.3.2 Interactional mapping .....	211
7.3.3 Thematic mapping .....	212
<b>7.4 Diagnostic reasoning: data analysis .....</b>	<b>214</b>
7.4.1 Presenting a hypothesis.....	214
7.4.2 Occasioning and presenting the second hypothesis.....	218
7.4.3 Responding to a diagnostic hypothesis.....	219
7.4.4 Occasioning and presenting the third hypothesis .....	220
7.4.5 Responding to a diagnostic hypothesis.....	220
7.4.6 Reaching consensus and closure.....	222
7.4.7 Section summary .....	223
<b>7.5 Discoursal marking of uncertainty in diagnostic reasoning .....</b>	<b>223</b>
<b>7.6 Summary .....</b>	<b>227</b>
<b>Chapter 8: The Tutor's role in Clinical PBL tutorials.....</b>	<b>230</b>
<b>8.1 Introduction .....</b>	<b>230</b>
<b>8.2 Studies on the role of the tutor in medical education .....</b>	<b>231</b>
8.2.1 Tutor strategies and role .....	232
8.2.2 The tutor's role in scaffolding learning and modelling expertise.....	235
<b>8.3 Mapping the tutor's participation.....</b>	<b>240</b>
8.3.1 Structural mapping: responding to diagnostic hypotheses .....	241
8.3.2 Interactional mapping .....	243
8.3.3 Thematic mapping .....	244
<b>8.4 Data analysis .....</b>	<b>245</b>
8.4.1 Questions and the tutor's role .....	245
8.4.2 Scaffolding learning through questioning .....	249
8.4.3 Scaffolding reasoning .....	256
8.4.4 Role shifting in pedagogic and clinical frames.....	264
8.4.5 Discoursal devices used by tutors.....	269
<b>8.5 Summary .....</b>	<b>270</b>
<b>Chapter 9: Conclusion.....</b>	<b>273</b>
<b>9.1 Introduction .....</b>	<b>273</b>
<b>9.2 Summary of findings .....</b>	<b>274</b>
<b>9.3 Methodological reflections.....</b>	<b>287</b>
<b>9.4 Contribution of the study and relevance .....</b>	<b>289</b>
<b>9.5 Implications of the study for PBL theory and practice.....</b>	<b>291</b>
<b>9.6 Further research .....</b>	<b>292</b>
<b>Bibliography.....</b>	<b>295</b>



## **List of Figures and Tables**

### **I. Figures**

Figure 1: Total distribution of turns, Tutorial 1, Cases 1 and 2	136
Figure 2: Distribution of turns, Tutorial 1 Case 1	137
Figure 3: Distribution of turns, Tutorial 1 Case 2	138
Figure 4: Turns by volume, Tutorial 1, Cases 1 and 2	139
Figure 5: Total questions, Tutorial 1, Cases 1 and 2	141
Figure 6: Types of questions, Tutorial 1	141
Figure 7: Total number of questions, Tutorial 1	149
Figure 8: Questions, Tutorial 1, Case 1 and Case 2	150

### **II. Tables**

Table 1: Tutorial sessions, their duration and clinical focus	116
Table 2: Tutorial participants and topics	118
Table 3: Structural mapping, Tutorial 1 Case 1: Ron's presentation	129
Table 4: Structural mapping, Tutorial 1 Case 2: Fay's presentation	130
Table 5: Sub-phases of symptoms presentation, Tutorial 1, Case 1	131
Table 6: Sub-phases of symptoms presentation, Tutorial 1 Case 2	133
Table 7: Thematic mapping, Tutorial 1 Case 1	143
Table 8: Structural mapping Tutorial 2 Case 1	168
Table 9: Structural mapping of diagnostic reasoning phases Tutorial 1	210
Table 10: Distribution of Number and Volume of turns	211
Table 11: Distribution of Questions	211
Table 12: Examples of Uncertainty markers Tutorial 1 Case 1	212
Table 13: Responding to Diagnostic Hypotheses	241
Table 14: Themes in Tutorial 5	244
Table 15: The range of Tutor roles	268



# **Chapter 1: Introduction**

## **1.1 Introduction**

The focus of this dissertation is interaction among students and tutors participating in problem-based learning tutorials in a clinical medical education setting. My specific interest lies in the management and negotiation of expertise and uncertainty by students and tutors in clinical tutorials. I examine how the tutorial setting, which is highly demanding in communicative terms, may afford opportunities for the display and negotiation of expertise, and how constraints may be placed upon this. The study looks particularly at how these opportunities and constraints are mediated by tutorial participation and at what contextual and interactional factors influence participation. As a communication skills teacher-cum-researcher, I wanted to explore the communicative opportunities provided by a particular curricular mode, that is problem-based learning (PBL, or more broadly problem-based pedagogy), that professed to facilitate the development of different kinds of expertise.

## **1.2 Problem-based learning in medicine**

PBL has become a widespread curriculum approach in medical faculties worldwide. Barrows' (1980:18) definition of the approach stressed that learning arose from the process of working through a problem to achieve "understanding or resolution":

The problem is encountered first in the learning and serves as a focus or stimulus for the application of problem-solving or reasoning skills, as well as for the search for or study of information or knowledge needed to understand the mechanisms responsible for the problem and how it might be resolved.

Barrows stipulated that the problem case should be authentic, ill-structured in its complexity and with no clear solution, and should reflect real-world issues that

students would encounter in their future professions. The case should be open-ended so that students first have to identify the problem (Hmelo-Silver, 2006). Barrows recommended that classes be held as small group tutorials of 7-8 students and that tutors should facilitate group discussion rather than take a didactic approach. Barrows (1986) acknowledged later that different approaches to PBL might be possible: Boud and Felletti (1997) listed several of these, such as the lecture-based case, where the tutorial problem is timed to coincide with relevant lecture topics, and closed loop or reiterative PBL, in which knowledge and skills gained are applied back to the problem following research. With its focus on problem analysis, exploration of learning issues, and independent research leading to redefinitions of the problem, PBL was seen to provide a multi-disciplinary mode of learning. Students were engaged in the co-construction of knowledge and the identification of new learning issues or objectives. In aiming to develop and apply clinical reasoning processes to real world clinical problems, PBL was seen as a move from traditional teacher-centred learning to student-centred learning (Barrows & Tamblyn, 1980).

In the rapidly changing environment in medical research and practice, PBL has come to be regarded as a response to a perceived need to promote lifelong and collaborative learning (Barrows, 1980, 1994; Boud & Felletti, 1997). One of the first universities to develop a PBL curriculum was McMaster University in Canada in the late sixties (Savin-Baden & Howell, 2004); in 1976, Maastricht University introduced PBL as its single mode of learning across all the professional programmes (Diemers et al., 2007). Medical faculties worldwide and other professional programmes followed suit and shifted curricular emphasis onto student-centred, collaborative and independent learning.

Far from being a smooth transition, the shift to PBL has seen considerable resistance and the emergence of many hybrid, compromised forms of medical curricula. Some medical curricula have committed to a “pure” PBL approach, in which the curriculum mode is entirely via PBL tutorials and learning is self-directed, in some instances without facilitators or tutors present. Many others have settled on hybrid models, combining PBL with elements from traditional curricula, such as subject-based lectures and tutorials. One model is the split PBL curriculum, in which the pre-clinical curriculum may adopt PBL while the clinical years revert to a traditional curriculum (Savin-Baden & Howell, 2004). Another variation has been the “one day, one problem” approach adopted in the Republic Polytechnic in Singapore (O’Grady & Alwis, 2002) and in continuing health education in Italy (De Virgilio, 2011).

Inexorably, medical curricula worldwide have bowed to the pressure to generate more research- and student-centred learning, and in many cases this has involved the importation of elements of the PBL approach. In 2003-04, a survey of 123 US medical schools (Kinkade, 2005) found that while 70% had incorporated PBL into their curricula, only 6% of these had implemented a fully PBL curriculum; most were partially integrated and had PBL problems and tutorials complemented by lectures and other curricular modes.

The model that influenced the form of PBL introduced at my university was the so-called “Harvard” model. Engel (1997) described this as a curriculum comprising a proportion of lectures and labs, which connect with the PBL learning topics or issues, while the remainder of the curriculum consists of PBL tutorials. The medical curriculum at my university follows the Harvard model in the pre-clinical years, with PBL tutorials alongside traditional lectures relating to the learning issues arising from

the PBL problems. In the clinical years, the PBL programme is more akin to the “one day one problem approach”.

The stages that a PBL group would go through has been described by Boud and Felletti (1997:126): participants first analyze the problem, making use of their reasoning skills and current knowledge. They also identify “needed areas of learning” and study these individually before returning to the problem to apply the knowledge they have gained. They would then identify new learning issues. The identification of learning issues is a recurrent practice in PBL. The PBL approach is distinct from traditional curricula which are typically based around large group lectures which are disciplinary specific and teacher-driven (Strobel & van Barneveld, 2009).

### **1.2.1 Perceived advantages of PBL**

The use of clinical cases in small group tutorials to generate learning issues or objectives, research into these issues, and discussion among participants is claimed to have several advantages. These include the development of clinical reasoning skills, long-term knowledge retention, and better communication and problem-solving skills as well as the learning of practices that contribute to lifelong learning.

One of the chief advantages of the PBL approach has been seen as the development of clinical reasoning skills. Barrows (1980) argued that PBL, through hypothesis generation, reflected the expert practitioner’s reasoning process. He suggested that the PBL process should reflect the five stages of reasoning beginning with information perception, followed by hypothesis generation, inquiry strategies and clinical skills, formulation of a problem, and culminating in a diagnostic (or therapeutic) decision. It is the *display*, rather than the development, of clinical reasoning in the PBL setting which forms a core part of this study (Chapter 7).

While the acquisition of clinical knowledge and understanding is a key curricular aim, PBL also targets a number of other key learning areas. Wood (2003: 326) suggested that PBL “facilitates not only the acquisition of knowledge but also several other desirable attributes, such as communication skills, teamwork, problem solving, independent responsibility for learning, sharing information, and respect for others”, skills and understanding only incidentally acquired in a traditional medical curriculum oriented primarily to the acquisition of clinical knowledge.

The use of clinical cases in PBL aims to provide triggers for learning in an environment where students establish their own learning objectives and carry out research to share with fellow participants. So, PBL may be seen as an approach “that empowers learners to conduct research, integrate theory and practice, and apply knowledge and skills to develop a viable solution to a defined problem” (Savery, 2006: 9). In sum, PBL is widely seen as more dynamic, participatory, integrative and empowering than traditional medical curricula.

### **1.2.2 PBL and constructivist learning**

The traditional undergraduate medical curriculum focused on biomedical and clinical knowledge, in the early years of study working through the various bodily systems, and necessarily becoming more holistic in the clinical years, as authentic patient cases are presented. The traditional curriculum was usually centred around structured, formal lectures, laboratory sessions and, in the clinical years, clinical visits, through clerkships (see Section 1.6.1 for further discussion of these sessions) and structured bedside tutorials.

PBL programmes, on the other hand, are designed to create a context for collaborative learning: students identify their own learning needs based on stimuli or triggers

provided by a problem case based on authentic medical histories. PBL, oriented to small group self-directed learning, was, according to Savery and Duffy (2001), based on a constructivist philosophy originating in Vygotsky's (1978) view of learning, centred on three propositions: firstly, that

Understanding is in our interactions with the environment: what we understand is a function of the content, the context, the activity of the learner, and, perhaps most importantly, the goals of the learner. Since understanding is an individual construction, we cannot share understandings but rather we can test the degree to which our individual understandings are compatible. (Savery and Duffy, 2001: 1)

Secondly, Savery and Duffy saw "cognitive conflict or puzzlement" as a motivation and purpose for learning and the nature of what was learned. Thirdly, knowledge is seen as developing through interaction:

Knowledge evolves through social negotiation and through the evaluation of the viability of individual understandings. The social environment is critical to the development of our individual understanding as well as to the development of the body of propositions we call knowledge. At the individual level, other individuals are a primary mechanism for testing our understanding. (2001: 2)

Knowledge thus becomes a form of understanding that can be mediated by individual understandings in a social context so it is dynamic and may change through different interactions and over time. These aspects of PBL and the ongoing debate regarding its effectiveness are discussed in Chapter 3.

### **1.2.3 A PBL case example**

Generally, in pre-clinical PBL tutorials (rather than the Bedside PBL of this study), PBL cases are revealed in stages over perhaps several weeks (see PBL Pre-Clinical Case Example below), with each stage facilitating the identification of certain learning issues. The issues centre not only on scientific issues such as anatomical, biochemical and physiological areas, but also on epidemiological, social and ethical issues related to public health and education, and the law, thus merging a range of



discipline-based knowledge. The following classroom example of a PBL case, from a pre-clinical course at my university, delivered in stages with research time between those stages, demonstrates this:

### **PBL Pre-Clinical Case Example 1**

#### *Stage 1*

Sammy Chu is a 45-year-old banking executive, 1.72 m tall and weighing 78 kg. Though he takes no regular exercise, he perceives his health to be pretty good. His friends ask him to join them for the charity MacLehose Trail marathon which will take place in 6 months' time. He agrees.

#### *Stage 2*

One Sunday, a fine sunny day in May, Sammy went with his friends to Sai Kung on stage 2 of the MacLehose Trail as their first training exercise. After walking for about half a kilometre he started to feel hot and short of breath. He also felt that his pulse was going faster.

#### *Stage 3*

Sammy Chu carried on walking for another 15 minutes, then he collapsed.

One of the team members was a general practitioner and he made an initial assessment of Sammy. On examination he found Sammy conscious and alert, with red face and dry tongue, feeling hot and sweaty, breathing very rapidly (40 breaths/min), with weak but regular pulse (pulse rate 150/min).

#### *Stage 4*

The general practitioner helped Sammy to a shady spot and applied wet towels to cool him down. He told Sammy to take a 1-hour break, to rest and to drink as much fluid as he could during this period. Sammy recovered slowly, the team decided to go home after this episode.

The team leader was concerned about Sammy's general fitness and advised him to get in shape for the marathon day. As Sammy wanted to continue with the team he went and saw his general practitioner who prescribed an exercise regimen for him.

The kinds of issues students might identify from a preliminary reading of these four stages include: at Stage 1, a definition of good health, and the relationship between lifestyle, exercise and health and epidemiological data on age, weight and mortality; at Stage 2, the effects of exercise on physiological processes such as respiration, dehydration, the measurement and interpretation of pulse, and what is considered a normal range; and in Stage 3 rehydration and body temperature, and the effects of

regular exercise and types of exercise regimens. Socio-moral and epidemiological issues may also be identified, although not every case scenario contains all types of issues.

In order to identify the problem and what their own learning issues are, students are expected to collaborate and together decide what they need to investigate. This is one of the key aims of a PBL curriculum, to foster participation by group members in collaborative discussion.

#### **1.2.4 PBL and collaborative interaction**

PBL advocates like Barrows (1980; 1985; 1990) and Savery and Duffy (2001) suggest that, through researching the issues identified at each stage and then returning to the group and discussing findings together, students are able to reach deeper and more applied forms of understanding. Through collaborative discussion, students actively construct shared meanings together:

The focus is on learners as constructors of their own knowledge in a context which is similar to the context in which they would apply that knowledge. Students are encouraged and expected to think both critically and creatively and to monitor their own understanding i.e. function at a metacognitive level. Social negotiation of meaning is an important part of the problem-solving team structure and the facts of the case are only facts when the group decides they are. (Savery & Duffy, 2001: 14)

Students collaborate to produce a solution to a problem (if possible) and to identify further learning goals if necessary. Smith and MacGregor (1992) argue that the key feature of collaborative learning is that it facilitates talk and that through this talk learning can occur. This aspect is considered further in Chapter 3 in the discussion of classroom research. Participation in the tutorial session is therefore a means of displaying learning and building on and constructing new knowledge in what is not only a clinical but also an instructional setting. Although the crucial role interaction

plays is acknowledged, apart from some notable studies mentioned below, there has been little attempt to analyse participation in actual PBL sessions, and it is this gap that the present study wants to bridge.

### **1.3 PBL research: a brief summary**

The earlier phase of research into PBL was concerned to see how it performed in comparison with the more traditional curriculum of large class lectures. Many of these findings were conflicting. It was also clear that instruments of measurement for gains in traditional curricula were limited in their application to PBL with its goals of collaborative participation, improving communication skills and lifelong learning. This led to more qualitative studies of attitudes and beliefs. To give some background to PBL research the brief summary that follows mentions a few of these studies.

#### **1.3.1 Comparison with traditional curricula**

Considerable medical education research into PBL has compared the effectiveness of PBL and traditional curricula, whether through metareviews, large-scale surveys or small-scale interview studies. For example, Colliver (2000), in a metareview, found that studies appeared to show that PBL improved neither knowledge base nor clinical performance. However, more recently, in a metareview which included Colliver's study, Strobel and van Barneveld (2009: 55) found that PBL was "significantly favoured" in "learning of ill-structured and complex domains" (such as medicine) and was more effective than traditional curricula in training competent practitioners.

While the studies mentioned above and those included in the meta-reviews focused largely on the acquisition of content knowledge, another tradition of research has looked at interpersonal and attitudinal aspects of PBL considered key to its success. Schmidt, Vermeulen and van der Molen (2006), maintaining a comparison with

traditional curricula, reported that graduates from PBL curricula rated themselves more highly in terms of clinical as well as interpersonal and cognitive competencies. The current study of participation, following this process rather than an outcomes-oriented emphasis, also includes in its scope collaboration, independent learning, student attitudes to PBL (e.g. Norman and Schmidt, 2000) and student conceptions of constructivist learning (Loyens, Rikers and Schmidt 2006).

### **1.3.2 Focus on PBL processes**

The growing body of work focusing on the PBL process rather than its outcomes has included a range of approaches including conversation analysis (CA). A special issue of the journal *Discourse Processes* in 1999 presented articles which each looked at the same video segment of a PBL tutorial from different theoretical and analytical perspectives. Using CA as the methodological approach, Glenn, Koschmann and Conlee (1999) examined how PBL tutorial participants presented theory through evidence and reasoning, and at the tension between group problem-solving and instructional tutor-student interaction. Frederiksen (1999) also looked at reasoning through discourse within the frame of the diagnostic process and found that inquiry helped to co-construct diagnostic models and showed how reasoning was used to evaluate hypotheses. These articles present a focus on the PBL process rather than the assessment of knowledge gains and show how knowledge and reasoning are co-constructed in group collaboration, a perspective that resonates with the current study and is discussed in more detail in Chapter 7.

Studies reported in Evensen and Hmelo's edited volume (2000) focused on group collaboration and self-directed learning in PBL. The volume provides an overview of the PBL literature that has emerged from researchers at Maastricht University, and

includes analyses of aspects of group collaboration in PBL, such as the quality of the initial problem and tutor expertise and role (Schmidt and Moust, 2000; Koschmann, Glenn & Conlee, 2000); assessment of participation (Faidley, Evensen & Salisbury-Glennon, 2000) and inequities or asymmetries in participant roles based on gender and ethnicity (Duek, 2000). Schmidt and Moust's metareview had mixed results on whether learning was better supported by tutors with subject expertise as opposed to student tutors. Faidley et al.'s study of participation by first year medical students showed that two out of the four groups they studied were led by tutors who made use of didactic and Socratic methods of questioning and challenging. Faidley et al. measured this against self-reported student assessment of their performance and found little difference between students in these groups and student-led groups. They suggested that the type of group might not matter "if the aim of the PBL program ... is simply to offer an alternate, perhaps more engaging way of enabling students to acquire the biomedical knowledge foundational to medical practice" (Faidley et al., 2000: 131). While Duek's study focused on gender and ethnic differences in participation, she noted that participation was affected by role and identified roles such as group leader, reference person, scribe and task organiser.

Also in this volume, Koschmann, Glenn and Conlee (2000) compared findings from a study of conventional tutorials and PBL tutorials. They found that while there were similarities in problem-solving and tutor role, the PBL tutorials featured withholding of information by the tutor, and participation appeared chaotic: "Participants overlap each other, pause, stumble over words, express ideas in vague or uncertain ways, and laugh in response to statements." (Koschmann, Glenn & Conlee, 2000: 66). These findings are referred to in Chapter 7 Section 2 when discussing student and tutor participation and roles.

What the studies above do not problematise are the notions of role, with its corresponding notion of participation, and of expertise, with its corresponding notion of uncertainty. Although revealing a great deal about the nature of participation, these studies do not show how tutorial participants, in generating theories collaboratively, negotiate the challenges of collaborative interaction and display expertise and uncertainty in a hybrid instructional and clinical context. Glenn, Koschmann and Conlee (1999: 131) acknowledged the competing agendas of the different frameworks, that is, group problem-solving and teacher-led interaction: “The two frameworks may differ such that orienting to both creates interactional problems for participants. How they make one or the other relevant at particular moments provides an interesting question for further exploration.” This is an aspect which the current study takes into account.

#### **1.4 Professional expertise and socialisation through participation**

Expertise is conceptualised in this dissertation as a multi-faceted feature which can encompass knowledge and skills of different kinds. It may be seen as professional competence developed with experience, and it has been linked with communicative ability (Candlin & Candlin, 2002) or what Sarangi (2010a) called ‘interactional expertise’ or ‘interaction as an expert system’. In this conceptualisation, expertise is evident in both content knowledge and procedural knowledge. As such, it is inextricably linked to the context in which it is displayed. In other words, expertise is intricately linked to participation and, in this study, through participation in the PBL tutorial encounter.

One broad framework sees medical students as socialised into the medical profession through their medical education and participation in training. This process takes place

within what Lave and Wenger (1991) called “situated learning”, i.e., in the institutional context of university medical education and clinical training. In the physical settings of the laboratory, operating theatre, clinic and hospital ward, and through curricular modes such as lectures, problem-based learning tutorials, ward rounds, simulated role-plays and patient interviews, students are socialised into a community of practice. In situated learning, learning is part of practice where “agent, activity, and the world mutually constitute each other” (Lave & Wenger, 1991: 34). Although learners’ participation is on the edge of professional practice, Lave and Wenger saw this as both an empowering and disempowering position in that some practices are allowed to the student while others are not. Generally however, Lave and Wenger observed that “peripherality” of this kind is a positive condition as it offers relevance and connectedness which leads to “identities of mastery”.

In Lave and Wenger’s model, participation in situated learning is a necessary step in the progress towards full membership of the community through apprenticeship. This includes learning how to talk to become a “master practitioner” (Lave & Wenger, 1991: 111). In the current study, tutorial discussion is based on what students have learnt from patients in the wards, their subsequent case presentations, and their interpretation of patients’ presenting problems based on their medical education. Through this peripheral situated learning, the tutorial provides opportunities for the negotiation of expertise. The case history presentation is therefore a key component of this study and is discussed in detail in Chapter 6.

The PBL tutorial in the clinical years is a hybrid educational and clinical context, in which scientific learning, skills and procedures are displayed to peers, teachers and medical personnel, and, sometimes, to patients. Participation in the tutorial involves

the discussion of cases or case talk: this may include, as it does in this study, case presentation. Sarangi and Roberts (1999) viewed case talk between novices and experts as “a distinct medical genre geared towards professional training” (Sarangi & Roberts, 1999: 65) in which case presentation “combines modes of competent accounts of professional knowledge and pedagogic sequences of institutionally relevant management of a case”. In the later years of the medical curriculum, students spend considerable time in the hospital wards where, as mentioned above, their roles are marked by hybridity: while they remain students, they are performing minor clinical tasks – which they will continue to perform throughout their professional careers – such as examining and interviewing patients, and sharing their findings with colleagues and supervising physicians. They are therefore in a situation of legitimate peripheral participation in which they are also learning the discourse of the clinical community.

### **1.5 The current study**

While professional expertise has been studied in the context of doctor-patient communication, counselor-client interaction and supervisors-medical graduates, this study moves the focus to PBL pedagogy in undergraduate medical education. The study builds on and is informed by scholarship in the fields of education, classroom discourse, medical education, and discourse/interaction analysis in institutional and professional settings.

The rest of this introductory chapter describes the scope and orientation of the study. It gives background to PBL in the medical curriculum generally and in the location of this study, Hong Kong. It also describes the emergence of my interest in this area.



This is followed by the research design, research questions and a brief chapter-by-chapter preview.

### **1.5.1 Background to the study**

The specific focus of the study is the latter years (years 4 and 5) of the undergraduate clinical curriculum when students are at the end of their studies as university students and on the cusp of professional practice, approaching the beginning of their professional work as interns in the hospital setting. As mentioned, the study specifically focuses on one component of the medical curriculum: problem-based learning tutorials. The study is located in Hong Kong, where I have been working for over twenty years. Although I had also taught medical and allied health students in universities in Saudi Arabia and Kuwait, it was in Hong Kong in the late nineteen nineties that I was exposed to the movement towards problem-based learning in medical education.

The study's setting within clinical medicine was chosen as this was one of the departments that maintained a focus on PBL in the clinical years (this choice is described in more detail in Chapter 4, Section 4.3). As a communication skills teacher, I was interested in students' performance in English in their clinical studies and particularly in their interaction in PBL tutorials. PBL had been introduced into the undergraduate medical curriculum in 1997, along with a greater focus on disciplinary communication skills courses in the University and within the Faculty.

These specially developed communication skills courses aimed to help students meet the communicative demands of key components of their medical studies, specifically in PBL tutorial discussion in the first year, and case presentations in ward teaching and learning contexts in the second year of their studies. Using observation data and

transcriptions of first year PBL tutorials we identified patterns and problems in communication in the target contexts, and based the communication course design on our findings. The communication skills course for first year students took a task-based approach. It aimed to reflect the “PBL ethos” where possible, in terms of learning through collaborative, problem-oriented interaction, and used authentic video recordings of PBL discussions. In the second year course, video data of bedside case presentations were used with participants’ permission in learning and teaching. However, despite gaining insights into the pre-clinical years of the curriculum, the later clinical years where students are “situated learners” within a professional community, were unexplored. We felt that a research gap existed in the study of discourse and participation in situated contexts in the clinical years and that recordings of tutorial interaction for research and educational purposes would be a rich source of data to support further course development.

### **1.5.2 Scope of the study**

The scope of this study goes beyond the area of tertiary communication skills training with its focus on meeting the immediate needs of learners in academic contexts. Sarangi and Candlin (2011) have argued that the “over-proceduralised” and generic focus of communication skills training cannot capture the contingencies that characterise professional practice and point out that even professionals themselves may not be able to verbalise “tacit” knowledge. They went on to say that, for applied linguists, a range of “methodological and analytic know-how” (Sarangi & Candlin, 2011: 5) is necessary in order to gain insights into such practices.

This study extends to the interrelationship between the instructional and clinical contexts, where students are expected to both display their clinical knowledge and are

already participating in certain professional activities, as they are about to enter the profession. The approach in this study is based on the belief that a close examination of the interactional dimension can shed light on instructional and professional practice. By looking at tutorial participation through verbal interaction, we can identify interactional strategies such as questioning, and key themes of classroom interaction and professional practice. We can see if and how expertise (including markers of uncertainty) is displayed through negotiated participation in tutorials and how it can encompass both medical knowledge and interactional/communication strategies. We can also examine how the activity-specific roles taken up in the tutorial such as chair, scribe, and presenter, shape the interaction. Ultimately, it is hoped that the study will add to our understanding of the dynamic nature of the PBL activity in this kind of educational-cum-clinical setting.

### **1.5.3 Orientation of the study**

The orientation of the current study has been informed by theoretical and empirical work in the areas of discourse analysis, the sociology of medicine and medical education. Guiding concepts from these fields overlap in their application to the hybrid educational and professional context of this study, including views of knowledge which embrace concerns for both social responsibility (see Chapter 2 section, 2.2.1) and scientific reasoning.

From the pedagogic perspective, cognitive psychology, social constructivist theories of learning, and the construction of knowledge as social processes have contributed to the understanding of interaction in context, and the nature of activities in which learning takes place. Goffman (1983) advocated the investigation and analysis of socially situated activities through “microanalysis” and called this “analytically viable

... domain” (1983: 2) an interaction order:

it appears to me that as an order of activity, the interaction one, more than any other perhaps, is in fact orderly, and that this orderliness is predicated on a large base of shared cognitive presuppositions, if not normative ones, and self-sustained restraints. (1983: 5)

Any interaction order, such as the PBL encounter, would thus present its own affordances and constraints through its ritualised character and social situatedness.

Following from Sarangi and Roberts (1999) and building on work in the sociology of professions and organizations, Sarangi and Candlin (2011:14) further distinguish institutional and professional orders: “professionals, although most of them are institutional representatives as well, are endowed with a sense of agency based on knowledge and freedom. By contrast, institutional representatives ...tend to underline objectivity and rule/procedure orientation of systems”. In the medical education setting, these orders are intertwined with each other, one unable to exist without the other. Medical students develop expertise interactionally and are socialised into becoming physicians, learning to interact within institutional and professional orders. Sarangi and Candlin (2011) suggest that professional practice takes place within institutions with their network of rules and procedures and that “the institutional order of practice(s) and the interactional order of engagement(s) in action are ineluctably interconnected” (Sarangi & Candlin, 2011: 6). The institutional order and the interactional order take the notion of communities of practice further, integrating the roles that professionals play, which are manifest in the interaction order.

Expertise and uncertainty are crucial aspects of the professional order. The theme of uncertainty has been prominent in medical education research – for example in the work of Renee Fox (1959; 1980) on preparing medical students for a professional life

of uncertainty in medical knowledge, and Paul Atkinson (1984; 1995) who argued for a broader understanding of uncertainty. These notions are problematised further in Chapters 2 and 3 in the context of professional practice vis-à-vis theories of socialisation, apprenticeship and participation.

In this study, tutorials were recorded and the verbal interaction transcribed (as described in Chapter 4). The approach to the data analysis is from a perspective which views interaction as socially constituted and contextually bound. The analytical framework for the study takes its guiding conceptualizations from the work of Erving Goffman (1976; 1981; 1983) and of Stephen Levinson (1992[1979]), through their notions of participation framework and activity type respectively, and Sarangi's activity analysis framework that integrates these notions (Sarangi, 2010a). The contributions of conversation analysts such as Atkinson and Heritage (1984) and Schegloff (2007) have also been drawn on to inform the study. Thomas's (1983; 1995) work in pragmatics, particularly in the investigation of interactional asymmetry, has also been a useful resource.

## **1.6 Background to PBL at The University of Hong Kong**

PBL in the pre-clinical and clinical programmes at the University of Hong Kong differs in its prominence in the syllabus and the nature of the programme. This is described in greater detail in Chapter 4 but in order to contextualise this study, key features are described below.

In the medical faculty in which this study was carried out, a partial or "hybrid" model, (as mentioned in section 1.2) was adopted, with PBL tutorials and traditional lectures running side by side in the pre-clinical curriculum. While PBL tutorials are a major feature of the pre-clinical curriculum with two, two to three hour weekly tutorials, in

the final clinical years, the presence (or absence) of PBL in the timetable is decided on a departmental basis.

### **1.6.1 Clerkships and PBL**

By and large, PBL has become a component of the clerkship or in-service training (Prince et al. 2000) programmes at this level. At my University, the curriculum is divided into two pre-clinical years and three clinical years, the third, fourth and fifth years, with students going through the junior, senior and specialty clerkships in these latter years. Clerkships provide experience of hospital practice for students as they rotate for periods of eight to ten weeks through different wards and specialties. The Junior Clerkship begins in the third year of study while in the fourth and fifth years the Senior Clerkship and Specialty Clerkship take place.

### **1.6.2 Bedside PBL tutorials**

The fourth and fifth year Bedside PBL (BPBL) tutorials, which are the subject of this study, are based on case histories and are part of the Senior and Specialty clerkships. The interactional dynamics of these tutorials, where participants display and negotiate their “situated expertise”, are the subject of this study.

The BPBL component in Clinical Medicine in the fourth and fifth years consisted of bi-weekly tutorials focused on issues arising from the cases of patients students had interviewed in the wards, at the bedside of the patients. In most instances, the first tutorial was devoted to selecting a case and determining issues for discussion. The second tutorial, two days later, lasted between one to two hours and this is the session that was observed and recorded to provide data for the study.

## **1.7 The development of the research focus of this study**

As a teacher of communication skills in a university where the medium of instruction is English and the students are almost entirely native speakers of Chinese, I was involved in several funded research projects which investigated the communication needs of these students and the challenges presented by having to study medicine in English (Shi, Corcos and Storey, 1999; Storey and Tse, 2005; Storey, Tse, Chan and Yip, 2011).

### **1.7.1 Role of the communication skills teacher in the PBL curriculum**

The transition to PBL in the pre-clinical medical curriculum in 1997 prompted a Faculty request to the Centre for Applied English Studies (then the English Centre) to develop a communication course on academic discussion for first year medical students. Medical faculty members reported student difficulties in participation in the new PBL tutorials and asked for a communication course which might help students overcome these difficulties, and increase their tutorial participation. In order to identify student needs, I led a team of colleagues and, with support from the medical Faculty staff and students regarding observation and recording of tutorial sessions, we investigated the communicative demands of tutorial participation and student interaction in first year PBL tutorials. We transcribed the tutorial discourse and interviewed tutors and students, deriving objectives for the communication skills course and course content from our results.

### **1.7.2 PBL research project findings**

To teachers-cum-researchers with a background in applied linguistics and language teaching, this project presented challenges. The first was whether as outsiders we

could identify communication issues in our data and, secondly, what analytic approach would be most appropriate; a related issue was whether students would perceive the course designed on the basis of our findings as relevant, and useful for their PBL tutorial performance.

In order to identify communication issues in the data, we took a discourse analytic approach and, in particular, the concept of *critical moments* (Candlin, 1987; Roberts & Sarangi, 2002) as an entry point. Tutor interventions were taken as an indicator of critical moments on the basis that tutors would intervene when they felt that the discussion had become problematic. Findings indicated that, in these PBL tutorials, group discussion was infrequent; students displayed a marked preference for presenting scientific explanation, rather than hypothesizing; and they often read source material verbatim with very little reformulating or paraphrasing of written texts, or academic sources.<sup>1</sup> The tutorial discourse was marked by acceptance rather than questioning and there was an absence of conflictual or challenging discussion. In short, it appeared that the students' highly structured educational background had ill-prepared them for the heightened degree of autonomy and participation required in a PBL-oriented curriculum.

Initially, blame for these shortcomings was placed on the so-called Confucian approach to teaching and learning in Hong Kong secondary schools, with its emphasis on learning for assessment and rote learning (Watkins & Biggs, 2001). While this may have been a factor, the findings of a later project we undertook suggested another possibility (Storey & Tse 2006). This project investigated first year students' conceptions of PBL and knowledge in PBL through the use of images and mind maps

---

<sup>1</sup> The findings were reported in conference papers in Storey and Tse 2005; Storey, Tse, Lam and Legg 2004; Storey 2006; and see Legg, 2007)



featuring pictures and diagrams. The findings indicated three most common conceptualisations of PBL and, in particular, of understandings of processes of gaining knowledge in PBL: firstly, knowledge was seen as gained through a collecting/gathering process; secondly, through a refining, convergent process; and finally, through a divergent process.

In the first conceptualisation, the collecting of knowledge was seen as a target, which could be found in a source, and this knowledge could be quantified. In this view, PBL was seen as offering great opportunities for gaining more knowledge (e.g. one group of students suggested they learnt “100 times more in PBL”). The learner was seen as an agent, rather than the “real” source of knowledge, with PBL providing occasions for learners to take turns to be the agent, presenter of knowledge, and learners viewed themselves as absorbing knowledge from the source. In the second conceptualisation, student images seemed to indicate that knowledge was something that had to be refined from multiple subjective views into objective knowledge consisting of facts, figures and evidence. These learners appeared to have set limits on what knowledge might be. They conveyed the view that, in PBL, unrefined knowledge from books, people and practical experience had to be transformed into structured, condensed knowledge through a refining process leading to objectivity and clarity. The third conceptualisation saw knowledge as something which could be created and in which learners could be creative: the source of knowledge was viewed as personal and students in this group explained that “Personal views are original and can influence others”. In this view, students saw knowledge as being constructed together through sharing and collaboration. This view, the researchers felt, was a “strong form of PBL” (Storey & Tse, 2005), a view that in this study, coincides with the social constructionist view of knowledge explicated in Chapter 2.

The researchers drew the conclusion that while a few students saw knowledge and learning as constructed collaboratively through the PBL process, most were not fully engaged with the underlying principles of PBL (Storey & Tse, 2005). However, these studies were conducted in the first year of medical education. While they shed some light on underlying attitudes and provided guidelines for course development, it seemed likely that student attitudes or performance would have evolved by the time they reached their clinical years. There had been reports that clinical students were “more communicative” than their less experienced counterparts (Nandi, Chan, Chan & Chan, 2000: 305) and that initial problems in adjusting to the PBL mode of learning were overcome after a time (Khoo, 2003: 401). If so, in the later years of their medical studies, students might be expected to display expertise at a level closer to what professional practice would expect. Motivating this current study was the question of what kinds of expertise would be necessary, how it might be displayed, and what would influence, facilitate or constrain the display and negotiation of such expertise.

### **1.8 The research focus of this study**

The research focus was investigated via the following broad and specific sets of concerns: what kinds of expertise do medical students and their tutors display in their participation in BPBL tutorials? How do medical students and their tutors negotiate expertise in BPBL tutorials? How is uncertainty displayed and negotiated? How do participation structures mediate the display and negotiation of expertise? More specifically, the research questions can be formulated as follows:

1. How is the PBL tutorial activity structured in terms of participation and role-positioning? (Chapter 5)

2. How is case presenting affected by being situated within the context of the Bedside PBL tutorial activity type? (Chapter 6)
3. How, in a problem-based interaction setting, do students shift between the activity-specific roles vis-à-vis question and answer sequences to reach agreement or get consensus about a diagnosis, and how does their management of uncertainty in clinical reasoning (as evidenced in their questions) relate to the negotiation and distribution of expertise? (Chapter 7)
4. How, in a problem-based interaction setting, do tutors shift between the activity-specific roles vis-à-vis question-answer sequences and how do these role-shifts affect the display and negotiation of expertise and the management of uncertainty? (Chapter 8)

In the later years of their studies, during the Specialty clerkship, students spend most time in the hospital wards: the tutorial is thus situated within clinical and educational contexts (hospital, university, and medical training) requiring different types of expertise at the levels of knowledge and participation. Thus the focus of this study is on the PBL tutorial as a type of hybrid activity in which educational and clinical expertise is displayed through talk in interaction, where the variable nature of expertise may be displayed by participants to different extents, and where their shifting roles contribute to the dynamic nature of the tutorial.

The use of a real patient case as the basis for tutorial discussion (unlike the “paper” case in the example in Section 1.2.3) places the tutorial at the centre of a complex interactional sphere in which the tutorial activity takes different forms. The setting and the case are factors in how the participants orient themselves to the circumstances of the tutorial setting. How participants cooperate with each other to fulfil the

ostensible goals also includes the playing of a number of roles in each stage beginning with the patient interview, then the brief determination of discussion issues (not included in this study), and finally in the tutorial itself. In the patient interview and physical examination, students introduce themselves as students but in all other respects seek to perform their tasks as a competent physician would. The determination of issues for discussion was negotiated jointly by students and tutor (the student participants reported this to me, as I was unable to observe these sessions).

As mentioned above, students are likely to wish to appear competent and as expert as possible in these roles, particularly at this stage of their studies. This led to my posing the question of how, when about to graduate, as students and soon-to-be practising physicians, they might display both their expertise and their uncertainty in their participation in the tutorial discourse. A discourse/interaction analysis perspective was a logical approach to exploring how expertise-in-participation is displayed and negotiated in the context of this hybrid activity.

I argue that participation is determined by contextual and interactional factors, some of which arise from the nature of PBL as an activity but also from the interplay between the clinical and educational discourses. This dissertation seeks to explain how these create the dynamic interactional trajectory of the tutorial activity.

## **1.9 Chapter overview**

The literature review in Chapter 2 discusses in detail the theoretical and analytic studies which underpin the present study, particularly the understanding of expertise and uncertainty in the sociological literature and, from the perspective of medical education, looks at the case presentation as a key marker of expertise. Making use of

Berger and Luckmann's work as a conceptual foundation for the understanding of expertise as a social phenomenon, the chapter proceeds to consider the relationship between case presentation and professional expertise in the medical context. As a corollary, and reflecting an emphasis in the medical education literature, uncertainty in medical education and practice is examined through the work of Fox and Atkinson in particular. The chapter focuses on the ways in which case presentations may afford opportunities for the display of both expertise and uncertainty and on student attitudes to uncertainty as an apparent marker of ignorance. The chapter considers how expertise and uncertainty may be displayed in diagnostic reasoning and what Atkinson (1995) calls "evidentiality" or the marking of evidence.

Chapter 3 continues the review of the literature, and is divided into two parts. The first part introduces literature relating to participation and draws on pragmatics-based and discourse analytic studies, including activity-type-based studies while the second part focuses on research in the educational or classroom setting. Beginning with Goffman's work on participation and role, and production and reception roles, I highlight his view of the situated and dynamic nature of role where roles are specific to and situated in certain activities. This has been further developed by Sarangi (2010b; 2010c), building on Thomas (1983) with the distinction between social role, activity role and discourse role. I move on to consider Levinson's (1992[1979]) notion of activity type as a way of conceptualizing the tutorial as an institutional encounter with shared goals and fixed routines. I draw on Sarangi's (2011) framework which applies the work of Goffman and Levinson to operationalise their notions in an approach he has termed 'activity analysis'. This has been combined with a theme-oriented approach (Roberts & Sarangi, 2005) which focuses analytical engagement on "the micro-level of interaction against the background of institutional/professional

realities” (Sarangi, 2011: 192). These studies help to define the nature of role in this study, and provide a conceptual as well as analytic framework for the study as a whole. The educational perspective on participation is the subject of the second part of the review, from a constructivist perspective which sees classroom interaction as part of the social process of learning. It focuses on how research in the classroom setting has revealed patterns of teacher-student interaction, especially in the use of question and answer sequences, that can affect participation, and the roles afforded to participants by the interaction order.

The methodological approaches are covered in Chapter 4. This relates the history of data collection, data presentation, the process of ethics approval, recruitment of participants and the difficulties encountered. It describes the pilot study and how it contributed to the design of the main study.

The next 4 chapters (Chapters 5-8) present the data analysis. The first of these, Chapter 5, demonstrates the activity analysis of a prototypical PBL tutorial as an activity type. It focuses on the structural and interactional mapping of the tutorial and shows how the key analytic themes of questioning, role sets, alignment and asymmetry emerge and are negotiated in the trajectory of the tutorial. The structural analysis shows key types of engagement and surveys the key emergent focal themes as follows: the presenting of a case history, clinical and diagnostic reasoning, and the management of uncertainty. An analysis of each of these three focal themes is presented in Chapters 6,7 and 8.

The first of these themes, presenting a case history, is described in Chapter 6. Using illustrative data examples it shows how expertise may be displayed vis-à-vis case presentation and how the structure of a presentation may be adapted to meet both

overt and covert goals of the tutorial activity type. The analytic focus is the presenting of the case history by the student who has previously interviewed and examined the patient. Analysis of data extracts shows how presenters take up a range of roles and how the presentation of the case history is shaped to the demands of the activity by the participants. Analysis also shows how the presentation affords opportunities for the presenter to display expertise through the role of knower and expert in this patient's history. Uncertainty in this context is seen as an element to be downplayed.

The following chapter (Chapter 7) expands on the theme of uncertainty in sequences of reasoning where evidence is provided for claims (primarily through question-answer sequences). Therefore, the focus is on how other co-present student participants apart from the presenter (though the presenter may participate in such sequences) interact in diagnostic reasoning sequences and in the management of uncertainty in evidential discourse. Because the tutorial by its nature is a locus of uncertainty, where it is hoped uncertainty will be diminished through collaborative discussion, I show that uncertainty is part of the rhetoric of developing expertise and the activity and the roles it affords participants allow for a rhetoric of uncertainty.

While chapters 6 and 7 focus largely on student participation, Chapter 8 focuses on the activity-specific roles played by tutors in relation to the display of expertise, reasoning and the management of uncertainty (mainly via question-answer sequences). Tutors may display differences in orientation depending on their role and the frame in which they are participating. While the study confirms the tutor's role in scaffolding learning through a range of strategies which include the taking up of more or less asymmetrical positions in relation to the student participants, there are also indications of alignment with students and a reduction in asymmetry to create a more

collegial atmosphere. The study also reveals marked differences between tutors and students in the use of modality to indicate likelihood, and in the inclusion of previous experience and common sense reasoning in the provision of evidence.

The final chapter, (Chapter 9) revisits the main conclusions of the study in view of the research questions and considers its limitations, outlines possibilities for future work and the contributions of the study.

### **1.10 Summary**

In this chapter, I have introduced the key constructs underpinning this study. These are PBL in medical curricula, the different forms it can take, and its perceived advantages with its foundation in constructivist learning and collaborative interaction. I have introduced the notions of participation and expertise and socialisation of novice learners through an apprenticeship or “legitimate peripheral participation” (Lave & Wenger, 1994). I have also discussed findings of PBL research studies which have compared PBL and traditional curricula as well as those that have focused on the process of PBL tutorials and the interaction of participants. Finally, I introduced the scope of the study, its research orientation and chapter overview.

In the next chapter, I review the literature which has informed the theoretical foundation of the study with regard to the notion of expertise, and follow this with a review of studies on the corollary of expertise – uncertainty - within medical education.



## **Chapter 2: Conceptualising expertise and uncertainty and perspectives from medical education**

### **2.1 Introduction**

This is the first of two literature review chapters, each of which features a combination of theoretical work and insights drawn from applied studies. In this chapter I begin by explaining my conceptualisations of expertise and uncertainty as social and discursive phenomena, with the clinical case presentation as an example of the discursive manifestation of these phenomena. In Section 2.2 I provide an overview of how expertise has been conceptualised within the sociology of knowledge as a dynamic constituent of social development and professional socialisation and how this may be discursively displayed. In Section 2.3 I discuss professional socialisation within the context of medical education in terms of student attitudes to knowledge. In this section I also introduce notions of the voice of medicine and the relationship between voice and roles. In Section 2.4 I move on to a discussion of uncertainty in medical education, its sources and its role in clinical reasoning while in Section 2.5, in connection with clinical reasoning, I introduce the medical case presentation literature and studies of expertise and uncertainty in case presentation discourse. I end the chapter in Section 2.5.4 with a review of selected studies of tutor management of student-tutor encounters in PBL tutorials.

In this chapter, I also consider the ways in which a deficit model of knowledge, that of uncertainty, has been framed, a model which continues to dominate the literature. The role of uncertainty is crucial in preparing students to become experts, and equally

to become accepting of its place in clinical reasoning. I then focus more narrowly on the case history presentation as an indicator of expertise, and as an activity in which uncertainty may be displayed in the negotiation of expertise. I investigate the role of case presentations in medical education, drawing on notions of expertise and uncertainty as features of professional practice, apprenticeship and diagnostic reasoning.

## **2.2 Expertise, Knowledge and Evidence**

### **2.2.1 Conceptualising expertise**

What does expertise mean in the context of this study? Although the study is situated in an educational setting, I have established in Chapter 1 that the clinical tutorial activity is a hybrid one, existing in the overlap between academic education and the beginning of professional practice. I therefore consider the notion of expertise from a wider perspective, beginning with a lay understanding that sees expertise as residing in knowledge and mastery of practical skills, and then considering expertise as a key concept in the sociology of knowledge. To inform our understanding of expertise I firstly draw on the work of Berger and Luckmann (1966), who distinguished between lay and professional knowledge, which they explored in terms of social and specific knowledge. I return to their work in Chapter 3 when discussing the constructivist views of knowledge that underpin PBL. Secondly, I go on to discuss work on the nature of expertise within the medical education setting, notably by Fox and Atkinson, in examining the relationship between expertise and uncertainty in medical education and training.

### **2.2.2 Expertise and knowledge as social phenomena**

The concept of knowledge as a social phenomenon has been the focus of discussion by both philosophers, such as Wittgenstein, Foucault and Rorty, and sociologists like Berger and Luckmann. A social constructionist perspective on knowledge is explicated in Berger and Luckmann's landmark work (1966). They attributed the foundation of a 'sociology of knowledge' (1966: 16) to German philosophers such as Schutz, who argued that the social distribution of knowledge is relative, and relevant to a particular situation, group and social context:

The expert's knowledge is restricted to a limited field but therein it is clear and distinct. His opinions are based on warranted assertions: his judgements are not mere guesswork or loose suppositions. The man on the street has a working knowledge of many fields which are not necessarily coherent with one another. His knowledge of recipes indicating how to bring forth in typical situations typical results by typical means. (Schutz, 1962: 122)

Schutz's view was that the expert's knowledge was founded on an ability to provide "warranted assertions", or specific evidence for judgments, as opposed to the "recipe" type knowledge gained by the non-expert. Berger and Luckmann (1966) took the notions of typical or "recipe-type" knowledge and professional knowledge further with their division of knowledge into two types, social and specific. Their view that specific knowledge is part of a conception of expertise accommodates the subjective, lived experience in which knowledge is seen as socially distributed and contextually bound: different social beings build differing forms of knowledge according to their different contexts. Although both types of knowledge are socially constituted, the knowledge of the "man on the street" is available to all persons in society, while professional knowledge is available only to individuals operating within certain specific social spheres and to whom both types of knowledge are available.

This view of knowledge is highly pertinent to the conceptualising of expertise. A key distinction Berger and Luckmann make between social and specific knowledge is that those with specific knowledge have to organise and administer their domains (1966: 95), and these domains have become social institutions. This view places expert knowledge within an institutional context, whose members have different kinds of knowledge. Berger and Luckmann see expertise as residing in these “exceedingly complex and esoteric systems” (1966: 60-61), which are enacted through institutions. While many expert systems may be superficially familiar to the layperson, such as the division of medicine into specialties or areas of clinical research (see discussion of professional vision in Section 2.2.4 later in this chapter), Berger and Luckmann suggest that the layperson’s knowledge is different from expert knowledge. This difference may be seen in the situation of the communication skills teacher in medicine, who studies the expert system but cannot fully grasp all its complexities and ramifications. It is also an issue with regard to the researcher from outside the discipline, as later discussed in Chapter 4 on Methodology. Berger and Luckmann describe the nature of expert knowledge as “sedimented”, with language as a “depository of a large aggregate of collective sedimentations” (1966: 87). Language is crucial in this view as a way of transmitting shared experience and common knowledge and can be seen as the foremost sign of the institutional order.

Through the institutional order “differentiated knowledge” is “legitimated” (Berger and Luckmann, 1966: 111-113) by specific roles, formal procedures and codes of conduct (as described by, for example, Goodwin, 1994; Mehan, 1979). Implicit in these views is the inaccessibility of knowledge to individuals outside the areas of expertise, and the difficulties of apprehending the full extent of that knowledge

through its “aggregate of collective sedimentations” (Berger and Luckmann, 1966: 87), as a dense internalisation of what an expert knows.

Although Berger and Luckmann wished to include subjective experience in their concept of knowledge, later critical approaches pointed out that in this view knowledge was located within institutional and professional domains and omitted personal lives as sources of knowledge. Writers such as Dorothy E. Smith sought to place greater emphasis on experience as a constituent of knowledge, looking to develop a sociology of knowledge that took into account lived experience, particularly that of women:

I thought we would want a sociology that would create an account or accounts, analysis or analyses, of how societies were put together so that the worlds of our everyday/every night experience happened as they did. Then we would have a knowledge from our standpoint, making claims to comprehend a scope of history and society (Smith, 1989: 39)

Smith’s view of knowledge was that it included the personal and experiential aspects, traditionally excluded from sociological views of knowledge:

Within the social sciences, identifying practices of organizing the relevances of a given discourse to exclude the knowledge arising in experience, maintaining the sharp division between the authoritative knowledge of the expert and the experiential knowledge of the layperson, and institutionalizing the dependence of the latter on the former is standard practice. For of course, an experiential knowledge isn’t recognised as knowledge on the terrain of professional, scientific and other academic discourses. (1989: 40)

This connects with Mehan’s view of institutional reality (1979), in that what is recorded becomes institutionally real and that those who define the record have knowledge and power (as illustrated in Goodwin, 1994, see section 2.2.4). Smith wished to include knowledge that arose from lived experience. If these views of knowledge are also taken into account, the understanding of knowledge is broadened to include personal knowledge or experience, which though not easily categorised

may play a role in expertise. This line of research is one of the focal areas of this study, notably in Chapter 7, where I look at the kind of evidence students present and ask about in clinical reasoning, and in Chapter 8, in my analysis of the tutor's role.

### **2.2.3 Professional socialisation**

As new knowledge is added or the old is amended or elaborated through new experiences, both social and expert knowledge may be seen as dynamic (Berger and Luckmann, 1967). This is part of the rationale for PBL: to build on existing forms of knowledge by stimulating learners to acquire, through collaboration, not only scientific but also evolving socio-moral understandings of social and ethical medical issues (See Ch.1, Section 1.2.3). Berger and Luckmann frame this process as *socialisation* and give examples of how 're-socialisation' may take place as an individual's experience shifts, as during military service or hospitalisation. Sarangi (2010a) argues along similar lines about the cumulative structuring of scientific/technical knowledge and experiential/clinical knowledge within a given organisational ethos. Context is important here as the socialisation takes place within a "specific social structure" (183). I use the term "professional re-socialisation" to try to capture the notion of an individual's re-socialisation into many roles, a more nuanced understanding than the term "professionalisation" with its connotations of institutional development and frameworks as in the professionalisation of medicine or social work. The notion of a plurality of roles or role-sets is addressed in more detail in Chapter 3 (Section 3.2.4).

Medical students in the clinical years are moving into different contexts in the wards, the clinics and the operating theatres. While they are initially onlookers or observers, they also begin to practice certain skills, such as physical examination, within what

Lave and Wenger (1991) called a context of peripheral participation. Lave and Wenger suggested that people take on new identities as they experience “multiple waves” of socialisation. Berger and Luckmann, on the other hand, tended to distinguish these multiple realities, or the socialised roles that a person may perform with “significant others”, from the perspective of a person’s self-identity, a point which is made later in this review.

In summary, Berger and Luckmann’s view of knowledge is pertinent to the conceptualising of expertise, encompassing as it does the constantly changing nature of knowledge, the social distribution of knowledge, institutional knowledge, the internalisation of knowledge, ongoing re-socialisations, and the role of language in mediating expertise. If, however, the socialisation process is ongoing and the state of knowledge is dynamic, then knowledge and expertise are on a cline and, at any one time, an individual or group of individuals can be at different levels or stages. This implies that at all stages of learning and knowledge there may exist forms of uncertainty affording the possibility of acquiring new knowledge.

#### **2.2.4 Professional vision and language**

The view of professional knowledge as embedded in language is vividly illustrated in Goodwin’s (1994) notion of “professional vision” and his account of the 1992 trial of four Los Angeles police officers accused of the gratuitous beating of an African-American man, Rodney King. Goodwin showed through his analysis of trial transcript data how three language practices contribute to professional vision: coding, highlighting and the production of material representations. These, Goodwin argued, are embedded in the interpretation of the event produced by professionals. Goodwin

illustrated this “embedding” with examples from archaeology and his own professional practices in the area of anthropological linguistics:

An event being seen, a relevant *object of knowledge*, emerges through the interplay between a *domain of scrutiny* (a patch of dirt, the images made available by the King videotape, etc.) and a set of *discursive practices* (dividing the domain of scrutiny by highlighting a figure against a ground, applying specific coding schemes for the constitution and interpretation of relevant events, etc.) being deployed within a *specific activity* (arguing a legal case, mapping a site, planting crops, etc.). The object being investigated is thus analogous to what Wittgenstein (1958:7) called a *language game*, a “whole, consisting of language and the actions into which it is woven”. (Goodwin, 1994: 606-607, italics in original)<sup>2</sup>

In other words, professional vision selects its focus, places the object of knowledge under the microscope and, through its discursive practices, highlights what the professional considers relevant for interpretation. Goodwin defined coding as a process of classification or categorisation which has the “power to organise apprehension of the world”. He defined highlighting as “divid[ing] a domain of scrutiny into a figure and a ground” (Goodwin, 1994: 606), so that events relevant to the activity of the moment stand out: “through these practices structures of relevance in the material environment can be made prominent, thus shaping not only one’s own perception but also that of others” (Goodwin, 1994: 610). Graphic representations are seen as “mirroring” or “complementing” spoken language “using the distinctive characteristics of the material world to organise phenomena in ways that spoken language cannot” (1994: 611). The practices described by Goodwin as constituting professional vision are seen in medical practice in its coding of the body, for example, through classifications of symptoms, body systems, and disease, and graphic representations in X-rays, magnetic resonance imaging, and patient notes. These may also be said to offer warrants in clinical reasoning processes and the making of

---

<sup>2</sup> This view of activity specific “language games” will be revisited in Ch. 3 in the discussion of Levinson’s activity type.



diagnostic claims. The professional coding of information, highlighting of salient facts, and graphic representations are considered in the analytic chapters 6 to 8, where I examine in depth the themes of expertise and uncertainty, and clinical reasoning.

Another aspect of the power of the professional is a discourse that is widely seen as privileged. Goodwin (1994: 625) pointed out the asymmetry of “who can speak as an expert and thus structure interpretation”, and those who are not able to speak as experts. Goodwin contrasted the learning process of the trial jury members who remain silent, with that of the novice archaeologist whose work is guided by a supervisor and is also collaborative: “The necessity of collaborative action not only posed tasks of common understanding as practical problems but also exposed relevant domains of ignorance, a process crucial to their remedy.” (1994: 628) This has similarities to Lave and Wenger’s notion of “peripheral participation” as part of apprenticeship within a community of practice (Chapter 1, Section 1.4), where learning to be a professional requires interaction with someone who has already reached that level. What is key to learning in this kind of context is the role each party takes up: in the PBL setting these might include guide, facilitator, or the hybrid role of novice practitioner. In my analytic chapters 6-8, I explore and discuss the extent to which novice medical practitioners in the clinical PBL setting are able to learn, apply and interpret the practices of coding, highlighting and graphic representation, and convey their vision of clinical problems, or contest that of others. I question whether professional vision is necessarily a homogeneous entity, especially in the context of novices learning to be professionals.

## **2.3 Developing knowledge/expertise**

It is clear that knowledge asymmetries operate in an educational context where tutors, faculty members and fellow students possess varying degrees and layers of knowledge. It is unsurprising that, given their previous educational experience of what is valued and rewarded, medical students should focus on the acquisition of substantive knowledge and see this as the prime goal of their medical studies. In the following sections, I discuss medical students' attitudes to knowledge and expertise and how the discourse of medical expertise has been discussed in the literature.

### **2.3.1 Medical students' attitudes to knowledge and expertise**

When medical students enter the institution of the university in order to become professionals within the institution of medicine, they tend to view knowledge as objective and quantifiable, as described in Chapter 1 Section 1.7.2. This is similar to the findings of a long-term study of student perspectives on medical education by Becker, Geer, Hughes and Strauss (1961), which are still valid today. They showed how the medical students in their study moved from a narrow understanding of knowledge and expertise to a more complex view. The authors interviewed graduate students in a medical school in the USA every year over the course of their studies with the aim of examining the transition from novice to professional, or what they called learning how to “play the part of a physician in the drama of medicine”. Students' initial perspective in pre-clinical years was to “learn-it-all” (Becker et al., 1961:92) and study “what the faculty wants” (1961: 157). As time went on, the students the researchers talked to became increasingly more efficient in prioritising and selecting what they studied.

Students were found to move to an understanding in the later years of the need for responsibility in their professional practice and the importance of gaining practical experience of medicine and patient care. In particular, Becker et al. (1961) noted that with increasing contact with patients and with ward experience, the students' key perspectives shifted to a sense of responsibility for the patient and a sense of the value of experience, an aspect also highlighted by the clinical tutors. Students also valued clinical events, which provided more than lecture-based knowledge: students were seen to be developing a broader vision of knowledge and acquiring a greater regard for the expertise displayed by faculty in professional contexts. There was a growing recognition that textbook knowledge and experiential knowledge might constitute different kinds of expertise, and that, as Smith (1989) argued, the role of experience needed greater recognition.

As medical students move through their studies, Becker et al. (1961) suggested the way students acquire knowledge and expertise is a form of socialization into the practices of the medical community, echoing the 'communities of practice' framework developed later by Lave and Wenger (1991). From the beginning, PBL-oriented medical curricula have seen the applications of book knowledge to clinical practice as a means of early socialization into the world of clinical medicine. In the next section I return to the notion of voice, linking it to the desire of junior clinicians in hybrid settings to perform well educationally through a display of expertise (Erickson, 1999; Pomerantz, Fehr & Ende 1997).

### **2.3.2 Voice of medicine and expertise**

The dichotomised lay versus specialist model of knowledge that Goodwin (1994) described has a parallel in the work of Elliot Mishler (1984) on the "dialectics of

medical interviews”. Although the patient interview is not directly a part of the current study, Mishler’s work is relevant to my discussion as the medical interview between doctor and patient is the first and key stage in the diagnostic process. The findings of the history-taking interview are the basis of the case presentation, which becomes the locus for transformation of what Mishler called the “voice of the lifeworld”, the lay voice, into the “voice of medicine” (1984: 63), the professional voice.

What Mishler termed the “voice of medicine” and the “voice of the lifeworld” are ways of speaking or writing that represent “normative orders” (1984: 63). The relationships between how things appear, and how they are represented through language (see earlier discussion of Goodwin’s notion of professional vision Section 2.2.4), were related by Mishler to Schutz’s view of knowledge and the contrasting of everyday or “natural attitude” (Mishler, 1984: 122) and scientific knowledge: “The medical interview may be viewed as an arena of struggle between the natural attitude with its common sense lifeworld and the scientific attitude with its objectified world of abstract knowledge and rationality” (1984: 123). Mishler’s work focused on the interactional “struggle” between these worlds, a struggle that he saw emerging from his analysis of interview discourse. Although Mishler did not look at the transformation of the interview findings into the medical case presentation (see section 2.5 below), there is also an interactional challenge in conveying the case in ways that are deemed appropriate by the profession. One related question raised in this thesis is how medical students display this kind of expertise in presenting the patient’s case.

While Mishler saw voice as a contrast between the lifeworld and the world of medicine, Erickson (1999) viewed voice as an individual's appropriation of a particular discourse, where the individual takes up, or is placed in the position of taking up, a certain role. He referred to the underlying desire to convey positive self-presentation through the appropriation of different "voices".

A speaker may have a plurality of voices, and voices may be shared across speakers.

Atkinson (1999) suggested that:

Different voices distinguish contrasting orientations to the world and to the moral order. Voices articulate different presuppositions concerning language and reality. They have different implications for avowals or attributions of agency and responsibility. (1999: 129)

What might distinguish these voices from one another is the relationship between what is asserted or accounted for, how it is asserted and accounted for, and who was responsible for carrying out the actions under discussion. We will see in Chapters 6 and 7, where I look at case presenting and clinical reasoning, that students need to account for their interpretations and to indicate their sources of disagreement. The linking of voice to agency and responsibility can be seen as contributing a moral foundation to actions within the professional setting. For example, as Becker et al's (1961) student subjects developed their view of knowledge, Becker et al. found that the students also became aware of the moral responsibility they would be discharging in patient care. How students ascribe responsibility in the accounts they give will also be examined in Chapter 7.

### **2.3.3 Expertise and role**

The display of expertise through different voices can also be manifest in the contextually relevant roles taken up by participants in interaction. This notion has been taken further in the genetic counselling setting by Sarangi and Clarke (2002),

who showed how overlapping “pluralised” voices are related to the range of roles available to speakers in professional-client interaction. While professionals might want to retain control over their specialised knowledge, and retain their professional freedom, “what counts as authoritative, professional opinion (i.e. invested with legitimacy) is derived from institutionally sanctioned roles” (Sarangi & Clarke, 2002: 140). Thus there may be a tension between the institutional order and the professional order (Sarangi & Roberts 1999; Sarangi & Candlin, 2011). Such institutional and professional roles may invest clinical interactants with expertise: “a prerequisite to adopting an expert stance”, as was seen in the professional expert role in Goodwin’s (1994) account of the Rodney King trial.

At the interactional level, expertise can be articulated through different means. Sarangi and Clarke (2002), following Goodwin (1994), mentioned the coding, highlighting, and articulating of “facts” by participants in the activity in “professionally specific and institutionally recognisable ways” (141). They argued that expert opinion is a “knowledge and truth claim” (141) in which knowledge provides the evidence to support the claim, as in Schutz’s (1962) “warranted assertions” (see Section 2.2.2). Sarangi and Clarke showed how, in the genetic counselling setting, counsellors may establish different “zones of expertise”, in some of which they are themselves expert while in other areas or zones they downplay responsibility through distancing themselves from that particular area of expertise.

The way in which the roles of participants in institutional settings carry with them degrees of authority by virtue of their expertise is shown by Mehan (1983). This authority is conveyed through language, or what Mehan called the “reflexive relations between the functions of language and the structure of role relationships” (209).

Mehan studied these relationships in a meeting of committee members, teachers and parents, in a special school referral system, which he found similar to the medical diagnostic process but with the student's scholastic performance being diagnosed and suitable 'treatment' recommended. Mehan identified institutional constraints such as funding and availability of school places, but focused his analysis on the discursal evidence of the decision-making process, where lay and professional reports were differentially privileged to the advantage of the latter, and where the role of non-experts was subordinated. He pointed out how the claims to truth of the lay participants were elicited rather than presented, and were seen to draw on "commonsense knowledge" and "unstructured observations" (Mehan, 1983: 205). This was contrasted with the preferred technical knowledge and "categorical assessments" of the professionals, as reported in Goodwin (1994).

#### **2.3.4 Expertise and evidence**

It may be concluded then that expertise on the part of junior participants in clinical educational settings develops through socialization into this professional knowledge and its discursal display. Roles which are asymmetrical in the hybrid educational and professional setting are played out through discourse. Any interpretation has to take into account the voices conveyed by the taking up of roles, as they have consequences in events and outcomes: Atkinson argued that several voices constitute the voice of medicine: these voices "are among the carriers of medical culture [and] reproduce the technical and social division of labour, and the stratification of expert knowledge within and between medical specialties" (Atkinson, 1995: 131). Atkinson viewed expertise as a fundamental resource in the marshalling of evidence, and which is constituted in institutionally governed and sanctioned knowledge, based in experience

and the roles played in different settings; and finally, it is applied in clinical reasoning and argument.

The notion of expertise as a resource for marshalling evidence to support an opinion or claim has been explored by several researchers (Fox, 1959; Atkinson, 1995; Sarangi & Clarke, 2002). The ways in which warrants for claims are made promote “zones of credibility” (Atkinson, 1995) in which a competent professional impression is afforded by the manner of articulating claims and warrants. Following Chafe (1986), Atkinson later referred to this role of evidence as “evidentiality” (1999). If claims to ‘truth’ cannot be supported due to lack of evidence, or the voice of experience and the voice of medicine are not in agreement, dissonance may arise, resulting in uncertainty. This discussion is pursued in more detail in Chapter 7 on clinical reasoning.

## **2.4 Conceptualising uncertainty**

While the role of uncertainty in developing knowledge and expertise has been studied in other fields, notably in the hard sciences by Thomas Kuhn, and Karl Popper, it has taken a particular turn in research into the sociology of medical knowledge. Parsons (1951) saw uncertainty as an inevitable result of the exponential increase in clinical knowledge confronting the physician, creating demands resulting in “not merely institutionalization of the roles [of doctors and patients], but special mechanisms of social control” (1951: 450). The theme of uncertainty in medical education and clinical practice has been critiqued from two perspectives that rest on the provision of evidence. The first perspective on uncertainty, like Parsons’, sees it as situated in individual ignorance and the limits and ever-shifting nature of current knowledge, – a view articulated by Renee Fox (1957; 1959; 1980). The second more social



constructionist perspective – most prominently that of Atkinson (1995) – begins with the premise that uncertainty is a normal ingredient in clinical reasoning, and that our understanding of what constitutes “knowledge” requires re-examination.

#### **2.4.1 Key perspectives on uncertainty in medical training**

Early research into uncertainty in medical education was led by Renee Fox (1957; 1959; 1980). Fox argued that not only does medical education begin with uncertainty, but it places students in what she called a context of “training for uncertainty” (1957; 1980). Fox exerted a significant influence on research into medical education through *Training for Uncertainty* (1957), her study of the role of uncertainty in medical education. Fox’s conclusions were based on her studies of socialization among medical students at several US universities in the 1950s. The uncertainty Fox found among these students was seen as resulting from a number of deficiencies: incomplete mastery and understanding of medical knowledge; the limitations of students’ medical knowledge, and the students’ “difficulties in distinguishing between personal ignorance or ineptitude and the limitations of medical science” (1957: 28). In a later justification of her stance, Fox (1980) empathised with medical students who may suffer the consequences of such ignorance or absence of knowledge:

To be puzzled, ignorant, unable to understand; to lack needed knowledge or relevant skill; to err, falter, or fail, without always being sure whether it is "your fault" or "the fault of the field" (as one medical student put it), is especially painful and serious when the work that you do is medical. (1980: 5)

She pointed to the perennial concern of medical students over disorders which appear to have no definite diagnosis: “What students found particularly "disquieting" (to use their own word), were those medical situations in which problems of uncertainty and problems of meaning were joined” (1980: 7), a perspective also remarked on by the

students observed by Becker et al. (1961). Fox talked of the uncertainty derived from ignorance and saw the concern with risk and danger as part of an “increased malaise about uncertainty” (1980: 3), with health and medicine at its centre. Fox’s view confirms the widely held association between professional expertise and certainty: the greater your perceived expertise, the more you are expected to express your views with certainty.

Atkinson’s (1995) perspective on uncertainty has its roots in research in the broader medical setting. Atkinson attempted to derive a more nuanced view of uncertainty by taking into account its corollary, certainty (Atkinson, 1995). Fox’s emphasis on the pervasive role of uncertainty, according to Atkinson, led to a reductionist approach. While his work did not place specific weight on medical education, Atkinson focused on group interaction in clinical contexts, particularly those involving medical students and junior physicians receiving specialised training, which may be seen as relevant to clinical learning and interaction.

In his study of collegial interactions in hematology rounds with students in an American teaching hospital, Atkinson (1995: 116) sought to place the focus on notions of moral and practical certainty and went on to suggest that medical knowledge encompasses personal knowledge and experience. He argued that uncertainty is context-dependent and that consideration of opinion, as an outcome of interpretation and evaluation, might be one avenue along which finer distinctions could be generated. This concept of opinion can then be broken down into propositions, and evidence – which may be drawn from book knowledge, experience or other skills. Thus each opinion is explicitly or implicitly supported by evidence, something which the PBL setting allows students to engage in through interpreting

case information and clinical reasoning. Atkinson (1995) also argued that much clinical practice is made up of “tried and tested routines”, certain in their application and based on experience and evidence. This latter aspect relates to the present study’s focus on students’ engagement in ward activities, where they observe and at times participate in habitual practices such as the measurement of temperature, blood pressure, analysis of X-rays and so on.

In his critique of what could be termed Fox’s “deficit” view of uncertainty in medical training and practice, Atkinson (1995) put forward a view of knowledge and expertise as embracing opinion, arguing for an understanding of opinion as interpretation and evaluation and necessarily embracing uncertainty. This understanding would necessitate an assessment of evidence to indicate one’s strength of belief or commitment to evidence supporting a proposition.

It is undoubtedly the case that medical students and practitioners make frequent appeals to matters of opinion, or judgment that cannot be validated unambiguously by scientific knowledge. But personal knowledge and experience are not normally treated by practitioners as reflections of uncertainty, but as warrants for certainty. (Atkinson, 1995: 114)

This view resonates with the approach to evaluating likelihood and probabilistic reasoning suggested by Sarangi and Clarke (2002: 142): “For medical professionals, then, it becomes not a matter of managing uncertainty, but rather a matter of conveying the grounds for the uncertainty – and this entails the demonstration of what is known (i.e., certain)”. Sarangi (2001), citing Reichenbach (1951), suggested that uncertainty is a form of “probable knowledge”, which may be manifest in the evidence brought to support claims and propositions. This view of uncertainty as a state of knowledge may manifest itself in probabilistic reasoning in which a “degree of confirmation and relative frequencies (and range and normalcy)” (Sarangi, 2001:

10) support one's argument. This practice may be seen as facilitated by the PBL context where students have the opportunity to weigh up different diagnostic or treatment options in light of epidemiological and other evidence. This aspect is returned to in Chapter 7 when analysing clinical reasoning and linguistic markers of probability and likelihood in the data.

#### **2.4.2 Sources of uncertainty in medical education**

In the context of medical education, the deficit model of uncertainty – constructing it as either a systemic source of anxiety or a failure built into our medical understanding – has been considered by scholars such as Light (1979), and, later, Timmermans and Angell (2001). While accepting Fox's premise, Light (1979) aimed to give a "conceptual update" on uncertainty, although he did not base his views on empirical data but on findings from a range of studies: "to combine selected observations about the education of physicians and nurses in such a way as to stimulate the reader to think about the training for uncertainty that occurs in a range of settings" (1979: 311). Like Atkinson (1995), Light included in his view of knowledge the role of experience and skill, and identified five sources of uncertainty for novices in the literature on medical training.

The first source of uncertainty, according to Light, lies in instructors and training programmes, where students, like those in Becker et al's (1961) study, wondered what lecturers really wanted. The second source lies in knowledge, as in Fox's typology: "Although every schoolchild experiences the uncertainty of whether s/he has learned course material well enough, the experience is particularly intense in professional schools, where there seems to be so much to learn all at once" (Light, 1979: 311). Light went on to extend the concept of knowledge to include experience and skill:

These uncertainties reflect on professional knowledge in two senses: on the knowledge of the professional and on the knowledge of the profession. Later, in clinical training, they take on a different hue than they do in course work. One asks, "Do I know enough to treat this case?" and "Does the field know enough to act effectively?" The concept of knowledge broadens beyond the thrust of Fox's essay to include experience and skill. (1979: 311)

The third source of uncertainty lies in diagnosis, treatment, and patient response. This is seen as uncertainty in the interpretation of symptoms and diagnostic reasoning, aspects relevant to the current study. Related to this is uncertainty about treatment, the fourth area identified by Light:

Even if the diagnosis is clear, how to treat a problem may involve a series of complex questions. Which treatment will be more effective? In the short run; in the long run? Is it worth doing? What costs are involved? Inadequacies of knowledge and uncertainties about the diagnosis further compound the uncertainties of treatment. Yet treatment is the primary reason why a client or patient seeks professional care. Thus uncertainties of treatment threaten the *raison d'être* of a profession and must be controlled. (1979: 312)

Uncertainty is seen here as a threat that needs to be controlled and limited, a view that appears to fail to take into account the professional clinician's ability to evaluate and assess treatment options. The final source of uncertainty in Light's typology is the uncertainty surrounding the patient's response which he divides into response to treatment and response as a client: "The main uncertainty of client response is whether the client will cooperate, and the young professional must learn how to minimize it" (1979: 312). Light suggested that rather than training students for uncertainty, as Fox advocated, the sources of uncertainty can be reduced by training for control. Strategies to do this included conforming to expectations and "impression management" (1979: 313), mastery of knowledge, techniques and medical specialization. Light acknowledged that gaining clinical experience could "bring with it greater command over uncertainties" and that experience could "define what is an error and what is ignorance and what is a matter of taste" (1979: 315) when making

clinical choices.

Although Light's views are contrary to Atkinson's understanding of the role of uncertainty as a feature of interpretation and evaluation of evidence, as we have seen above, Light also acknowledged the value of experience. He saw professional behavior in the context of power and dominance over both colleagues and patients, with the hierarchical structure of the profession giving greater influence to the physician with greater experience, even over technical expertise and knowledge: "The essence of professional work is coping with clients' uncertainties and emergencies, by using expertise and clinical experience" (1979: 318). He also took into account the role of experience in clinical decision-making, which may prove difficult in the PBL setting from the perspective of students, but which may be a resource of the tutor.

A new conceptualisation of uncertainty was sought by Timmerman and Angell (2001), who aimed to build on these studies by taking account of the move towards evidence-based medicine (EBM). They used in-depth interviews of medical residents, in an American hospital, who were at different stages of their rotations through a range of clinical specialties. They aimed to explore whether EBM reduces uncertainties. Timmerman and Angell drew the conclusion based on the interview data that "residents might thus repeatedly experience uncertainty, but they are not necessarily uncertain" (356). They argued that while control of uncertainty is impossible, due to changes in medical knowledge, the evaluation of evidence, as in Atkinson's view of medical opinion, aids in the management of uncertainty. Interpretation and evaluation of evidence is manifest in discourse and in the articulation of reasoning, the focus of Chapter 7 of this dissertation.

### **2.4.3 Uncertainty as a dimension of clinical reasoning**

Uncertainty may be seen then as a component of evidence and thus of expertise. One may turn to Toulmin's (1979) model of argument, in which he uses the term 'claims' for propositions, and 'grounds' and 'warrants', for evidence and its inferences or assumptions. Toulmin's other term, "qualifier", is expressed through modality and is an indicator of the strength of belief in the degree of demonstration of the warrant.

Evidence in the form of warrants is brought to bear in building arguments to support opinion. Clinical evidence may be drawn from stocks of knowledge: for example, knowledge of causes, symptoms and signs, or knowledge of biochemical processes etc. It is particularly revealing to look at the genetic counselling context that is the focus of Sarangi and Clarke's study (2002) as, in this setting, risk and the assessment of risk is a key topic of discussion. As Sarangi and Clarke noted, the basic element of this knowledge is epidemiological data regarding rates or incidence of clinical phenomena. This gives rise to assessments of what is common, normal, uncommon or abnormal, in various populations or clinical disorders. When this evidence is applied to a particular patient a comparison is often made with what is usual for most of the population. This is what Sarangi (2002) referred to as normalcy, encompassing both what is normal, usual or typical, but also what is morally right or wrong and as "something which can be made normal through intervention" (Sarangi, 2002: 15). Sarangi and Clarke (2002: 142) followed Atkinson in suggesting that "For medical professionals, then, it becomes not a matter of managing uncertainty, but rather a matter of conveying the grounds for the uncertainty – and this entails the demonstration of what is known (i.e., certain)." Sarangi (2002) went on to say that discursively, this would involve comparison and contrast, probability and frequency

statements, which I look at in Chapter 7.

It is to be expected then that comparisons and contrasts occur frequently in clinical discussion and particularly in diagnostic reasoning, along with the qualified expression of degrees of belief in the evidence. From a discursal perspective, Hobbs (2003), in her investigation of physicians' notes, has pointed out, after Hyland (1998)'s survey of scientific research articles, that the markers of uncertainty in medical discourse can equally well be seen as markers of precision and to a certain extent can be used to offer more exact estimates of degrees of likelihood. Hobbs also noted that these markers therefore have an interpretive, commentative function, in other words, an evaluative function which indicates one's understanding and stance. Skelton (2005) made a similar point in his study of scientific research articles: he noted that hedges are indications of the degree of commitment to a claim: "A deintensified truth judgement is a hedge. Hedges are extremely important in themselves, and in scientific writing are associated above all with the removal of a personal stake in the truth value of a proposition." (125) This evaluative role of language is also seen in Lingard et al.'s (2003a) findings on rhetorical features of uncertainty and certainty in the medical education context, a study which is examined more closely in Section 2.5.3 and in Chapter 7.

## **2.5 Reasoning and case presentation**

I turn now to a key area of research relating to this dissertation: clinical reasoning in student presentations of histories in problem-based learning tutorials. An important recent study was that of Glenn and Koschmann (2005), who examined the diagnostic process as evidenced in first and second year PBL tutorial interaction, and how students "orient[ed] to the social and evaluative environment".



Proceeding from the belief that diagnosing is not only a cognitive process but also one that is communicative and socially constructed, Glenn and Koschmann offer the following view of the social process of diagnosing: “Whatever happens in the mind of someone coming up with a diagnosis, it gets constituted through language-in-interaction, produced in and for social contexts that may involve judgments of the competence or expertise of the diagnoser.” (2005:153) Thus, they argued, diagnosing is a learned, communicative skill and tutorial participants show an awareness of the demands of the hybrid aspects of the tutorial setting: as a pedagogic enterprise in which their contributions are evaluated and assessed by peers and tutors but also as a collaborative, interactive process to which they bring elements of professional understandings and practice through their previous knowledge and experience. The PBL setting in clinical medicine offers a forum for the articulation of reasoning and evaluations of patient histories and in this study, those histories are provided through presentations by the students who have interviewed the patients.

### **2.5.1 The case presentation as display of expertise and uncertainty**

As mentioned earlier, the case presentation is a key component of the current study and is one of the contexts in which medical training provides opportunities for the display of expertise. As previously mentioned in Chapter 1, case history reporting (both oral and written) occurs in several contexts and usually consists of the reporting of a case history previously elicited from a patient during an interview and the physical examination. More senior students will also be expected to report on diagnosis and treatment.

The genre of the case history interview has been described as “a foundational element[s] of the physician-patient relationship” (Boyd and Heritage 2006: 151) and

mastery of the genre of case reporting is seen as an indicator of medical expertise (Anspach 1988; Atkinson 1999; Ainsworth-Vaughn 2001). Erickson (1999) listed the components of a full case presentation as:

(1) the patient's primary presenting complaint and other current medical conditions, (2) the history of the present illness, (3) past medical history, (4) review of major physical systems of the body, (5) family history, (6) social history, (7), report of physical examination, discussing vital signs and reviewing the body from head to toe, and (8) presentation of overall impression and tentative treatment plan (Erickson, 1999: 112)

Erickson went on to note that, in medical education, the case presentation is a hybrid genre, both professional and educational, in which students are expected to perform like experts. The presenter of the patient's history must be seen to "(re)present" the information provided by the patient, shaping the history to result in diagnosis and appropriate treatment, taking the presentation as "a whole gestalt" to persuade superiors of the presenter's competence (Erickson, 1999: 112). Hunter (1991) saw the case presentation as a way of "demonstrating the teller's understanding of the illness" and transforming the patient's story into a "narrative of education and control" (6). Referring to the traditional requirement to memorise the patient's information, she summarised the challenging complexity of a case presentation as

... not simply the prodigious recall of relevant biological and pathological information, but a ritualized storytelling: orally presented evidence that for this speaker, in this instance, the welter of clinical facts about a single patient constitutes a unity that hangs more or less inevitably together." (1991: 8)

One aspect of the tension between the roles of learner and expert in the case history reporting genre is the desire on the part of novice physicians to appear fully professional, particularly in settings where they are being assessed at the bedside of the patient. A number of interactional studies in the United States of precepting<sup>3</sup> interactions between recently graduated medical interns and their supervisors have

---

<sup>3</sup> In the U.S., one-to-one training situations are termed 'precepting', with the supervisor as preceptor.

focused on the strategies used by participants to maintain a cloak of expertise. Erickson (1999) examined how “voice” may be appropriated in a precepting situation in which interns interview and examine patients and report their findings and diagnoses to their preceptors.

In this asymmetrical interaction, one would expect to find instances marking the expert and novice status of the participants. However, Erickson (1999) described the interaction between the two during the intern’s case presentation as “partly a talk between student and teacher and partly a talk between physicians who are quasi colleagues” (1999: 110), which bears out the hybridity of the genre as being at once professional *and* educational. Erickson interpreted this feature as an opportunity for interns to learn how to talk and present themselves to fellow physicians in a positive light as colleagues rather than subordinates, through a display of competence and expertise: “there appears to be a desire on the part of the interns to look as if they know what they are doing clinically from the very beginning” (1999: 112). The preceptor was sensitive to the intern’s need to project a competent persona. Erickson argued that the management of roles and attempts to display expertise are mostly handled with regard to maintaining the appearance of collegiality and expert-to-expert collaboration. This is discussed further in Chapter 8 on the tutor’s role.

### **2.5.2 The discursal display of expertise**

Closer examination of the discourse of case presentations can indicate how presenters and their co-participants attempt to achieve such outcomes. Atkinson’s analysis of case presentations found that all parties in ward rounds – consultants, junior doctors and students – engaged in producing and negotiating “cases” discursively: “Through the narrative unfolding of the case, the patient’s illness career and the trajectory of

their condition is assembled” (Atkinson, 1999: 103). Atkinson focused on the discursive marking of evidence and credibility, noting the use of the passive voice: “The contrasts between personal agency and impersonal reportage in the passive helps to construct the contours of credibility and the zones of responsibility” (1999: 103). Anspach (1989) looked specifically at the language of case presentation in the context of professional socialisation, the language that novices learn on their way to becoming expert, and pointed out especially how language could be used to mitigate responsibility, a discussion that is returned to in Chapter 6 Section 6.2.3.

Students clearly aspire to professional expertise in case presentations, with competence and credibility conveyed by positive self-presentation: “the case presentation is not only a report on a patient, it is a report done rhetorically in such a way as to persuade the preceptor of the medical competence of the intern” (Erickson, 1999: 112).

In accounting for how expert scientific knowledge is mastered and privileged we have seen how it is necessary to consider both expertise and evidence and balance this with assessments of certainty and uncertainty (Sarangi & Roberts, 1999). As Erickson said, uncertainty “ups the stakes” (1999: 119) on professional presentation as it is more challenging to account for than medical certainty. Expertise is also conveyed through the appropriation of specialised routines and the discourses of those routines such as the description of an X-ray film or details of medication. Other studies that have considered uncertainty in the context of case presentation include Lingard, Garwood, Schryer and Spafford (2003a), Tipton (2005), and Knight and Mattick (2006) who looked at student attitudes to knowledge, certainty and uncertainty. The first two studies are discussed in more detail below while Knight and Mattick’s work is

discussed in Chapter 7, where the relevant research question is concerned with how, in a problem-based interaction setting, students shift between roles to reach agreement or consensus about a diagnosis, and how their management of uncertainty relates to the negotiation and distribution of expertise.

### **2.5.3 Student problems in mastering the case presentation**

Clinical perceptions of uncertainty tend to reflect the deficit model set out by Fox (1957). Lingard et al.'s (2003a) study of novice students' case presentations and attitudes to uncertainty in a pediatric clerkship at a hospital in Canada focused on the rhetorical devices used to convey certainty and uncertainty and their pragmatic role in professional socialisation (see Chapter 6, Section 6.2.4). Lingard et al. included student interviews in their battery of methods and, in the interviews, students reported that they saw "uncertainty as a condition to be avoided at all costs or disguised" (2003a: 609). The display of uncertainty was seen as an indication of shortcomings in knowledge. These studies of novice case presentations showed that the discourse was "brimming" (Lingard et al. 2003a: 611) with uncertainties, many of which derived from the provision of evidence. Lingard et al. also examined transcripts of case presentations on the wards. They recognised the hybrid nature of the tutorial with students needing to "assume a clinical orientation" and be able to respond as students to tutors' questioning and argued that:

Such incremental and iterative shifting underlies the power of apprenticeship education: guided and repeated practice with provisional and changeable responsibility. But this shifting also poses an essential challenge for students: navigating the circuitous course of trial and error learning and managing the overlapping activities of evaluation and patient care. (2003a: 609)

The challenge of mastering the "whole gestalt" of the history presentation has been experienced even by qualified physicians. Tipton (2005) showed that this is a

particularly difficult genre for international medical graduates (IMGs). Tipton portrayed the genre as “critical for professional success” and “characterized by uncertainty” (2005: 395). Tipton’s study was prompted by the difficulties IMGs had reported to her in their presenting of case histories and she acknowledged the challenges it brings: “The reality is that presenting a case is an inherently face-threatening display of professional knowledge and a form of socialization and self-presentation” (Tipton, 2005: 399). Tipton found that the IMGs in her study experienced tensions and pressure when placed once again in a student-like position in presenting a case history. She goes on: “It is intensely questioned and suspect if delivered with hesitance; thus, it should be delivered persuasively despite inherent uncertainty” (Tipton, 2005: 399). This observation relates to the interactional manifestation of uncertainty, which is considered further in Chapter 6.

Tipton focused on the training of IMGs to improve their performance, and advocated an interactive approach which allows for discussion. This, she believed, could give IMGs a greater metacognitive awareness of the role of language in the presentation. In addition to linguistic advice on grammar and pronunciation, Tipton (2005: 401) discussed with these IMGs, the “genre and complexities of the case presentation, frontstage versus backstage perceptions, their dual role-relations as student and physician, and the expectations of attending physicians”. This emphasis is echoed in this study, which investigates how students shift between the roles afforded by the activity to negotiate expertise. The issue of whether uncertainty is an interpretive resource for clinical reasoning or an element which diminishes expert performance is discussed in Chapter 6.

While the presentation in the PBL setting may differ from the supervisory setting in

the ward, the same shiftings – between clinical role and educational role in student responses to tutor questions – are very likely to be found. This is a specific area of focus in Chapters 7 and 8 in which roles of students and tutors respectively are examined.

#### **2.5.4 Tutor management**

Another setting which is relevant through its focus on case history presentation and interaction between tutors and students (a focus of Chapter 8 on the tutor's role) is that of precepting in which an intern presents a case history to a supervisor or preceptor.

Analysing video transcriptions and participant interviews through a combination of conversation analysis techniques, Ende, Erickson, and Pomerantz (1995) focused on preceptors' management of corrections in precepting encounters. Ende et al. (1995) identified strategies such as the creation of "opportunity spaces" and "mitigation of corrections" (1995: 226-228). They (1995) found that preceptors tended to favor a more egalitarian approach in which the withholding of corrections "engage[s] the learner actively and encourage[s]. ...self-discovery" (1995: 228). Another apparent function of this strategy, in avoiding the master-apprentice relationship which more explicit correction might promote, was to lead the intern, through a sense of his or her own agency, towards increasing responsibility for the patient. Ende et al. (1995) saw preceptors' concern for their interns' self-esteem and confidence in two strategies: offering interns the opportunity to reflect on and revise their responses, and reformulating questions to guide interns towards a more appropriate response. In these ways they avoided making overt corrections of interns' answers. Ende et al. (1995) suggested that these strategies were simultaneously motivated by concern for

patient care, the intern's professional development and the continuing collegial professional relationship between intern and preceptor. These aspects are discussed further in Chapter 8 where I look at how tutor roles emerge through questions which can frame sequences of talk as clinical or educational.

The management of the display of expertise by interns can be seen as posing an interactional dilemma for preceptors. Ende et al. (1995) described the complex combination of teaching strategies outlined above as "improvisational" and an "artful endeavor" (1995: 228). Such tutors would avoid threats to the interns' self-esteem and image before the patient, such as the subsequent re-asking of questions of the patient or re-taking the history, something also noted by Pomerantz, Fehr and Ende (1997). Where such a practice was clinically justified the preceptor would be concerned to respect the intern's professional expertise and status. In these studies, interaction in the precepting setting is characterised by tensions between educational and professional practice as the intern moves from the status of novice towards greater expertise. In studying tutor-student interactions, whether the patient is present or not, this tension between educational and clinical roles needs to be considered, as, in Chapter 8, these tensions may be seen to affect the display and negotiation of expertise and the management of uncertainty.

More recent work has focused on the ways that tutors model case history taking techniques and clinical reasoning patterns for their students, a process Pomerantz (2003) called "invisible" modelling (389). Pomerantz suggested that modelling acts as a form of socialization, encouraging care and responsibility for the patient at the same time as developing clinical expertise. She also suggested that this can help to avoid the creation of teacher/learner and expert/novice roles as long as interns understand



the rationale for preceptors' modelling. These issues are taken up in the analytic chapters 6 to 8.

## **2.6 Summary**

The chapter has focused on theoretical and applied research into expertise, uncertainty and their manifestations in case presentations, key components of the clinical PBL tutorial. I have reviewed work on knowledge and expertise and how these concepts have been problematised and discussed in the literature relevant to medical education. I have drawn on literature from both within and outside the medical field to show how professional expertise may be privileged, and how differing views conceptualise uncertainty within a deficit model or as an interpretive resource in clinical reasoning. This debate has also taken in the role of common sense knowledge and knowledge gained from experience in an understanding of expertise and its relation to a moral order of responsibility, reasoning, and evidence, encompassing views of uncertainty. These are issues that I address in my analysis of tutorial interaction transcripts featuring case history presentations, clinical reasoning and the interactive dynamics between tutors and students. Studies of the PBL setting have shown how this setting allows students to engage in the presenting of evidentiality through interpreting case information and clinical reasoning. This also allows for the marking of evidence for uncertainty and certainty. This review chapter has also highlighted the discursual manifestations of the constructs under study and the importance of the roles taken up by participants in the specific PBL settings, issues that I address in the analytic chapters.

The next chapter focuses on research into interaction and the nature of participation, contextualised by a review of studies of the other side of the hybrid tutorial setting –

the educational aspect. I review relevant theories of learning and classroom research, and take a closer look at research into how discourse studies can shed light on group interactions in educational contexts.

## **Chapter 3: Participation, frames and alignment, and classroom talk**

### **3.1 Introduction**

In the previous chapter I reviewed key work on conceptualizations of knowledge, expertise and uncertainty and medical socialisation. As mentioned in Chapter 1, the interaction order is manifest through the participation and roles of individuals in situated activities. Hence, the first part of this chapter discusses the key interactional concept of participation. Using a Vygotskian social constructivist perspective, I also discuss empirical studies in the educational setting of school classrooms to highlight key themes in PBL's educational manifestation.

Participation in professional and educational settings is linked with knowledge, and learning and participation are linked through the work of Vygotsky. Vygotsky (1962; 1978) looked for a method that would aid the analysis of the connection between thought and language. His research led him to hypothesise that expressions of thought in social situations increased the adjustment of a child's thinking; and to propose that knowledge was actually constructed through social interaction. In this chapter I look at the influence of social constructionism on the analysis of classroom interaction and learning. Emerging from this work are discursal themes that are investigated in the analytic chapters, in particular, question and answer sequences. Firstly and more theoretically, I review the notion of participation as being organised in social encounters, a notion that is central to the work of Erving Goffman and those scholars who have built upon his theoretical frameworks. Goffman's (e.g. 1959; 1967)

concepts of participation framework, frames, footing and alignment are of immediate relevance to the interactional approach I take to the analysis of PBL tutorial discourse in this activity-based discourse-analytic study and I discuss these further in the Methodology chapter (4), and in the analytic chapters 5-8. While this chapter also draws on sociolinguistic and discourse analytic studies such as those of Goodwin and Goodwin (1992) on context, and Tannen (1993) on frames, I also review work which has taken notions of context and participation further in their focus on situated activity: Levinson (1992[1979]) on activity types, and Mehan (1979) and Sarangi (2010c; 2011) on roles.

### **3.2 Participation frameworks**

Many of the concepts relevant to interactional sociolinguistics today can be traced to Goffman's work. Goffman (1959) introduced the notion of participation as performance in everyday interactions and saw participation as a network of roles, of relationships between participants in social activities, and of relations between speakers and utterances:

If one starts with a particular individual in the act of speaking... one can describe the role or function of all the several members of the encompassing social gathering from this point of reference (whether they are ratified participants of the talk or not) ... The relation of any one such member to this utterance can be called his "participation status" relative to it, and that of all the persons in the gathering the "participation frameworks" (1959: 137).

Taking the view that restricting analysis to a speaker-hearer dyadic relationship was too simple, Goffman (1974; 1979) differentiated between production and reception roles and what he called ratified (or "official") and unrated participants. Production roles would include for example, the presenter of a patient history, while the remaining participants may be seen as ratified listeners and addressed recipients as

they listen to the presenter and each other, and, in turn, make a contribution. Unratified participants in a social encounter include hearers who might unintentionally or intentionally overhear, such as eavesdroppers. In a classroom setting, all participants in a learning activity are ratified participants. While listeners do not focus their eyes on the speaker for too long because, Goffman said, this would infringe territoriality, the speaker can direct listeners to another object or another individual, and the latter then becomes a “ratified participant” (1959: 141). Goffman pointed out that “when talk comes from the podium” it is the audience that does the hearing: the audience is physically removed and is there to appreciate: “They give the floor but rarely get it” (1959: 138), an observation that might be applied at times to the classroom setting and also to the case presentation mode. The interactional challenge of getting the floor may also be seen in tutorial interaction, a feature I expand on in the analytic chapters.

### **3.2.1 Relationality**

The relationality between speaker and utterance in the participation framework was seen by Goffman as the connection between an individual at a particular time and an utterance. Goffman (1981) described four positions: animator, author, figure and principal, each of which is produced through talk and indicates a level of ownership of the message. Goffman explained that the speaker is “the talking machine” functioning as an “animator”, one of the functional roles in a communication system in which participants can perform in different capacities, speak of someone else and in someone else’s words. The speaker can comment on his/her own self with breaks in fluency making him/her an “embedded animator” or can figure in a statement as him/herself or someone else. There can be multiple embeddings: for example, “To the

best of my recollection I think that I said I once lived that sort of life” (Goffman, 1981: 149).

The speaker can also speak for and in the name of others. In replays of past events participants may become narrators and listeners to a story. An individual may not be restricted to one of these but may fulfil one or more of them simultaneously and shift from one to another in the same strip of talk. Schiffrin (1994: 104) explained: “an animator produces talk, an author creates talk, a figure is portrayed through talk, and a principal is responsible for talk.” Listeners may be aware of these shifts as they have “normative expectations about the conduct appropriate for each position” (1994: 104). Goodwin and Duranti (1992: 25) viewed the animator, author, figure and principal as “entities that can be invoked by a speaker within a strip of talk”. This aspect of invoking other speakers is seen in academic professional discourse where speakers refer to their sources and display a stance towards them. This is an element that is examined in Chapters 6 and 8, in both student and tutor participation, and is relevant also to the discussion of alignment in the following pages.

### **3.2.2 Frames**

The invocation of other speakers in one’s speech points to an ability to set up an interactional context that may differ from the context at the outset of the interaction. Goffman (1974) built on Bateson’s (1972) notion of framing in explaining how individuals attempt to shape their interactions depending on context: “... persons seem to have a very fundamental capacity to accept changes in organizational premises which once made, render a whole strip of activity different from what it is modeled on and yet somehow meaningful...” (Goffman, 1974: 238). Goffman went on to say that “these frameworks are not merely a matter of mind but correspond in

some sense to the way in which an aspect of the activity itself is organized” (1974: 247). The adaptability of individuals to changes in frame is conveyed through their interactional and discoursal practices:

Given their understanding of what it is that is going on, individuals fit their actions to this understanding and ordinarily find that the ongoing world supports this fitting. These organizational premises – sustained both in the mind and in the activity – I call the frame of the activity. (1974: 247)

It would appear that frames may exist on different levels: social, cultural, institutional and professional, and, within these, individuals may frame and re-frame their participation through their interaction and particularly through shifts in footing. Framing may also occur in educational and clinical interaction, particularly, as we shall see, in PBL tutorials where the hybridity of the setting points to the likelihood of such shifting between educational and professional frames.

How listeners respond to the framing of a speech activity can be explained in two ways according to Tannen (1993). She pointed to the notion of schemata or “cognitive scripts” as internal “structures of expectation” (1993:6) and differentiates these from Goffman’s notion of frame as “what is going on in the interaction” (Goffman, 1974: 8). Tannen and Wallat (1993: 61) noted that schemata and frames interact: “expectations about objects, people, settings ways to interact, and anything else in the world are continually checked against experience and revised.” They found key elements in framing include linguistic registers which are indicated by intonation, pitch, vocabulary and special terms as well as register shifts. They showed in their analysis of a paediatrician’s interview with a mother of a child with cerebral palsy that frames can be juggled simultaneously: “Each interactive frame that she (the paediatrician) is engaged in within the interaction entails her establishing a distinct footing with respect to the other participants” (Tannen & Wallat, 1993: 66) who

negotiate in the shifting and maintenance of frames.

### **3.2.3 Footing and alignment**

Goffman also observed how a shifting of frame could be prompted or influenced by how participants orient themselves to others in a given encounter. This observation led him to develop the concepts of footing and alignment. He explained (1981: 128) that “a change in our footing is another way of talking about a change in our frame for events” and that footing is the “participant’s alignment or projected self” or stance, which is “somehow at issue”. This projection can be held across turns or only for a brief turn and may be on a continuum from major shifts to very subtle cues. Goffman suggested that a “higher level” or episode with a new footing can act as a “buffer” and changes in footing imply changes in alignment and frame. Across talk, participants are constantly changing their footing: a footing shift where one speaker “embeds” speech and the actions of others means that the speaker “removes himself from the alignment he might normally take” and for the narration “maintain another footing” but from which he can also “break the narrative frame at strategic junctures” (1981: 152). This can happen in PBL contexts when case presenters incorporate the voices of patients or fellow professionals. For Goffman, changes in footing are seen mainly through language: “Linguistics provides us with the cues and markers through which such footings become manifest, helping us to find our way to a structural basis for analyzing them” (1981:157).

The influence of Goffman’s notions of frames, footing and alignment may be seen in further work by Gumperz (1982) on conversational inference, Schiffrin (1993) on speaking for another, and is also seen in Goodwin and Goodwin (2004). Goodwin and Goodwin, in critiquing Goffman’s emphasis on the speaker in interaction, argued that



“[b]y lodging participation in situated activities it is possible to investigate how both speakers and hearers as fully embodied actors and the detailed organization of the talk in progress are integrated into a common course of action.” (2004: 223) Duranti and Goodwin (1992: 5) wrote: “The dynamic mutability of context is complicated further by the ability of the participants to rapidly invoke within the talk of the moment alternative contextual frames”. They advocated an approach which takes the perspective of an actor “operating on the world” in which the study is embedded, “t[ying] the analysis of context to .... activities participants use to constitute” this world and recognizing that participants can change rapidly and dynamically – through shifting frames and footing. As people interact, events become more complex, are reshaped, shaped to further participants’ own interests, and they may invoke organizational patterns “that have an existence that extends far beyond the local encounter” (1992: 6). This complex shifting of frames and footing can be seen in professional practice, and is looked at more fully in my analysis of case history presentations in the PBL tutorial.

The notion of frames has been employed by Roberts and Sarangi (2004) within an interactional and thematic ‘mapping’ of the discourse of genetic counselling and primary care consultations. They showed how frames and alignment, in the positioning of speakers and the shifting of positions, along with their activity roles along the trajectory of the encounter, were indicative of the thematic concerns of participants in the encounter. This analytic notion is taken up in Chapter 5.

### **3.2.4 Roles and role-sets**

Goffman (1981) drew on theatre for his notion of role and the awareness of the audience that a role is being performed. There is therefore a distinction between the

role and the self, as a role is determined by and only makes sense within situated activities. Since roles are situated, not fixed, individuals may move into and out of roles as the situation requires. Goffman (1969[1959]) also suggested that individuals normally perform a role in such a way that they display themselves in a good light, and this may be achieved through role embracement or role distancing. Role embracement signals active engagement with a role, while role distancing occurs when an individual may deny a role, perhaps for a particular period of time, or may reduce his/her involvement in a role.

These notions of role engagement and role distancing relate to institutional and professional contexts particularly well. For example, in many PBL tutorials, participants may shift between a range of roles, some of which are fixed for the duration such as chair or secretary, and others as they arise, such as proposers, seconders, speakers in favour of a motion or against and they may also distance themselves from roles that are afforded to them (something I examine in Chapter 6 on case presenting).

The notion of participant role was taken further by Thomas (1986), who distinguished between discourse roles and activity roles. Discourse roles are roles which concern the speaker as a producer of or recipient of the message while activity roles arise from the activity in which the participants are engaged. Thomas (1986) also saw the need to expand the notion of participant role, differentiating social role from discourse role and defining discourse role as the relationship between the speaker and the message. Thomas was concerned by the possible overlap between discourse roles which may differ across different activities.

Activity roles arise out of the particular activity in which speakers are engaged (Thomas, 1986) and take legitimacy from the activity. I have already mentioned the roles available to tutorial participants such as chair, case presenter and scribe. As I show in the data analysis chapters, a participant may fulfil several roles in the same tutorial event: for example, those of chair and presenter (see Chapter 6 on case presenting). There are links then between discourse role and social role, and between authority and status. Roles may also influence speaker rights, turn-taking and who can ask or answer questions, and whose contribution carries most weight in determining institutional or professional outcomes. Thomas related social roles to the degree of authority a speaker has and how responsible that speaker is for the message.

The link between role behaviour, social role and discourse practice suggests that in positioning ourselves in relation to others there is inevitably a kind of asymmetry, which may be marked in role behaviour and participation (Sarangi & Slembrouck, 1996). Thomas (1986) argued that interactional asymmetries are affected by the different roles of speakers and impinge on speaker rights. According to Thomas, interactional asymmetries are characterised by markers of interactional dominance and include topic and floor control, and a prevalence of specific, closed questions, interruptions and reformulations. Asymmetry is often bound up with the interactional context, for example in hybrid educational professional settings where differences in knowledge result in asymmetries in interaction. I examine evidence of asymmetry in Chapters 7 and 8.

The landmark study by Mehan (1983 - of a meeting to decide whether a child should be sent to a special school, discussed earlier in Chapter 2), reached similar conclusions to Thomas (1986). Mehan summarised the differences between the lay

(the mother's and teacher's) reports and the professional reports (by the nurse and the psychologist) given in the meeting thus:

In sum, the mother's and the teacher's reports have the following features in common:

1. They were elicited.
2. They were made available by people who occupy either low status or temporary positions (both in terms of institutional stratification and distribution of technical knowledge).
3. Their claims to truth were based on commonsense knowledge.
4. Their reports were based on direct albeit unguided or unstructured observations.
5. They offered contingent assessments of student performance.
6. They resulted in a context bound view of student disability.

By contrast, the psychologist's and the nurse's reports had the following features in common:

1. They were presented, not elicited.
2. They were presented by people who occupy high status and permanent positions.
3. Their claims were based on technical knowledge and expertise.
4. They were based on indirect albeit guided or structured observations.
5. They offered categorical assessments of student performance.
6. They resulted in a context free view of student disability.

I will call the first "lay reports" and the second "professional reports."  
(Mehan, 1983: 205)

Mehan argued that the professional reports gained their authority from the language in which they were delivered, the authority of the speakers, and through membership of a community of practitioners who can all understand each other and are "grounded in the reflexive relations between language and role" (1983: 209), and who are connected through professionals' role relationships within the institutional structure. How the tutorial participants in my study position themselves in sequences of tutorial discourse is examined in Chapter 7 "Clinical reasoning".

The number of roles a participant in an activity may take up is part of the theory of role-set; as Merton (2002[1968]) and then Sarangi (2010c) argue, role-set differs from multiple roles in that an individual may fulfil several roles:

Role-set theory begins with the concept that each social status involves not a single associated role, but an array of roles. This feature of social structure gives rise to the concept of role-set: that complement of social relationships in which persons are involved simply because they occupy a particular social status. Thus, a person in the status of medical student plays not only the role of student vis-à-vis the correlative status of his teachers, but also an array of other roles relating him diversely to others in the system: other students, physicians, nurses, social workers, medical technicians, and the like. (Merton, 2002 [1968]: 450)

Saranghi (2010c) pointed out that within a professional activity there may be conflicts for an individual among the several roles afforded within the activity, and that taking up one role may result in a different outcome than when taking up another. Saranghi (2010c: 38) gave the example of an academic:

In the academic sphere, professionals find themselves in competing and conflicting roles when acting out supervisor and assessor responsibilities simultaneously in relation to a student's dissertation/project. While one part of the role-set is meant to be one of facilitating and scaffolding, the other part is one of gatekeeping.

This not only highlights the hybridity that may be present in a certain activity but also that the role-set available includes roles that may conflict with one another. A role-set is seen as being activity driven, specific, and contextual. The role-set afforded to a speaker can be said to mediate participation and through the taking up of a role one is also taking on responsibility and positioning oneself in relation to others in a given activity. In the PBL setting this may be seen in the ways in which the student participants align with the activity-specific role-set roles afforded by the hybrid nature of the clinical and educational context (Chapters 6 and 7).

This review has thus far introduced and examined theoretical notions which are relevant to my study of PBL tutorials: frames, alignment, roles and role-set, and, crucially, the importance of the nature of the activity in mediating these. Before moving on to empirical studies dealing with participation and role in educational

settings, it is necessary to review Levinson's (1992 [1979]) key work on activity types and language.

### **3.3 The notion of activity type**

The notion of the activity type was developed by Levinson (1992[1979]) as part of his interest in the pragmatic organization of interaction. I regard it as an important concept in the analysis of participation in professional settings, particularly useful in studying educational and professional activities such as PBL tutorials. In developing the notion of activity types, Levinson (1992[1979]) referred to Wittgenstein's work on language games and how understanding language also requires an understanding of the activity in which communication takes place.

While speech acts or episodes may capture events within an activity, Levinson pointed out that Wittgenstein's analogy with language games and the games listed by him (such as telling jokes or solving riddles) are indicative of the "embedding of language within human activities". Levinson used the example of the game of cricket with its peculiar vocabulary to illustrate how understanding "depends on understanding the 'language game' in which it is embedded" (1992[1979]: 68). Levinson noted that, without visual support (as in a game of cricket), there may be "massive ellipsis" which is contextual and can only be diminished through contextual cues. Levinson went on to define an activity type as referring to:

any culturally recognized activity, whether or not that activity is co-extensive with a period of speech or indeed any talk takes place in it at all.... in particular I take the notion of an activity type to refer to a fuzzy category whose focal members are goal-defined, socially constituted, bounded, events with constraints on participants, setting, and so on, but above all on the kinds of allowable contributions (1992 [1979]: 69)

The continuum or “gradient” of social events mentioned by Levinson range from “the totally prepackaged activity” to the “largely unscripted” (1992[1979]: 69). Talk may be an integral part of each activity, the activity may be constituted entirely by talk, or may be ritualised or non-existent.

Levinson characterised the structure of an activity into episodes within which there may be pre-structured sequences, conventions and norms for turn taking, along with role constraints, topical cohesion and how adequate contributions are in terms of the activity. He saw these structural elements as “rationally and functionally adapted to the point or goal of the activity in question, that is the function or functions that members of the society see the activity as having” (1992[1979]: 71). These characteristics are related to participation frameworks and activity roles through the shared vision of all members of the group.

The properties of an activity were seen by Levinson as constraining participation so that there are “constraints on what will count as allowable contributions” (1992[1979]: 72). Contributions to talk “are tied and rationally and functionally adapted to the point or goal of the activity in question, that is the function” (1992[1979]: 71). This means that for every activity there is “a corresponding set of *inferential schemata*” (1992[1979]: 72) In other words, speakers have a common understanding of what the activity entails: “Because there are strict constraints on contributions to any particular activity, there are corresponding strong expectations about the functions that any utterances at a certain point in the proceedings can be fulfilling” (1992[1979]: 79).

The educational setting is one of Levinson’s paradigm examples along with the courtroom setting and Levinson’s examples from the courtroom and the classroom in

particular showed how participation in an activity type is structured by questions, a key discoursal feature in the PBL tutorials (Chapter 5), and one which I address later in this chapter when reviewing the relevant applied linguistic work of Mehan and Cazden.

Even where the activity type may suggest prototypical characteristics there may be divergence and overlap: Sarangi (2000: 6-7) summarised the strengths of the notion of activity-type as follows:

it takes into account cognitive, historical and genealogical dimensions, as it links these to interactional patterns and structural configurations. .... activity type analysis removes the burden from the individual... Against the backdrop of prototype theory, Levinson moves away from an either/or categorisation, towards a categorisation of entities based on more/less along a continuum. For instance, not all legal proceedings or medical consultations are conducted in exactly the same way, but there is a prototypical form from which other versions can deviate, but not without activity-specific inferences/implicatures attached to such deviations. A notion of normality is thus presupposed in activity-specific behaviour, but this does not amount to fixedness or rigidity. Deviations from the focal points only make us rethink the potential boundaries and crossings.

Sarangi (2000: 2) argued that “interactional hybridity” can help to explain both “continuity and variations within and across activity types” (2000: 2) and is most clearly manifest through the forms of talk or “discourse types”, for example advising, questioning, or taking a medical history. PBL, from this perspective, can be regarded as a hybrid activity type, situated between professional socialisation and educational trajectories. Sarangi went on to operationalise the notion of activity type through activity analysis and this analytical framework is discussed in Chapter 4.

### **3.4 Participation and roles in educational settings**

The notion of participation is central to PBL and as it is a hybrid activity type, studies of how students interact in the classroom can shed light on the PBL setting. This



section considers empirical studies relating to role and participation in educational settings – particularly those which view participation as a means of learning and developing understandings of knowledge. Key theoretical insights drawn from Vygotsky (1962; 1979), Cazden (2001), and Mercer (1996; 2004) provide a foundation for the present study, locating it within a social constructivist view of participatory learning and the development of expertise. Research into learning and classroom discourse (e.g. by Mehan, 1982; Sinclair & Coulthard, 1974) and PBL (via Barrows, 1980; 1985; 1994, Schmidt & Moust, 2000: and Hmelo-Silver, 2004) reflects the discursal aspect of the activity type approach as described above.

### **3.4.1 Social constructivism and classroom research**

In this section, I review work on learning and participation conducted from a social constructivist perspective. I look first at the fundamental theoretical work of Vygotsky (1962; 1979) and then review applied research undertaken by scholars such as Mercer (1995), Edwards and Westgate (1994) and Sinclair and Coulthard (1974). Although their work was predominantly carried out in the primary and secondary school sectors, it remains highly relevant to communication studies in general and to my PBL research in particular through its focus on participation and roles.

The influence of Vygotsky's (1962; 1978) theories of learning and the social constructivist movement is important in studying classroom interaction. Vygotsky's work focused on the development of language and cognition in children, in particular on how children learnt to make meaning. He believed that language and consciousness were inextricably linked within social activity, and that this activity should be a primary focus of study. The theories he developed have been influential in the field of education and the ethos of PBL may be said to have its roots in his

theories of talking and learning, scaffolding and collaboration, all of which relate to how learners participate in activities, and take up roles.

Vygotsky studied how the child learnt via the process of interaction, between child and parent, and child and teacher. He suggested that the child learnt collaboratively in a social context: the difference between what the child could do on its own and what the child could do in a collaborative context Vygotsky called “the zone of proximal development” which he defined as “the distance between the actual developmental level as determined by independent problem solving and the level of potential development as determined through problem solving under adult guidance, or in collaboration with more capable peers” (Vygotsky, 1978: 86). In this zone, teachers and parents provide appropriate “scaffolding” to support the child’s learning through a process of “collaborative dialogue”. Vygotsky’s work, along with that of scholars such as Piaget and Dewey, influenced the development of social constructivism in education, which advocated collaborative learning, and discussion scaffolded and facilitated by the teacher. These are the guiding principles behind educational approaches such as PBL.

### **3.4.2 Group interaction in the classroom setting**

An approach which emphasises context and is theoretically aligned with the work of Vygotsky is that of Mercer (1995; 2004) whose sociocultural discourse analysis is one in which “communication, thinking and learning” (Mercer, 2004: 138) are seen as processes shaped by culture. The sociocultural approach was designed by Mercer (1995; 2004) to apply to the analysis of group interactions in primary school classroom settings in the United Kingdom. Mercer believed that the classroom was a place where “knowledge is jointly constructed” and that classroom learning was just

as much about learning “ways of using language itself” (1995:11). He argued that “an analysis of the process of teaching and learning, of constructing knowledge, must be an analysis of language in use.” (Mercer, 1995: 6) and studied student interaction in group learning where the teacher might not always be present. Mercer theorised that, through collaborative tasks, argument contributes to the learning process and is often better without the teacher’s direct oversight.

The teacher’s role was suggested by Mercer to be one of checking students’ understandings to see if they are similar to the teacher’s – what he called the “validating” role of communication (1995: 15). This is close to the PBL facilitator’s role mentioned in Chapter 2 Section 2.2.4. Mercer observed that, in teaching and learning situations, one participant may become the “intellectual authority” and there may be situations where this is contested. This process was also observed in the pre-clinical PBL tutorials described in Chapter 1, where one student became the intellectual authority, particularly when tutors abdicated this role or perhaps were uncomfortable with areas outside their own expertise. Ultimately both power and authority are “vested in the teacher” but in PBL this can be far less evident if students take over the role of intellectual authority. This aspect is discussed in Chapter 6 on the expertise of the case presenter and Chapter 8 on the tutor’s role.

Following studies of small group interaction and analysis of data of talk by school children of a range of ages, Mercer proposed three modes of talking and thinking “where people think together” or as “social modes of thinking” (1995: 104):

1. Disputational: disagreement, and individual decision-making versus the pooling of resources, or constructive criticism. ...
2. Cumulative: speakers build “positively but uncritically” on each other’s input.
3. Exploratory: speakers “engage critically but constructively” with each other. There may be challenges and counter challenges but these are

justified with alternative hypotheses: “Knowledge is made more publicly accountable” and “*reasoning is more visible*” (italics in original).

Disputational talk was typified by assertions and challenges while cumulative talk contained repetitions, confirmation and elaborations. In Mercer’s model, the type of talk – disputational, or cumulative and exploratory – indicated the type of communicative relationships. Disputational talk implied less collaborative and less constructive learning. Cumulative is associated with solidarity and trust and moves towards the construction of a “common knowledge” but is uncritical and accepting, seen through repetition and confirmation of each other in the group. Exploratory talk puts reasoning first with all speakers giving reasons, stating and evaluating proposals and agreement before action. The goal of exploratory talk is consensus whereas disputational talk is competitive. Exploratory talk may include conflict but sharing and collaboration make it more effective in problem-solving. The second of Mercer’s categories – cumulative talk – occurred frequently in the study of first year PBL tutorials described in Chapter 1 where it was referred to as “knowledge display” and students presented their research findings with little or no discussion.

According to Mercer, the analysis of these types of talk should operate at three levels – linguistic, psychological and cultural (1995: 105): the linguistic level covers speech acts such as asserting or explaining; the psychological concerns how speakers interact and whether reasoning can be seen to be pursued, and the cultural level refers to the kinds of “educated discourse” that are valued in institutions, as found in exploratory talk:

The analytic category of exploratory talk ... embodies certain principles of accountability, of clarity, of constructive criticism and receptiveness to well-argued proposals – which are valued highly in many societies. (106)

This is the type of talk that PBL discussion, as a formative, socializing setting, is meant to promote, and that is examined more closely in the analytic chapter on clinical reasoning (Chapter 7).

Language, Mercer wrote, was also a way to “interrogate the quality of the claims, hypotheses and proposals made by other people” (1995: 106). Legal discourse for example is “language in which *reasoning is made visible* and in which *knowledge is made accountable*” (1995: 106, italics in original). His rationale was that by creating contexts which required collaborative talk, teachers could help children to use language in certain ways and they are given access to “educated discourse”. There are parallels to be drawn with the PBL tutorial setting where, through the articulation of the problem, there is an attempt to create the motive for talk, and the activity of talk has consensual goals (as in Levinson’s activity type). In his own data, Mercer found few examples of exploratory talk; although, where “ground rules” (1995: 109) for participation were developed at the outset of the class, these were similar to those students operate with in PBL:

- sharing all relevant information and suggestions
- having to provide reasons to back up assertions and opinions and suggestions;
- asking for reasons when appropriate;
- reaching agreement about what action to take, if at all possible;
- accepting that the group (rather than any individual member) was responsible for decisions and actions and for any successes and failures which ensued. (1995: 109)

One example from Mercer’s study, where children are working in a small group without the teacher present, on a history task using a computer programme, illustrates this:

*Planning a raid*

Diana: Let’s discuss it. Which one shall we go for?...

Peter: 1,2, 3,4. Well we’ve got no other chance of getting more money because

Adrian: And there's a monastery  
 Peter: Yeh but because the huts will be guarded  
 All: yeh  
 Diana: It's surrounded by trees  
 Peter: Yeh  
 Adrian: And there's a rock guarding us there  
 Peter: Yes there's some rocks there. So I think, I think it should be 1.  
 Adrian: Because the monastery might be unguarded.  
 Diana: Yes 1.  
 Adrian: 1 yeh....  
 (Taken from Mercer, 1995: 102)

Mercer saw the discourse here not only as following ground rules but as interactive and reflective of shared thinking processes, so that the children “buil[t] up shared knowledge and understanding to a new level through their talk” (1995: 104). They were engaged in the task, reminding each of what is relevant and evaluating possibilities.

Mercer also saw a place for reflection by both students and teachers and, for teachers, the use of confirmation, reformulation, elaboration and “admitting perplexity” in the guiding of students. Mercer recognised, however, that in the “long conversations” (1995: 70) of the learning process much is not said and is left implicit because of shared histories and assumptions, a view resonating with Levinson's (1992[1979]).

### **3.4.3 Learning through talk**

Despite Mercer's call for more guided collaborative discussion in classrooms, research has shown that many classrooms remain teacher-centred rather than pupil-centred. Edwards and Westgate (1994), in describing “talking to learn”, argued that the construction of knowledge emerged through an interaction between what an individual knows and new experience. This was aided in the classroom by collaborative discourse which included argument, explication, hypothesis testing and

justification. Talk is seen as “social action” (1994: 11) and Edwards and Westgate explained:

As we hear ourselves say what we think, or what we think that we think, we can monitor this objectification of our thought, judging its accuracy or adequacy and modifying it where necessary. (1994:11)

This corresponds to Vygotsky’s idea that “talk gives access to inner speech”, where talking helps us to organise our thinking. Research shows that even though curricula are moving towards learner-centredness, where the activities take place in high stakes, examination-oriented settings, despite “innovative communicative aims” (Edwards and Westgate, 1994: 39-40) communication remains centred on the tutor, who decides who talks, asks questions, evaluates, answers and manages: pupils remain “mainly or merely receivers of knowledge”.

The parallels with the PBL setting being researched in my study are close. Edwards and Westgate (1994:47) write of the ideal of a pedagogy where “to be asked a question by someone who wants to know is to be given the initiative in deciding the amount of information to be offered and the manner of its telling”. This is a target of the PBL curriculum, where students are encouraged to take control of the learning process. While the “expert” controls “knowledge” (Edwards & Westgate, 1994: 48), in small group discussion – such as PBL tutorials – the expert/tutor may play the role of observer, and group members have the responsibility of managing the talk. Edwards and Westgate also identified a social problem with collaborative learning that I have noted in my study of pre-clinical PL tutorials (referred to in Chapter 1: Storey & Tse, 2004), that “unwillingness to take the social risks of disagreement with friends may lead discussion groups to close down their talk prematurely by reaching a contrived consensus”, a feature noted in the earlier study of PBL discussion.

### 3.5 Classroom discourse

The work reviewed so far was conducted from a broad educational framework, taking a special interest in participation and communication, but with a learner-centred perspective. I turn now to the more linguistic and discourse analytic perspective of Sinclair and Coulthard (1975), who brought an applied linguistic perspective to the analysis of communication in educational settings, and Mehan's (1979) follow-up work, also in education. I also look at the work by Cazden (2002) that redresses to some extent negative constructions of the teacher's role in classroom learning.

#### 3.5.1 IRF Sequences and Questioning

Sinclair and Coulthard (1975) devised an analytical scheme of categories of participation based on spoken data analysis that offered a linguistic rather than quantitative account. Their emphasis was on how teachers elicited student talk and on "informative" and "directive" types of talk plus statements, questions and commands (1975: 138). They identified the teacher-led sequence of Initiation-Response-Feedback (IRF) as the dominant discoursal mode. This sequence was seen as reflecting teacher control and decreased participation by students.

For example, in a PBL tutorial in my dataset, students responded to questions from the tutor on blood, and among these question-answer sequences there were several examples of the IRF sequence:

Tutor ] but there is there is another paraproteinaemia which: it is common  
in (.) which is what (.) we talked about it the other day  
Ron (^^^)  
Tutor yes (.) wh why is it more common in ]  
Ron ]because the IgM is a much larger molecule  
Tutor that's right (0.4)



The tutor initiates the sequence with the question asking for another example of paraproteinaemia. While Ron's first response is inaudible (from the tape), the tutor's acceptance of his answer is "yes" and the tutor asks a follow-up question "why is it more common?" to which Ron gives the answer "because the IgM is a much larger molecule" (Response). The sequence ends with the tutor's "that's right"(Feedback).

Mehan (1979) linked what he termed the Initiation-Reply-Evaluation (IRE) sequence to performance: he viewed classroom speech events as a collaborative endeavour in which "*school* is always a performance that must be constituted through the participation of a group of actors" (1979: 40, italics in original) with teacher in roles of both director and actor, and the traditional lesson is "an idealized script in the teacher's head". Mehan found the Initiation was used "to govern the talk that followed" through its function as a directive or was used to give information and suggested that the IRF/IRE structure performs a range of pedagogical functions. Similarly the PBL tutorial can be described as affording performance by students in its evaluative, educational context. The occurrence of the IRE sequence in tutorial interaction may frame participant roles, particularly the roles of the tutor.

### **3.5.2 The Teacher's Role**

The view of questioning – a primary technique of the initiation stage of the IRE sequence – as a form of control was recognised by Cazden (2001) following her analyses of teacher-student classroom talk in American schools. She suggested that one contribution of IRF sequences to student learning was that they helped "to maintain the necessary control over the flow of information and the advancement of the academic content." While Cazden mentioned that teacher questions are mainly only "display" questions to test students, she offered a positive view in that they can

also be used “to establish an agreed account” of what was being learnt. The agreed account then becomes “common knowledge” (2001: 47), a view acknowledged by Edwards and Mercer (1987) in seeing the teacher’s role as validating what was being communicated.

Cazden (2001) has also suggested that greater use of reflective enquiry and recognition of the value of student explanations has led to a decrease in teacher talk. She noted longer student answers, more problematisation by pupils, and extended explanations in their answers. Cazden reported a shift to “non-traditional” modes of teaching and learning, in which classroom discourse was the “essential medium” for achieving “fundamental communication goals” (2001: 49). Her views are similar to those of Mercer (1995; 2004, discussed in Section 3.5.2). Cazden discussed the role of the teacher in scaffolding learning within what Vygotsky called the “zone of proximal development”. According to Cazden (2001: 77), the “mutual appropriation” of knowledge that seems to be going on as children learn from each other and the teacher emphasises “the learner’s active construction”: “what can be ...appropriated from other people still requires significant mental work on the part of the learner”.

The view of the teacher’s role in scaffolding and facilitating learning through talk is relevant to the current study and particularly to the research question on tutors’ roles and the shifting of roles in the context of expertise and uncertainty. Cazden referred to the practice of “revoicing”, or animating in Goffman’s terms, of student answers by teachers. This, she wrote, can have several functions: to re-broadcast the student’s answer to the whole group, often with reformulation, and to reconceptualise student responses, often attributing to the students a viewpoint they had previously been unaware of (Cazden, 2001). The teacher may also position him/herself in relation to

students as validating authority in a traditional lesson or as a “continuing negotiator” where students can come back with an evaluation of the teacher’s reformulation. Many of these observations inform the analytic chapters in this study, in particular Chapter 8 on the tutor’s role.

### **3.6 Summary**

In this second literature review chapter I have tried to show how social constructivism and Vygotskian thinking has influenced mainstream educational practices, and has strong resonances for small class tertiary settings, such as the PBL tutorials studied here. In reviewing the work of Goffman, and of scholars such as Levinson and Sarangi whose empirical studies have built on his theories, I have attempted to establish a conceptual and analytical foundation for the current study through Goffman’s participation framework. Goffman’s notions of frames, footing and alignment inform my analysis of relationships between tutorial participants and between participants and their utterances. The shifts in frames inform thematic analysis and provide support for the roles participants take up in their role-sets. Levinson’s notion of activity type underpins my analysis of tutorial participation. The findings of research into small group collaborative learning are also especially relevant to the PBL context, as are the findings of research into types of talk, like Mercer’s (1995) exploratory, cumulative and disputational types of classroom talk. I have also reviewed studies on teacher-centred classrooms and views of the use of the IRF (or IRE) sequence as the dominant mode of teacher discourse. Finally, I have discussed different views of the teacher’s role in classroom research, work which informs my analysis in Chapter 8.

In the next chapter, I describe the research setting and participants, and the data collection methods used, and then discuss my methodological approach to data analysis in this study. Several of the tools that I use for the analysis of participation in tutorial discourse, such as the notions of frame and alignment have been reviewed here; in the next chapter I go on to show how they are integrated into my analytic framework.

## **Chapter 4: Research Design, Methodology and Analytical Framework**

### **4.1 Introduction**

In this Methodology chapter, following a re-cap of my research questions, I describe the setting of the study (4.2), key curriculum objectives and activities, my interests that motivated the study (4.3), and details of the ethics approval for the study (4.4). I then describe the stages and methods of my data collection (4.5) and the actual data collection and transcription (4.6), and the limitations and strengths of the data (4.7). In the final section I describe and discuss the analytic framework – activity analysis – that I chose for this study (4.8).

#### *Research questions*

The research questions that emerged from my reflections on the relevant work reviewed in the literature review chapters are:

- How is the PBL tutorial activity structured in terms of participation and role-positioning? (Chapter 5)
- How is case presentation affected by being situated within the context of this activity type, that is the BPBL (Bedside Problem-Based Learning) tutorial setting? (Chapter 6)
- How, in a problem-based interaction setting, do students shift between the activity specific roles vis-à-vis question and answer sequences to reach agreement or get consensus about a diagnosis, and how does their management of uncertainty (as evidenced in their questions) in clinical reasoning relate to the negotiation and distribution of expertise? (Chapter 7)

- How, in a problem-based interaction setting, do tutors shift between the activity specific roles vis-à-vis question answer sequences and how do these affect the display and negotiation of expertise and the management of uncertainty? (Chapter 8)

In order to investigate these questions relating to tutorial participation, it was necessary to gather spoken data and in 4.3 below I go on to describe the methods I used to gather my data, and the role of the researcher as a participant observer. However, to help contextualise the study, I begin with background and setting within the curriculum.

## **4.2 Brief Background to the present study**

The present study is situated within the Li Ka Shing Faculty of Medicine of The University of Hong Kong, which has implemented a hybrid PBL approach to varying extents at all levels of the curriculum, with PBL tutorials running alongside lectures. The faculty-wide conversion from a traditional discipline-based curriculum, (for example, anatomy, physiology and biochemistry) to PBL took place in 1997 and was facilitated by financial and administrative support (MacKinnon, 1999). PBL brought with it a more integrated systems-based curriculum taking the body systems such as cardiovascular, respiratory, and urogenital systems as teaching and learning frameworks. This shift coincided with the overall orientation towards “student-focused learning” in Hong Kong in which students would learn to “seek knowledge and find solutions to problems on their own” (Education Commission, 2000).

Between 1992 and 1997, funding was made available to universities across Hong Kong to promote reform of the health sciences curricula (Kember et al., 1997). At the Li Ka Shing Faculty of Medicine PBL had already been introduced on a departmental basis, for example, in the Departments of Physiology and Pathology (Kwan, Chan,

Nichols, Sheng & Wong, 1997). Subsequently, PBL was implemented across the pre-clinical curriculum (first and second years) in the 1997 curricular reform of tertiary education accompanied by systems-based lectures (Chan, Ip, Patil & Prosser, 2011). In the clinical curriculum, that is years three to five, each department decided on the extent to which they would implement PBL. The tutorials which are the main focus of the present study are one example of how PBL was put into practice in the clinical curriculum as Bedside Problem-Based Learning (BPBL).

#### **4.2.1 Setting**

The Bedside PBL tutorials in Clinical Medicine in the 4<sup>th</sup> and 5<sup>th</sup> years took place at the teaching hospitals associated with the university. The tutorials took place in one of three locations: in the hospital ward itself, close to the bed of the patient whose case was the subject of discussion; in a multifunctional staff room outside the ward, or, in the departmental library and conference room located in the professorial offices some distance from the wards.

#### **4.2.2 Student activities**

In the final fourth and fifth clinical years, students take up residence in medical student facilities at the hospital and spend the majority of their time in the wards. They spend approximately eight weeks in each of the major specialties: medicine, obstetrics and gynaecology, orthopaedics and traumatology with emergency medicine, paediatric and adolescent medicine, psychiatry and family medicine, and surgery. During this time they are engaged in a range of modes of learning such as the Residential Clerkship, Bedside PBL, and Case Discussion among others. Students take up the role of assistant interns and are expected to conduct a range of medical duties including taking blood samples and setting up an intravenous drip. The

interviewing of patients to practise history taking and reporting at the bedside is a major component of the curriculum.

#### **4.2.3 Tutorial objective and format**

The Student Handbook states that the objective of Bedside PBL is to “To bring PBL to the bedside as a basis for analysis of all patients the students will encounter”.

Students are expected to carry out literature searches in preparation for discussion.

The format of the Bedside PBL sessions is described as follows:

##### *Format*

This will be conducted in the wards or the side rooms of the wards. The physician will choose one or two cases from the ward(s) of the students from one pair of wards. On the first day, usually on Tuesday, the students will discuss the case among themselves and define the problems and learning issues of the patient(s). The presence of the physician at this stage is optional. He will however be required to be present near the end of this first session to see whether the problems have been correctly identified by the students and to assign which student should read up on which problem. He should also check the physical signs in the patient(s) with the students. The patient(s) can be discharged after this session. During the second session, usually on a Thursday, the students and physician will discuss the identified problems after the students have presented their review of the problems.

(Student Handbook 2007)

The Tuesday session was reported by students to last 15-20 minutes and to consist of case selection and identification of learning issues. I was able to attend only the Thursday sessions (apart from one of the pilot sessions) due to work commitments. Ideally, it would also have been helpful to attend the Tuesday sessions to capture the negotiation of the learning issues as these would determine the direction of the Thursday discussions but I was unable to be present at or record these.



### **4.3 My interest in PBL**

When PBL was introduced into the undergraduate medical curriculum in 1997, it was accompanied by a greater focus on disciplinary communication skills courses in the University and within the Faculty. I was involved in developing disciplinary communication skills courses that aimed to help students meet the communicative demands of key components of their studies. In the Faculty of Medicine, the new pre-clinical PBL programme was the focus of our course development. The research projects engaged in to support this course development aroused my interest in how PBL would operate in the clinical years of the medical curriculum. Alongside this we carried out similar course development to prepare second year students for the first phase of ward teaching and learning in the junior clerkship. In these communication skills projects we identified patterns and problems in communication in the target contexts, and based the communication course design on these findings. This is where my interest in the latter years began: how did PBL operate at clinical levels? Did it succeed in achieving its ostensible aims? Did students develop the communicative skills that we had hoped our course would help initiate?

The medical faculty operated a partial or “hybrid” model of PBL, (as mentioned in Chapter 1 Section 1.2), with PBL tutorials and traditional lectures running side by side in the pre-clinical curriculum but, in the final clinical years, the presence (or absence) of PBL in the timetable is decided on a departmental basis. In deciding to pursue my interest, I first needed to identify the departments with PBL programmes. At the same time, it was important to gain permission from relevant Faculty members and consider ethical issues and requirements.

Two departments expressed interest in my study: Surgery and Medicine. As mentioned in Chapter 1, Section 1.6.2, the PBL programme in the final years is part of the Specialty Clerkship and student groups encounter a different PBL tutor each week of their eight-week rotations. I met with one tutor from each specialty, and after gaining permission from their students, carried out a pilot study (Section 4.5.2) of two Surgery tutorials and one tutorial in Medicine.

## **4.4 Ethical approval**

### **4.4.1 Ethical considerations**

Ethical considerations were identified before the ethics application was made and before the data collection process began. One issue was whether to include the patient interview by students. I felt that although this would add an important dimension to the study, it was not essential to my main focus, the tutorial process. In addition, as the student interview of the patient was carried out in Cantonese this would also have required translation.

### **4.4.2 Ethics application procedures**

The application for ethics approval was carried out at my university where I collected the data, again at my university when I applied for financial support to the Leung Kau Kui Research and Teaching Endowment Fund, and at Cardiff University. The ethics application was made to my University's Human Research Ethics Committee and granted (Reference no. EA080707) in July 2007. This decision was brought to and supported by the Ethics Officer at Cardiff University School of English, Communication and Philosophy. The Leung Kau Kui Research and Teaching Endowment Fund awarded financial support (Project ref. 109400) which went

towards release from teaching duties one day a week for one semester. I was also required to seek permission from the Hong Kong Hospital Authority to film on hospital premises and to do this for every video recording session.

#### **4.4.3 Informed consent**

The letters to students and tutors requesting their consent to participate in the study are attached in Appendix A along with the response form. The letters gave detailed information about the study so served as an information sheet as well. The letter stated that participants could withdraw from the study at any time and that pseudonyms would be used at all times. The letters were sent by email attachment to participants before observation and recording began.

Before beginning the pilot study and main study, I held a ten-minute meeting with the two student groups before the first tutorial observation and gave a short description of my study and answered student questions. With the tutors, I discussed and answered questions in telephone conversations when first requesting their consent. Letters of consent with the information about the project were sent to the tutors by email attachment following these conversations and they replied with their consent or refusal by email. Tutors who agreed to participate gave me signed copies of the response form when I attended their tutorials.

One of the tutors later requested that the video recording of his tutorial be deleted following transcription and this was carried out. He expressed concerns as to the security of the video recording. This was an element that should have been included in the letter requesting consent but to alleviate any potential concerns following this incident, further tutorials were audio-recorded.

## **4.5 Stages and methods of data collection**

For ease of reference my activities can be seen as going through three stages: the first stage included the recruitment of participants, the second the pilot study, and the third stage comprised the main study.

### **4.5.1 Stage 1: Recruitment of participants**

Recruitment of participants began in September 2007 after ethical clearance had been given. The participants for the study were fourth and fifth year medical students and clinical tutors. Tutors were assigned to tutorials on a weekly basis. While the student groups remained constant, each week they encountered a different tutor in the tutorial sessions. In the first stage, after receiving ethics approval, I selected random tutorial groups and sent invitations to the group members by email. This approach yielded few replies. I next approached the tutors and two responded by inviting me to observe final year tutorials in the surgery specialty and in clinical medicine. These three sessions, which took place between August 2007 and April 2008, make up the pilot study described in more detail later in this chapter.

The students in the main study were divided fairly equally by gender in both groups and were all aged between 20 and 25. The number of students attending each tutorial ranged from 7 to 10 and the total number involved in the study from the two groups was 18 (not including the visiting students). They were all from Hong Kong apart from the visiting students who did not attend tutorials regularly. The student participants had received a largely English medium education from kindergarten through secondary school, with at least three having studied overseas in English-speaking countries. A few had participated in exchange programmes overseas or in mainland China, and one had worked in an African country as an assistant intern for

one year. While the majority of participants in this study may be regarded as second language speakers of English, they are reaching the culmination of many years of study through the medium of English. Therefore, when undertaking data analysis, no special focus will be placed on the second language status of most of the participants in this study.

It is useful to note that English is one of the three main languages of formerly colonial Hong Kong, and although the issue of second language medium education has a long and contentious history in Hong Kong, in the context of the study of medicine, there has been little controversy. Most clinicians have received their professional training in an English medium country, their teaching is conducted in English, and the standards of English they expect of their students are very high. It is my experience as a language instructor that proficiency in English in the medical faculty remains higher than in nearly all other faculties in the university. By the time students reach the clinical stage of their studies their English no longer presents a substantial impediment to their clinical communication.

While second language issues may affect the performance of some participants, the analytic focus of this study remains on those aspects of clinical communication which transcend issues of fluency and correct usage. I am concerned rather with the nature of participation and the roles of participants in the clinical communication context under study and the impact of factors like uncertainty and expertise on the effectiveness of that communication and of the learning and teaching process.

The students in the two groups had been through several rotations together so were familiar with each other. Approximately one-third of the students had attended

compulsory communication skills courses taught by the researcher during their pre-clinical studies for either one or two semesters in their first and/or their second year. This may have been a factor in their apparent lack of attention to my presence, although it might equally have been a factor in the lack of participation by some students.

Seven tutors were from Hong Kong and the other was from an English speaking country. The tutors came from a range of specialties, such as surgery, haematology, neurology, and dermatology. As no female tutors had accepted my request, the tutors I observed were all male.

#### **4.5.2 Stage 2: Pilot study**

The aim of the pilot study was to gain a general impression of tutorial interaction. It consisted of three tutorials which took place in September 2007 and January 2008 with four fifth year students, and April 2008, with seven fourth year students: the first two, with fifth year students, took place in the surgical ward and the other with fourth year students took place in a side room outside a ward. I took notes during observation of these sessions but these tutorials do not form part of the main study.

The preliminary findings from the pilot study indicated that there appeared to be some common features among the tutorials: for example, the interaction was marked by the presenting of case histories taken by students from patients in the ward, and was also marked by lengthy question and answer sequences, with the tutor asking almost all questions. The first tutor especially asked students to hypothesise and draw analogies with everyday occurrences. I was aware that not all specialties conducted the PBL sessions in the same way: the Surgical tutorials were held *in media res* in the ward with participants standing throughout, while the Clinical Medicine tutorial took place

in a side room off the ward with participants sitting around a table. The Surgery tutor at times questioned the patient so locating the tutorial in the ward with students and tutor wearing white coats brought realism to the encounter while the side room setting appeared more an educational context. Having said that, the Clinical Medicine tutor also returned with students to the ward where he re-examined the patient, demonstrating examination techniques and asking students to repeat them.

Prior to my joining these tutorial groups and carrying out the observation, the tutors had asked the students if they would allow me to observe the sessions and take notes. Following the students' granting of permission, I held a ten-minute meeting with them in which I gave students copies of my letter requesting consent and discussed my research aims and methods and answered their questions. Both groups (in the Surgical Specialty and the Clinical Medicine Specialty) agreed to allow me to observe the tutorials. The second group, in Clinical Medicine, also agreed to be participants in the main study.

Students informed me in the pre-session meeting that they were told to carry out an interview and physical examination before meeting with the tutor. They were also told *not* to present a history as in the clerkship but to do it "more like PBL". They remarked that Bedside PBL was different from pre-clinical PBL when they had to prepare and research learning issues and where everyone wanted to speak and everyone had done the same research. They felt the process was faster now and that they covered a lot more and that it was much more interesting to interview and examine an actual patient. The students commented that in some specialties the sessions were more "PBL style" but that now they had their "own knowledge" and did not have to research the problem. They also felt that the process was very

different from pre-clinical PBL because a specialist was present rather than a tutor who might not have specialised knowledge of the problem area.

I observed and made notes of the interaction but did not make any audio or video recordings. I noted the verbal interaction and any specific activities, such as examining the patient or checking the patient's notes, that also occurred. The first two tutorials in the ward itself took the form of an initial case presentation by one of the students, followed by an extensive question and answer session in which the Surgical Tutor questioned the students. Many of his questions asked the students to hypothesise regarding causes and diagnosis or what they would do in different situations for example, "If you were a doctor seeing this patient on a foggy evening on Lantau Island what would you do?" or "What sort of patient would require amputation? ...PBL is thinking...you can say whatever you want". Tutors also asked students to define and explain terms used: other questions asked the students to imagine themselves in the place of the patient and to consider related contexts. Occasionally the patient was included in the discussion through further questioning or examination by the tutor.

The third tutorial took place in a side room off the Clinical Medicine ward. Eight fourth year students were present for most of the session, with two arriving late. This session was more typical of what I expected of a PBL tutorial based on my experience with pre-clinical students: a Chair was selected, and a case history was presented by a student. In this session, most of the questions were asked by the tutor to check information in the case history and to check the student presenter's knowledge. The tutor and students returned to the patient's bedside to repeat the physical examination and to interpret an X-ray. Students were unable to answer several questions and were



directed to research these before the next tutorial. The next tutorial was to be the first in my analytic study.

#### **4.5.3 Stage 3: Main analytic study**

Tutorial features in the pilot study that informed the main analytic study included the embedded nature of the event: for example, the re-examination of patients, the discussion of x-rays and the reading of case notes. Another feature was the switching between Cantonese and English when talking to the patient and when students talked among themselves. The final feature was the taking up of authoritative roles: the tutor in the Surgery tutorials directed the discussion and both tutors chose to involve the patient. The Chair in the Clinical Medicine tutorial also took on a degree of authority in the management of the interaction. These observations provided an indication of the format and nature of the tutorials and went some way to capturing the complexity of the event, the roles taken up by the participants and the issue of authority.

In the third stage, between the end of April 2008 and December 2008, I followed up the Clinical Medicine tutorial group who had taken part in the pilot study and contacted their tutors in the department of clinical medicine. This process took much longer than expected with several refusals of consent from tutors for reasons ranging from unwillingness to participate to last minute schedule changes. As tutors rotated on a weekly basis, refusal meant that no tutorial could be observed that week. However, between April 2008 and August 2008 I observed and video-recorded a total of five tutorials with the first group of students (Group A).

At the end of the academic year I was able to identify a second tutorial group (Group B) who were entering the final year of their studies and as described in Section 4.2.1

obtained consent from them, followed by their tutors. I recorded three tutorials with this group.

#### **4.5.4 Duration and number of tutorials in the main study**

Of the eleven sessions observed, eight form the main study (the three other tutorials were included in the pilot study). Two groups of eight to ten students and tutors were observed and recorded in eight tutorials. The tutorials were scheduled to last for between one and two hours, and the length depended on the tutor's schedule, with some beginning the session later than scheduled, finishing earlier or, as in the first session, extending the tutorial. Table 1 below summarises the duration and number of tutorials and the number of students who were present.

**Table 1: The 8 tutorial sessions and their duration**

<b>Group</b>	<b>Session</b>	<b>No. of Students</b>	<b>Session Duration</b>
A	1	7	2h. 30:00
	2	7	1h. 38:23
	3	7	1h. 09:00
	4	8	49:32
	5	7	1hr.19:58
B	6	10	1h. 50:59
	7	10	1h. 57:55
	8	8	1h. 42:34

#### **4.6 Data collection**

Of the eleven tutorials I observed for the pilot and main studies, I recorded eight. Of these, five were video recorded and three were audio recorded. The decision not to pursue video recording was made when it became clear that the transcription of the interaction would be adequate for analysis and when I felt able to transcribe the interaction based only on auditory input. I also felt that the presence of the video camera could be seen as disruptive and that it might have been a factor in the request of one tutor to delete the recording (see Section 4.2.1 above). During all the tutorials I took notes to complement the recordings and these were especially helpful when the auditory quality was poor.

Almost half of the tutorials took place in a large conference room with participants sitting around a large oval table. Due to the size of the table there was a tension here between interfering with the students' desired seating arrangements and the placement

of the camera to capture all participants. In order to cause least disruption, I decided not to interfere with the seating arrangements but was therefore unable to capture the facial expressions of all participants. The remaining tutorials took place in a range of side rooms off the wards, most of which were extremely cramped with participants squeezing around a table and the camera placed behind the door. As mentioned earlier, the students seemed less aware of the recording than the tutors.

#### **4.6.1 Transcription**

The data were transcribed using Standard English orthography, and turn numbers and conventions were based on Roberts and Sarangi (2005), with refinements drawn from Jefferson (1974). I aimed to capture turn-taking and sequence as well as overlaps, pauses, non-verbal sounds such as laughter, and tonal effects such as volume and pitch (see Appendix B for a list of transcription conventions). In the transcriptions student participants are given pseudonyms while each tutor is simply called ‘Tutor’. The full tutorial transcriptions are included in Volume 2, Appendix C of this thesis and are listed in the table below in order of reference in this thesis.

**Table 2: Tutorial participants and topics**

<b>Tutorial</b>	<b>Group</b>	<b>Clinical focus and patient details (if mentioned)</b>
1	A	Case 1 Symptoms of stroke (Mr. Lam 35 years old) Case 2 Heart disease case management
2	A	Numbness (Miss Wong 61 years old)
3	B	Blisters (Mr Lau )
4	B	Weakness (Madam Wu)
5	B	Dizziness, vertigo
6	A	Pain, bleeding, bruising, multiple myeloma
7	A	Heart disease
8	A	Blood presentations

#### **4.7 Limitations and strengths of the data**

The data collection process was extended due to the delay in gaining consent from tutors and student groups, as mentioned in section 4.2.1, and subsequently the lack of consent from several tutors. The observation schedule had to be extended and eventually eight tutorials were recorded, totalling approximately 15 hours of data; I considered this adequate for the purposes of this study.

Restrictions in the students' schedules meant that I was unable in most instances to check the transcription with students or my interpretations against those of the participants. The verifying of the transcriptions and researcher interpretations through post-tutorial participant interviews was difficult to arrange as students left the tutorial sessions immediately for the next activity on their schedule. Ultimately only one brief session took place immediately after a tutorial. Group A accepted a lunch invitation to

be followed by viewing of the video. They viewed sections of the video recordings and transcription briefly, commenting on the accuracy of the transcription, but also pointed out that their memories could be faulty.

Despite these shortcomings, the pilot study data offered a valuable resource as it presented a complex learning setting where participants are just beginning professional practice but are still within the educational context. The aim of the present study is not to discover frequency or repeated patterns, although these too can offer insights, but to investigate the dynamics of participation within a specific learning activity.

#### **4.8 Analytical framework: activity analysis**

In this section, I describe attempts to find an appropriate analytical framework for the analysis of the tutorial interaction. I sought an approach that would connect micro-level with macro-level analysis in terms of underlying themes and interaction, and a scheme that would capture the trajectory of a tutorial. In the end the analytical approach and rationale for the study is based on work by Roberts and Sarangi (2005) on theme-oriented discourse analysis and Sarangi's work (2005; 2010a) in which he operationalised the notion of activity type through the activity analysis approach. This approach allows for the identification and analysis of focal and analytic themes through mapping the structure, interaction and emergent themes in the data and identifying the discoursal devices through which this is effected.

Initially, I had considered ready-made coding schemes such as the Roter Interaction Analysis System or RIAS (Roter and Hall, 1989) (based broadly on Bales' Interaction Process Analysis) which has provided useful categories for coding healthcare interactions. However, it has been suggested that such an approach using pre-

established categories “overlooks the fact that coding is inevitably interpretive; that interaction is a dynamic, cumulative activity which defies any one-to-one correspondence between linguistic/semiotic form and function” Sarangi (2010b: 400-401). In the early stages of this study, I adopted an empirical approach to coding data so that my coding would emerge from the data rather than being imposed upon it: examples of student talk included hypothesizing, clarifying, elaborating, and so on. While this led to some useful insights, the coding process was problematic for the same reason as Sarangi gives above: there was overlap between categories and the categories themselves were ambiguous. As Mercer (2004) pointed out such coding “cannot handle the dynamic nature of talk and so cannot deal with the ways that meaning is constructed amongst speakers, over time, through interaction.” (Mercer, 2004: 142) That is not to say that codes do not have a function in interaction analysis: they can help to make sense of the data and present the analyst’s interpretations.

In what follows, I describe the key analytic frameworks which have guided my data analysis: Roberts and Sarangi’s (2005) theme-oriented interpretive approach, which is combined with Sarangi’s activity analysis (2005; 2010a; 2011), and I set out the preliminary analysis. I selected these as a systematic approach which could take in both analysis of participation structures, roles, overall thematic trajectories, and the rhetorical devices at the micro-level along with an interpretive analysis of thematic sequences.

The most relevant research done on the structuring of participation and role positioning in clinical encounters is Sarangi and Roberts’ (2005) work on theme-oriented discourse analysis of genetic counselling and primary care consultations, further developed in Sarangi’s (2011) continued analysis of genetic counselling

encounters. Theme-oriented discourse analysis is integrated into the activity analysis approach taken by Sarangi (see also Sarangi, 2005), builds on Levinson's notion of activity type, and has its roots in Goffman's interaction order (Chapter 1 Section 1.5.3). The approach can also integrate conversation analysis for what it reveals at the micro-level level of speech turns.

As described in Chapter 3, the PBL tutorial may be seen as constituting an activity type (Levinson, 1992[1979]), with its activity specific constraints, inferential schemata and common goals. In activity analysis, Sarangi (2000; 2005; 2010a) has built on Levinson's ideas to allow for flexibility and variation and to emphasise the task of mapping:

Within this orientation, variations within and across healthcare encounters – in terms of focal and analytic themes – are legitimately warranted. More importantly, the analytic task is to be based on an overall mapping of structural, interactional and thematic trajectories of a given encounter as a way of identifying activity-specific coherence and incoherence as well as critical moments for further detailed analysis. (Sarangi, 2010a: 178)

The mapping of the encounter through coding and identification of frames can reveal the topic range and trajectory across the activity (2010a: 178). The themes, set out below, are both focal in terms of the concerns of the participants, and analytic in terms of the discoursal means by which the focal themes emerge. Sarangi (2010b: 403) offered the following examples:

- *Focal Themes*: e.g., normality, responsibility, autonomy, choice, decision making, patient-centredness, professional neutrality, symptoms presentation, delivery of diagnosis, voice of medicine, voice of lifeworld, quality of life, coping, risk, reassurance, etc.
- *Analytic Themes*: e.g., frames and footing; contextualization cues and inferences; face and facework; other devices (contrast, constructed dialogue, repetition, lists, metaphor, analogy, extreme



case formulation, character and event work etc.).

Roberts and Sarangi (2005) explained how this kind of approach to discourse analysis “works at the level of whole encounters and at the micro level of detailed features of talk to focus on analytic themes, ... [and] explores how interactions are organised thematically and rhetorically” (2005: 638-639) through framing and giving verbal and non-verbal cues in context. Activity analysis has refined this further through structural, interactional and thematic mapping, in which the analytic themes align with the professional concerns or focal themes emerging from a particular encounter.

#### **4.8.1 Structural, interactional and thematic mapping**

Activity analysis includes “an overall mapping of structural, interactional and thematic trajectories of a given encounter as a way of identifying activity-specific coherence and incoherence as well as critical moments for further detailed analysis” (Sarangi, 2010a: 179). Structural mapping involves identifying stages or phases in the activity: for example, in a primary care consultation, Sarangi identified the following components: opening, symptoms, treatment, symptoms, examination, diagnosis, treatment, symptoms, treatment, closing. In another example, the phases were far more dispersed. Sarangi (2010a: 405) pointed out that the categories are not rigid nor necessarily sequential and also that to “make sense of the dispersed nature of participant and content structure, it is desirable to map the encounters interactionally and thematically.” Interactional mapping involves looking more closely at each phase to identify participation structure: speakers, number and volume of turns, and type of turns and interactional patterns such as information giving which can be identified as focal themes. The notions of frames and alignment can help to identify where in the trajectory of the tutorial these themes are most salient (or not). Thematic mapping

studies the focal themes more closely through interpretive analysis and can identify backgrounding and foregrounding of information.

From the perspective of “interaction as an expert communicative system” (Sarangi, 2010a: 192) Sarangi has provided several examples of this analytical approach. Using examples from genetic counselling sessions between counselors and clients on the topic of breast cancer and familial risk, Sarangi (2010a: 192) demonstrated how “the dynamic frame shifts between accessing services, explaining conditions, taking family history, discussing testing protocol, diagnosis, prognosis and treatment”. While Sarangi identified risk as a key theme running through the activity, risk is also the explicit topic of discussion, and he illustrated how the interactional patterns show the escalation and de-escalation in risk talk between participants.

Recently, Sarangi (2010c) has applied activity analysis to role positioning. Taking his data from encounters in the primary care setting between a general practitioner and a child patient with accompanying mother, Sarangi (2010c) showed that the doctors took on two roles – therapeutic and pedagogic, where the pedagogic role and the explanations proffered by the GP appeared to delay prescription of antibiotics. Sarangi explained how this occurred:

[T]he GP formulates his expert assessment in the form of interpretive summaries ....which contain elements of individually-oriented diagnosis (‘it does sound a little bit chesty, but actually she’s perfectly clear, there’s no chestiness there’), as well as generally framed pedagogic explanations (‘I think this is the kind of cold that children get’). Such summaries anticipate intervention, in this case non-intervention. The decision against prescribing antibiotics (‘because the irritation here isn’t a cough, it’s a virus infection, I don’t think you need to treat this with antibiotics’), is accompanied by an explanation. (Sarangi, 2010c: 52)

This combination of, and shifting between, therapeutic and pedagogic roles marked by evaluative and explanatory turns is a paradigm example of the hybridity of many

professional activities, also shown in Gilstad's (2011) case study of encounters between midwives and expectant mothers.

The advantages of activity analysis are that it is an eclectic approach which can take in accounts analysis, conversation analysis (CA), corpus-based approaches and theme-oriented discourse analysis and is a "useful bridge between *micro-level understanding* and *macro-level explanations*" of interaction (Sarangi, 2005: 166, italics in original). In my application of Sarangi's activity analysis approach I make use of accounts analysis and theme-oriented discourse analysis.

#### **4.8.2 Components of activity analysis**

Sarangi (2010a) described activity analysis as proceeding systematically through three key stages: structural mapping, interactional mapping and thematic mapping and including some or all of the following:

- Mapping of entire encounters at structural, interactional and thematic levels
  - Communicative flexibility in terms of activity types and discourse/interaction types
  - Integration of discoursal and rhetorical devices
  - Goffman's notions of frame, footing and face-work
  - Gumperz's notions of contextualisation cues and conversational inference
  - Alignment: sequential and normative
  - Social and discourse role-relations
  - Thick participation and thick description
- (Sarangi, 2010a: 180)

Sarangi (2010a: 178) suggested that activity analysis "pays attention to the flexible nature of the relationship between form and content of a given encounter". He

described interactions within this framework as a “narrative unfolding” (2010a: 180) in a sequential order with its own characters and key events, with the negotiation of these events achieved through rhetorical moves. Such moves are not arbitrary but determined to an extent (as in an activity type) by the activity itself so that participation and discourse are linked by relevance to the activity in hand. This can be seen in the use of rhetorical devices such as contrast, repetition and reported speech, all examined in the analysis in the current study. In the current data, in the two examples that follow, the presenters use reported speech to voice the patient’s words and the clinical concerns mentioned in the notes:

“for the history of present illness, (.) uh she *described* the numbness as a tingling sensation which is parasthesia and there was associated decrease in sensation, and it was ascending in nature (.) it started off on her bilateral foot and within seven days it spread up to the T4 level, (.)”

“um actually and uh also for one part of the history he *didn’t volunteer* himself I *found from the case notes* in um May 07 actually he was admitted with uh left foot cellulitis and was given some antibiotics and *tha that case mentioned* that um he was known to have poor foot care”

In the next example, the tutor reformulates and repeats the student’s previous turn:

“I see so do you want to withdraw that *whatever you said just now about the fact that you thought it was unusual the fact that it was unself-limiting* (0.2) yeh yeh *I thought that it was um your argument* was uh do you agree do you agree that her argument (.) sounds (.) reasonable?”

And in the final example, a student participant contrasts the patient’s symptoms with what is or is not “normal”:

*“um I would say the gait was uh no not normal uh the patient was having a hemiplegic gait affecting her right side of the ~leg causing uh causing some circum circum circum gait”*

#### **4.9 Summary**

In this chapter I have outlined the background context and setting of the study and have described the participants, ethical considerations and the data collection process. Finally, I have outlined the analytical framework used in this study, i.e., activity analysis, attempting to justify my preference for a more empirical, data-driven mapping of tutorial participation. The first example of my application of this form of mapping is seen in the next chapter (5), which focuses on a prototypical PBL tutorial.

In the analytic chapters that follow, I make use of activity analysis incorporating theme-oriented discourse analysis. In particular, I carry out a structural interactional and thematic mapping to identify key phases and patterns in the tutorials, number and type of turns and focal and analytic themes.

## **Chapter 5: An Overview of a PBL Tutorial as an Activity Type**

### **5.1 Introduction**

This, the first of four data-analytic chapters, gives an overview of a complete tutorial in order to illustrate and begin to apply the activity analysis approach. Drawing on Levinson's (1992[1979]) notion of activity type, the activity analysis approach developed by Sarangi (2005; 2011) comprises the tripartite structural, interactional and thematic mapping.

As an activity type the PBL tutorial may include a number of case presentations and these in turn may contain the expected sequence of a number of homogeneous entities or phases as described in Chapter 2 (Section 2.5.1): the typical sequence begins with the patient's personal details, followed by the presenting or chief complaint, the onset and description of symptoms, past medical history, family history, social history, physical examination, results of investigations or tests, diagnosis and treatment. With regard to participation the tutorial foregrounds several constraints and a number of activity-specific roles.

As mentioned in the Introduction (Chapter 1), the broad questions this thesis attempts to answer are: how medical students and their tutors display expertise in clinical PBL tutorials, and how participation structures mediate the display and negotiation of that expertise (inclusive of uncertainty). In this chapter, I target the first of my specific research questions: How is the PBL tutorial activity structured in terms of participation and role positioning, i.e., how do speakers position themselves and shift

their positions and roles along the trajectory of the tutorial encounter?

In order to attempt to answer these research questions I adopted the activity analysis approach and mapped the data in terms of structure, interaction and theme. I illustrate this approach through examples from a prototypical tutorial in which the dominant discourse form is question and answer sequences (Heritage, 2010). The place of questioning in educational discourse has been discussed in Chapter 3 (Section 3.5.1).

## **5.2 Mapping a PBL tutorial for this study**

All the tutorials in this study (except one) share a key focus on patients' case histories and subsequent discussion of these and the goal of the tutorial is to reach and give an explanation for a diagnosis. The tutorial session that is the focus of the mapping in this chapter (See Volume II Appendices Transcriptions Tutorial 1) was selected for two reasons: firstly, discussion of the two patient histories in the tutorial exemplified contrasting participation frameworks through student-student interaction and tutor-student interaction (discussed further in Chapters 6, 7 and 8). Secondly, the session chosen illustrated structural, interactional and thematic features which are common in the dataset.

This tutorial took place in one of the teaching hospitals in Hong Kong. Eight final year students and a visiting student were present as well as the tutor and researcher. The tutor and students sat around a table and the researcher sat next to the camera. Four of the students were male; four were female and one of these was a visiting student from Germany. The researcher was only able to record the first fifty minutes of this tutorial due to teaching commitments. However, the tutorial activity in this location ended at this time, as the students returned to the ward with the tutor to re-examine the patient who was the subject of the second case history. Two students,

Ron and Fay, were given dual roles of presenter and chair (as discussed in Chapter 3). How they managed the demands of these roles in the context of the discussion is discussed in Chapter 6.

This tutorial was composed of two parts and one case was discussed in each part. The first is the case of a young man suffering weakness and headache (Case 1), and the second is the case of an older man who seemed to have suffered a stroke (Case 2). I first present the analysis of Case 1 and then Case 2, rather than the tutorial as a whole. Case 1 is presented by Ron, and Case 2 by Fay.

### 5.2.1 Structural mapping

The structural analysis we see in Tables 3 and 4 below show the classic phases of a case presentation: symptoms, physical examinations/investigations, diagnostic reasoning, treatment/management. Other categories such as Orientation and Learning Issues relate to talk about tutorial procedure or PBL task objectives.

**Table 3: Structural mapping, Tutorial 1 Case 1: Ron's presentation**

Turn nos.	Structural analysis
1-8	<i>Orientation (housekeeping rules)</i>
9-13	Symptoms
14-18	Diagnostic reasoning
19-31	Symptoms
32-37	Diagnostic reasoning
38-99	Symptoms
100-102	Diagnostic reasoning
103-132	Symptoms
133-141	Diagnostic reasoning
142-229	Physical examination
230-302	Diagnostic reasoning
303-322	Investigations
323-	Treatment/Case Management
324-330	<i>Learning issues</i>



The above structural map (Table 3) indicates the recursive nature of the discussion and the key types of engagement: presenting a case history via the descriptions of symptoms and findings of the physical examination, and diagnostic reasoning. The structural phases are all directed towards the common goal of reaching a diagnosis and the broad structure indicates that the phases are relevant as all make a contribution to the goal of the activity (Levinson 1992[1979]). As shown in Table 3, the sequence may include presenting test results (Investigations) or a review of learning issues and it does not always follow a neat pattern.

The structural mapping of the second case history in this tutorial session is quite different, showing the absence of the neat pattern seen in Table 3.

**Table 4: Structural mapping, Tutorial 1 Case 2: Fay's presentation**

Turn nos.	Structural analysis
359-365	Symptoms
365	Diagnosis
366-377	Management
378-490	Symptoms
491-716	Physical examination
717-739	Management
740-788	Diagnostic reasoning

In Ron's presentation (Case 1), we saw frequent alternation between presenting and discussing the symptoms of the case, followed by the results of the physical examination (including investigations) and diagnostic reasoning. The structural mapping of Fay's presentation (Case 2) lacks that systematic trajectory. Where the structure of Ron's presentation satisfies default expectations of the phases of a case presentation (Erickson, 1999), the anomaly at this structural level is indicative of

differential interactional trajectories – something that becomes apparent during the interactional mapping.

It is to be expected, from the above structure, that within these broad phases there are likely to be, as Levinson (1992[1979]) suggested, pre-structured sequences or sub-phases which “may be required by convention”. To investigate this further, and to help tease out the direction taken by Fay’s presentation, I mapped the sub-phases of the first part of each presenting phase in which the presenter begins with a long turn in presentation mode. A breakdown of the first structural phase of Ron’s presentation of symptoms, beginning at turn 9 in Example 1 below, shows sub-phases typical of case history reports with their accompanying constraints on what may be mentioned (Anspach, 1988; Erickson, 1999). Ron begins the first case history at Turn 9 with the patient’s name, age, and elements of the social history (non-smoker, non-drinker) before describing the chief complaints, their symptoms and chronology:

**Table 5 Sub-phases of symptoms presentation: Tutorial 1, Case 1**

<b>Presenter: Ron (Turn 9) Phase – Presentation of symptoms</b>	<b>Sub-phases</b>
[looking at notes] my patient um Lam Siu An is um a thirty-five year old man	Personal details
an ex-smoker and non-drinker and worked as a driver	Social history
he had a good past health	Past medical history
and complained of a three day history of right sided headache, and sudden onset of left sided weakness (.)	Presenting problems
uh: for the headache the onset was three days ago,	Onset of symptoms
right sided, it was a constant pain, he consulted the uh: uh the outpatient department of Princess Alexandra Hospital, and diagnosis was made to be a cluster headache together with the eye pain um and uh lachrymation uh: rhinorrhea (.) and the headache, uh but the headache persisted uh after the treatment and uh: together with a:: a:: blurring of vision on the right side,	Chronology of symptoms
it was not accompanied by vomiting, there was no diurnal variation of the headache, it was not preceded by any aura, there was no pre dromal or post dromal symptoms, and there was no clear precipitating or relieving factors	Negative symptoms

The sequence of sub-phases departs somewhat from the classic sequence of presentation (Erickson, 1999) by bringing forward the patient's past history and social history. The sequence begins with the patient's personal details, some of which might also be regarded as fitting into the category of social history, moving on to the history of the patient's problem. The onset of the problems, chronology and symptoms are presented after the personal details of the patient and before the review of the bodily systems and physical examination findings.

Although Fay's presentation (Tutorial 1 Case 2) similarly features pre-structured phases of the history report, the structure of the sub-phases contrasts sharply with the structure of Ron's presentation – an analytic insight directly resulting from the comparative structural mapping.

**Table 6: Sub-phases of symptoms presentation, Tutorial 1 Case 2**

Turn	Speaker		Sub-phases
359	Fay	so our patient is Mr Yeung a forty-nine year old gentleman	Personal details
		working as a security guard, a chronic smoker non-drinker,	Social history
		presented one month ago with a sudden onset of left sided weakness and slurring of speech while gambling uh playing cards	Presenting problem, Onset of symptoms
		so for history of uh presenting illness uh: patient was found to have hypertension, and uh diabetes two years ago, uh but he def defaulted follow up and he did not on uh was not on any medication (.) patient had a history of nocturia for uh usually two times uh a night uh polydipsia, polyuria, weight loss of fifteen pounds over the last two years despite good appetite / there's also (.) urine and haematuria which may point to the fact that the diabetes is not well-controlled,	Past medical history
		uh so uh the before admission the patient uh has bilateral ankle oedema (to the shins)	Symptoms
		there was no shortness of breath no orthopnoea and no uh paroxysmal nocturnal dyspnoea /	Negative Symptoms
		patient uh: presented with left sided weakness and slurring of speech and was brought uh to the A and E by ambulance and	Presenting problems
		patient denied uh denied any loss of consciousness nor had trauma before the uh incident (.)	Negative symptoms
360	Tutor	uh in a CT a CT scan uh a CT brain in the A and E was found uh the patient has a hemorrhagic stroke of the right side (.) for part 1	Diagnosis
		] so we lost the joy of making a diagnosis	<i>Orientation</i>
361	Fay	oh sorry oops (.) so: yep (.) {laughing} shall I continue {laughing} the presentation?	
362	Tutor	mm mm	

Fay moves from the presenting problem and its onset to the past medical history and then returns to the presenting problem and chronology, ending this phase with the diagnosis. The revelation of the diagnosis at the end of this turn is marked by the tutor's remonstrance "so we lost the joy of making a diagnosis" in turn 360. Here we

see the effect when an activity-specific constraint in the PBL tutorial setting, with its goals of diagnostic discussion and reasoning based on the case history alone, is ruptured. This incident indicates that one of the goals of the tutorial, and the participants' enjoyment of, and learning from, the ensuing discussion, has been spoilt by Fay's revelation. Departures from the classic structure are discussed in Chapter 6 on case presenting and this particular incident is discussed further in Chapter 8 in connection with the tutor's role in the management of the activity-type.

Structurally speaking, as these examples show, activity types are not rigid entities: the structural mapping can only offer limited analytical insights (Sarangi, 2010b). While elements of the pre-structured sequence can be seen in Fay's presentation – the onset of the presenting problems, symptoms – the constituent elements are more dispersed. In Example 2, in subsequent turns, Fay's presentation of symptoms and physical examination findings resumed until, towards the end to the tutorial, case management became the focus and the group and the tutor returned to the patient's bedside to re-take the history, perhaps reflecting the presenter's difficulties with the presentation.

The analysis set out above shows that the structural phases may not always occur in sequence: they may be dispersed and returned to in later stages of the tutorial. Table 3 showed that the diagnostic reasoning phases interrupted the symptoms and physical examination talk in a recursive cycle. The cycle of presentation of symptoms and diagnostic discussion continued until replaced by a cycle of physical examination and diagnostic discussion. The second presentation (Table 4) is strikingly different: it does not display the same pattern of recursiveness and the diagnosis was not preceded by several discussion phases as in the first (Table 3).

I have shown in this section how the structural map provides an indication of the main discursual activities within the tutorial and given examples to illustrate the three key phases: symptom presentation, presentation of physical examination findings and diagnostic discussion. The dispersed nature of the sub-phases has been shown as well as a recursive structural cycle. In contrast, the second presentation in this tutorial was marked by a lack of orderliness suggesting some confusion on the part of the presenter. While these examples may not be generalisable, the mapping outcome is similar to that of other case history presentations in the dataset and further examples are analyzed in Chapter 6. I have shown how the structure can indicate the range of activities within the activity type and the consequent shared expectations of the activity and its normative, preferred sequence. I have also indicated that the structural sub-phases may be linguistically marked, a level of analysis I commence in the next chapter (6), when I look in depth at how presenters display expertise and uncertainty when presenting the case history.

### **5.2.2 Interactional mapping**

The structural mapping has provided a picture of the key phases in the activity type of the PBL tutorial. In order to suggest reasons for the differences between the two structural mappings, as Sarangi (2010b) suggested, it is desirable to map the tutorial encounter interactionally and thematically. An interactional map can indicate how the discussion is managed interactionally in terms of participation framework, relationality, turn-taking and the distribution of turns.

In what follows, I map the interaction in terms of number and volume of turns to give an overview of who participates most in tutorial talk. While this stage of the mapping process can give an approximate indication of the amount of participation and key

discoursal features (in transcribing the tutorial talk, a turn was defined as a speaker's utterance until another speaker took the floor or uttered a response simultaneously with the turn-taker's utterance, so turn might simply consist of minimal responses), it cannot reveal the concerns which motivate the discoursal progression. It is, nevertheless, valuable as indicative of participation structures. The Figures that follow provide an indication of the number of turns taken by participants in each part of the tutorial (Cases 1 and 2), enabling comparisons to be made between them. I begin however by looking at overall participation in the entire tutorial. Figure 1 below represents participation across the whole tutorial in terms of the number of turns.

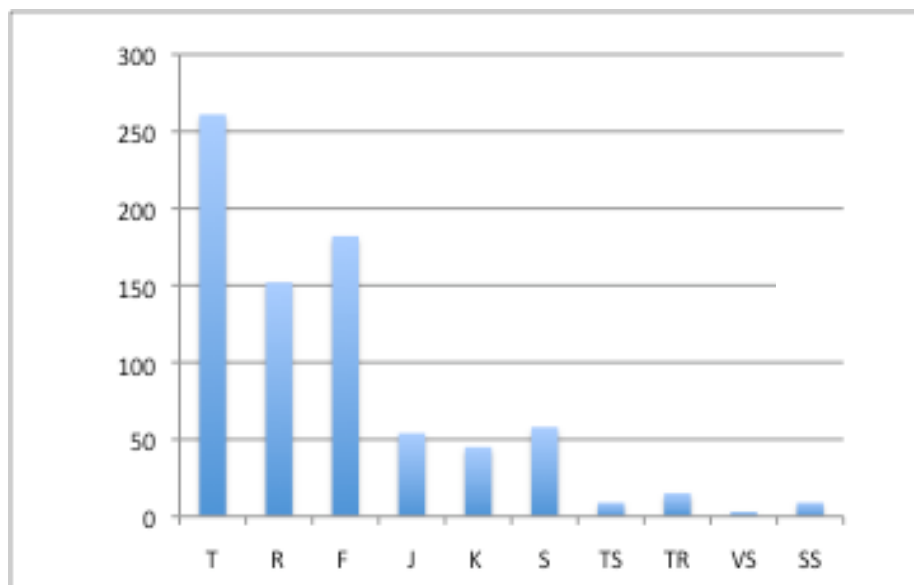


Figure 1: Total distribution of turns, Tutorial 1

Key: The vertical axis represents the number of turns

Horizontal axis initials: T= Tutor, R= Ron, F= Fay, J= Jan, K= Keith, S= Sue, TR= Trudy, TS= Tracy, VS= Visiting Student, SS= Several students together

Figure 2 below shows the number of turns taken by participants during the presentation and discussion of the first case history (Ron).

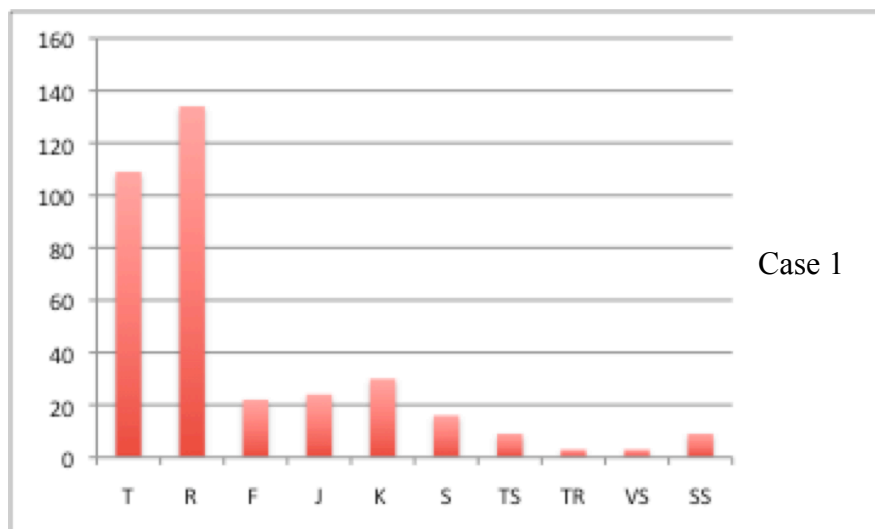


Figure 2: Distribution of turns, Tutorial 1, Case 1

The tutor, with over 250 turns out of 788, appears interactionally dominant. The student participants, Ron and Fay, have a total of more turns, with Ron's totaling more than 150 and Fay's 175, than all the other students combined. Of the total of other students' turns (almost 250), Jan, Sue and Keith have around 50 turns each.

Figure 1 indicates that the presenter, Ron, dominated the first part of the tutorial in his dual roles of presenter and chair, not unpredictably since this was the presenting phase of the activity. This is an indication of the link between the structural and interactional mapping where the relevant phase and sub-phase are matched by changes in the participant framework through shifts in role and topic. Of the remaining student participants, Jan and Keith appear, through their number of turns (25 and 35 respectively), to have made significant contributions. However, closer analysis reveals the caution one should take when interpreting the number of turns. On coding the turns, it emerged that while Keith's 25 turns consisted almost entirely



of questions for clarification, Jan's 35 turns, which included clinical reasoning statements and questions, played a significant role in moving forward the diagnostic discussion – something which emerges clearly during the thematic mapping.

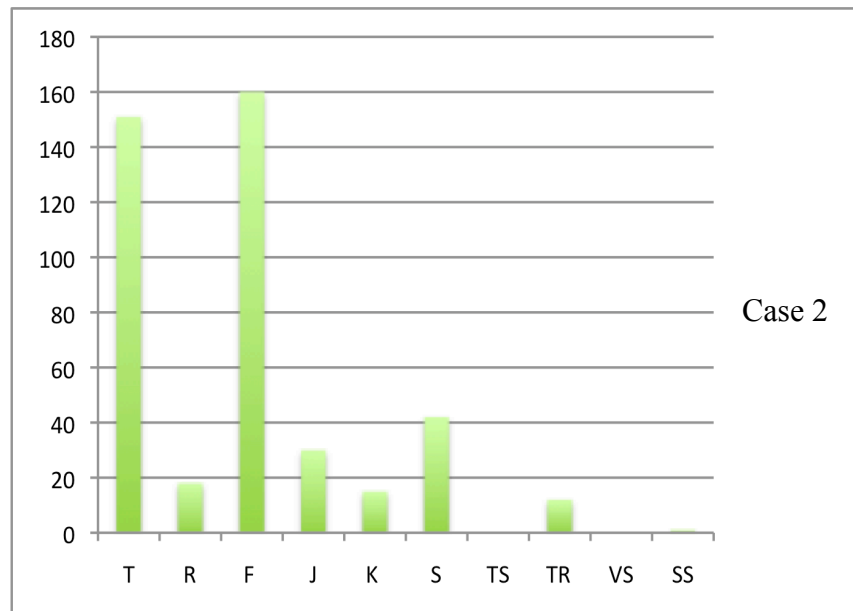


Figure 3 Section 2 Turns

In the second case history presentation phase of this tutorial, the chair and presenter of the history, Fay, had most turns of the student participants (Figure 3). Again, this is understandable given her dual roles in the activity. Figure 3 shows that the majority of turns are shared between the tutor and Fay (150 and 160 turns respectively). The participants taking up the roles of chair and presenter, Fay and Ron, in both sections not only take up more turns than the other participants apart from the tutor, but, as Figure 4 shows, their turns make up the largest volume in the tutorial as a whole, an indication of the importance of the roles which participants take up in the tutorial.

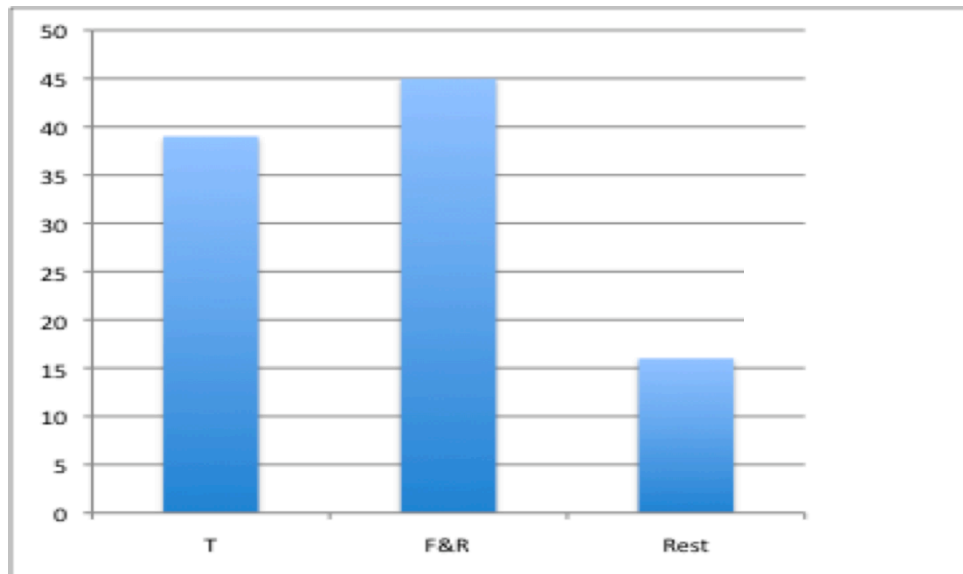


Figure 4: Turns by volume, Tutorial 1 Cases 1 and 2

(T = Tutor; F and R = Fay and Ron, Presenters; Rest = Other participants)

Figure 4 shows the three dominant forces: the tutor, the presenting students, and the other participants. Chapters 6, 7 and 8 focus on each of these three participant types in turn to examine the participation structure and dominant themes in this and other tutorials.

The structural mapping indicates that the turns are taken by three “parties”: the tutor, the presenters, and the remaining students.<sup>4</sup> The volume of turns, i.e. the number of words uttered by each of the three parties, gives a broad indication of who speaks most. While there isn’t necessarily a correlation between turns and volume, these figures appear to indicate that not only do the tutor and presenters take more turns, but that the volume of their turns is also largest. Figure 4 shows the volume of turns and we see that the two presenters over the course of each half of the tutorial have the

<sup>4</sup> One result omitted from the figures is the collective response when a number of students answer a question more or less simultaneously. There were nine instances of this in this tutorial; it was impossible to ascertain from the recording who spoke, or, who, if anyone, remained silent in these instances.

largest volume in terms of words uttered, with the tutor having approximately 40% and the rest of the student participants approximately 15%. As mentioned earlier, this is merely a rough indication as the figures include turns that included or were entirely made up of backchanelling and minimal responses. The structural mapping and the interactional mapping contribute to the thematic mapping through the constraints – and affordances – of the key structural phases, sub-phases and discoursal and rhetorical devices (Chapter 4, Section 4.8.2). The most prominent discoursal device emerging from the interactional mapping is question and answer sequences: I first outline the importance of these sequences in the data by a simple question count and offer a preliminary analysis of coding of questions before carrying out the thematic mapping.

When the data were examined for types of turns in the turn-taking sequence, what was most noticeable was the number of questions (Figure 5). While case presentations tend to begin with a long turn in presentation mode, as in Example 3 above, the subsequent interaction in the diagnostic discussion phase takes the form of question and answer sequences. It is noteworthy that during discussion of the first case (Ron), the questions are asked mainly by student participants while, during discussion of the second case (Fay), the tutor, mainly but not exclusively, asks questions of the presenter (discussed in more detail in Section 4.2.4: refer to Figure 8).

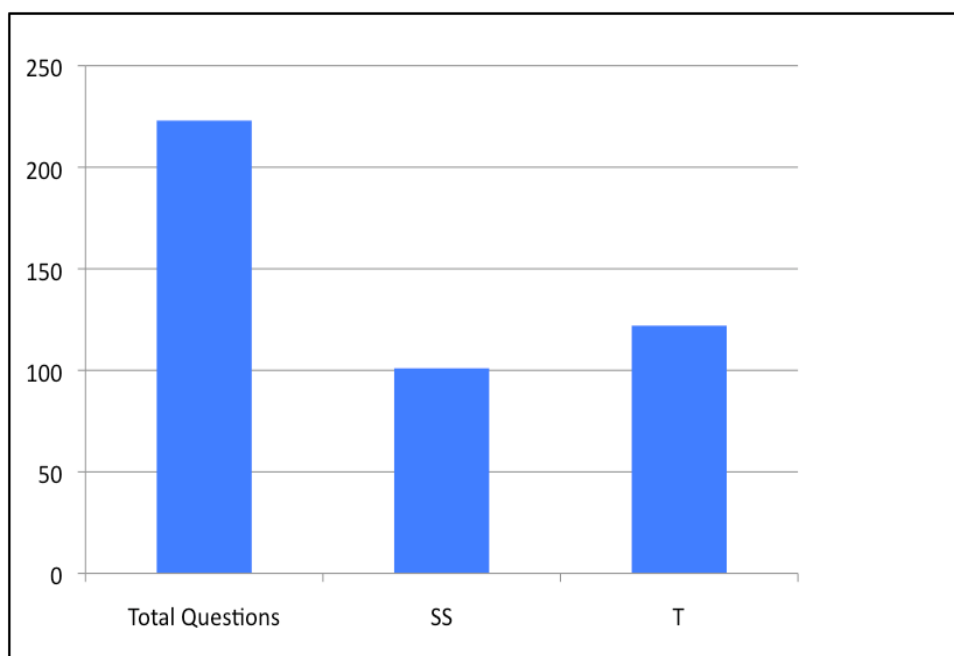


Figure 5: Total Questions, Tutorial 1, Cases 1 and 2

Key: SS = Students; T = Tutor

Question and answer sequences are distributed throughout the two sections (Ron and Fay) of the tutorial, following the longer turns by the presenters of the histories at the beginning of each case presentation. Possible reasons are discussed below.

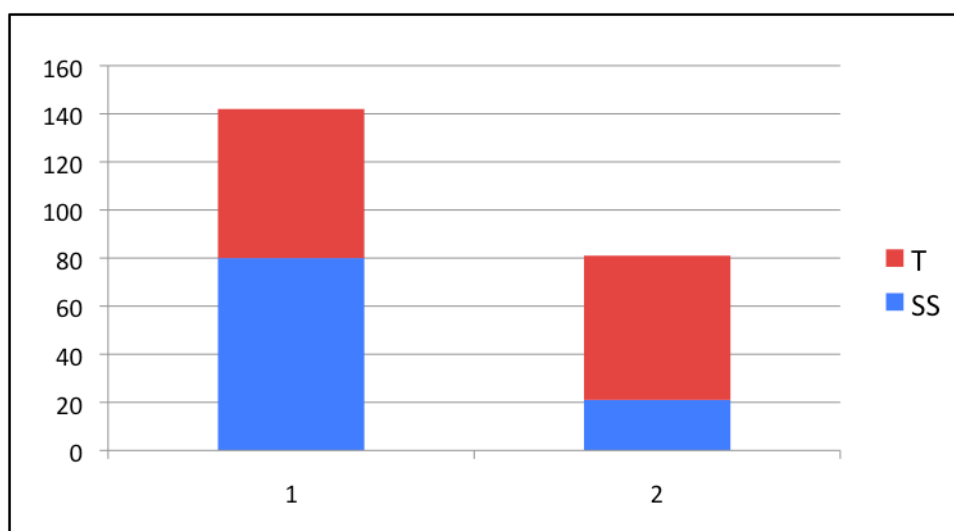


Figure 6: Types of questions, Tutorial 1

Key: 1 = Closed questions (yes/no, alternative, abbreviated yes/ no questions)  
 2 = Open questions (wh- questions)

Figure 6 provides an indication of the types of questions asked by participants in Tutorial 1 (Cases 1 and 2 combined). The Figure shows that the Tutor asked approximately the same number of open and closed questions in the course of the tutorial while the students asked predominantly closed yes/no questions. This difference may be explained in two ways: firstly, it may be hypothesised that student questions are abbreviated and seek confirmation with little elaboration expected as students share considerable amounts of knowledge. As tutor questions often aim to solicit elaborated responses, wh- questions are more searching and may also be used to test knowledge. To look at the interaction and the questions in particular we turn to thematic mapping.

### **5.2.3 Thematic mapping**

Thematic mapping considers the propositional and procedural content of the turns taken by participants in an encounter and identifies recurrent themes in the activity type, referred to as focal themes. It also reveals how these themes emerge through the types of turns and the manner in which they are expressed, that is, discursively. The latter are referred to as analytic themes (Roberts & Sarangi 2005; Sarangi 2010a). Focal themes may be distinguished on two levels. They may be explicitly discussed as in talk about risk in genetic counselling encounters or implicitly indicated as in the theme of misunderstandings in intercultural communication (Roberts & Sarangi 2005).

The example below is an illustration of the thematic mapping of a section of Tutorial 1 Case 1. The sequence takes place after Ron has begun to present the findings of the physical examination in Case 1 and is an example of a question and answer sequence in this sub-phase. It shows how the key themes of expertise and uncertainty emerge

through the display of substantive knowledge, the use of specialised terms, and the strategic deployment of discursive devices as indicated in the right-hand column.

**Table 7: Thematic mapping, Tutorial 1 Case 1**

Turn	Speaker	Interaction	Display of expertise
108	Visit'g St.	and how about the reflex?	Order of discussion (Exp)
109	Ron	uh reflex was:	
110	Tutor	] can we can we concentrate on the history first? OK and then we can focus on the physical examination (.)	
111	Keith	uhuh (when) the patient (complained of) the lower motor neurone facial palsy like it suddenly progressed to being complete or,	
112	Jan	] no it just	
113	Trudy	] it was a long time	
114	Ron	] it was a few years ago that our patient had lower motor neurone facial palsy	
115	Keith	] (.)	
116	Ron	with a residual weakness but no recovery during these few years	
117	Fay	was any diagnosis made in that time or was he told to be like (.) (.)	
118	Ron	{looking at notes and shaking head}	Questions (reduce uncertainty)
119	Keith	but the patient said it's now complete?	
120	Ron	(.) the patient is still in complete	
121	Fay	] (.) facial palsy	
122	Ron	(in complete) facial palsy now (.)	
123	Tutor	so any speech problem, any,	
124	Ron	] no dysarthria (.) no dys uh dysphasia (.)	
125	Tutor	any swallowing problem:? (.)	
126	Ron	I asked him whether he choked on food or drinks and he said he did not / (.)	
127	Tutor	so the patient remained: conscious all along?	Tutor modelling relevant questions (Exp.)
128	Ron	yes yes there was no episode of loss of consciousness no head injury:	
129	Tutor	mm how about the vision:?	
130	Ron	our patient complained a blurring of vision on the right side together with the onset of headache but the left sided vision was normal /	
131	Tutor	mm mm no double vision?	
132	Ron	no (.)	
			Ron case presenting (Exp.)

133	Tutor	] no so can we localise the lesion based on the history?	Sue's responses (Exp) technical terms and hedged diagnosis – Evaluating evidence hypothesizing, applying knowledge (Exp.) Diagnostic reasoning : (Exp.) expertise  Evaluating evidence (Exp.)  Presenting the physical examination findings (Exp.)
134	Sue	this patient presented with um (^^^) weakness of: uh left hemiparalysis and hemiparesis and without any cranial nerve deficits (.) from the history (.) so we would think that the lesions would be above the brain stem /	
135	Tutor	mm mm that's fair enough mm mm (.) can it could it be a spinal cord problem?	
136	Sue	mm: if it is the spinal cord problem at least it should be at the cervical region that it would affects both upper limb and lower limb {ac} but then uh it should be uh both side um would be weak instead of hemipares hemiparalysis (.)	
137	Tutor	mm mm	
138	Ron	and the sensory loss and the motor loss is on the same side (.) of the:	
139	Tutor	] (.) yes that's right yes	
140	Ron	]so it's suggested that the lesion should be uh above the uh brain stem	
141	Tutor	mm mm (.) OK (.) so any other relevant findings?	
142	Ron	so on physical examination um I noticed that the patient {hi} had uh a complete lower motor neurone facial nerve palsy, as a result of the few years ago onset with a residual weakness (.) and: there was no pallor, no clubbing,	

Key: Exp. = Expertise

Throughout this extract there is evidence of displays of both expertise and uncertainty within clinical and pedagogic frames: professional and educational. The display of substantive knowledge, the evaluation and assessment of evidence are seen in this example as well as the use of specialised terms, and the strategic deployment of discursive devices that in this context may convey communicative expertise in both clinical and educational frames. I elaborate these points with a brief analysis and examples below.

The first turn in Table 7 (Turn 108) shows the visiting student ask a question regarding the physical examination findings: the tutor in Turn 110 reminds her that the discussion on the symptoms should be completed before going on to the physical examination results - “can we concentrate on the history first? OK and then we can focus on the physical examination”. This reinforces the message that even though this is a PBL tutorial, all evidence, that is all findings from each part of the history should be presented fully, before moving on to the next stage. Keith’s question in Turn 111 frames the interaction clinically as he asks a question about whether the facial palsy experienced by the patient had been complete or incomplete. This is followed up by student responses in the following three turns (112-115), an indication that in the clinical frame in the PBL setting, any participant may contribute. The tutor’s questions in Turns 123, 125, 127, and 129 are abbreviated, for example “any speech problem”, and the Tutor here appears to be asking genuine questions, rather than checking knowledge, and Ron gives equally short answers “no dysarthria, no dys uh no dysphasia” (Turn 124). At the same time he may be said to be modelling relevant questions. However, when Ron responds in Turn 126 to the Tutor’s question “any swallowing problem:?” he gives a fuller response “I asked him whether he choked on food or drinks and he said he did not”. While the reported speech may be said to be a distancing device (Lingard, 2003), the use of “I asked him..” also serves to let the Tutor know that Ron had not omitted this question in the interview, and thus to remind the Tutor of Ron’s expertise in interviewing the patient.

The participant questions in this first section show students and Tutor trying to reduce their diagnostic uncertainty at this stage, and as such are an indicator of expertise in seeking the right kind of information that will help them to narrow down the possibilities. Sue volunteers the first diagnostic hypothesis in Turns 134, “this patient



presented with um (^^^) weakness of: uh *left hemiparalysis* and *hemiparesis* and without any *cranial nerve deficits* (.) from the history (.) so we *would think* that the lesions *would be* above the brain stem”, and 136, “if it is the spinal cord problem at least it should be at the *cervical region* that it would affects both *upper limb* and *lower limb* {ac} but then uh it should be uh both side um would be weak instead of hemipares *hemiparalysis* (.)” Her hypotheses are couched in technical language and appropriately hedged, indicators of professional expertise (Atkinson, 1995). In Turns 138 and 140, in response to the Tutor’s suggestion of another possibility, Ron supports and builds on Sue’s evaluation adding evidence in favour of discarding one hypothesis “and the sensory loss and the motor loss is on the same side (.) of the:” and finally supporting Sue’s original diagnostic suggestion with his conclusion: “so it’s *suggested* that the lesion *should be* uh above the uh brain stem”. In this short sequence we see the two students constructing their reasoning together, displaying diagnostic hypothesising, weighing up evidence and withholding complete commitment to the diagnosis in expert fashion. The Tutor’s response in Turn 141 “mm mm OK” appears to indicate agreement and, finally, a move to the next stage in the case history sequence, the physical examination findings.

If we look once again at the structural mapping of this tutorial in Tables 3 and 4 (copied here for ease of reference) and the two cases that are presented, despite differences in their structure and interactional pattern, we can see basic similarities.

**Table 3: Structural mapping, Tutorial 1 Case 1: Ron’s presentation**

Turn nos.	Structural analysis
1-8	<i>Orientation (housekeeping rules)</i>
9-13	Symptoms
14-18	Diagnostic reasoning
19-31	Symptoms

32-37	Diagnostic reasoning
38-99	Symptoms
100-102	Diagnostic reasoning
103-132	Symptoms
133-141	Diagnostic reasoning
142-229	Physical examination
230-302	Diagnostic reasoning
303-322	Investigations
323-	Treatment/Case Management
324-330	<i>Learning issues</i>

and

**Table 4 Structural Mapping, Tutorial 1 Case 2: Fay's presentation**

Turn nos.	Structural analysis
359-365	Symptoms
365	Diagnosis
366-377	Management
378-490	Symptoms
491-716	Physical examination
717-739	Management
740-788	Diagnostic reasoning

What these presentations share in structural terms is that the dominant activities are the presenting of a case history, including the physical examination report, and diagnostic discussion. To a certain extent this mirrors the medical consultation sequence of patient interview, physical examination, and diagnosis and in particular the case presentation sequences described by Anspach (1988), Erickson (1999) and Atkinson (1999). These participants clearly see the case history as the prime source of diagnostic information, as indicated by the Tutor's opening remark in the sequence above "can we concentrate on the history first", supporting the view of the case history as a "foundational" diagnostic tool (Boyd and Heritage, 2006).

In interactional terms, the dominant theme is question and answer sequences, between the student participants and the case presenter, and between the tutor and presenter or

the tutor and other participants. The number of questions asked by the tutor indicates that the tutor is an active participant and uses questions to control the activity and manage the content.

Through thematic mapping, two frames are evident: clinical and professional, and educational or pedagogic. In the professional frame, the tutorial affords opportunities for the display of expertise in the sub-phases of the tutorial, particularly in the case presentation and diagnostic discussion phases. In the educational frame, the case presenting is a communicative activity that is being evaluated, particularly by the tutor, and the presenter's goal is to carry this off in an expert, professional way. This goal and the underlying theme of expertise emerge through the case presenting, the asking of appropriate questions by tutor and students, the explanation for differential diagnosis, and its expression in professional terms. As the activity is also rooted in PBL, although of course this may happen in other settings too, the formal presentation can be interrupted by questioning, and the ability to answer these questions appropriately is also part of the display of expertise. Uncertainty emerges in the sense of trying to fill in gaps in knowledge on the one hand, and, in evaluation of hypotheses on the other, but also as an expert way of asking the right questions to get the answers that help build the right diagnosis.

#### **5.2.4 The role of questions**

The role of question and answer sequences is crucial in affording opportunities for participants to negotiate and display their expertise within different phases of the activity while taking up a range of activity roles and discourse roles, and to reduce their uncertainty in terms of knowledge gaps and evaluations of knowledge. In this section I look at the number of questions overall in the tutorial (Figure 7), the

distribution of questions between Cases 1 and 2 (Figure 8) and the types of questions asked, looking again at Figure 6 (from Section 5.2.2).

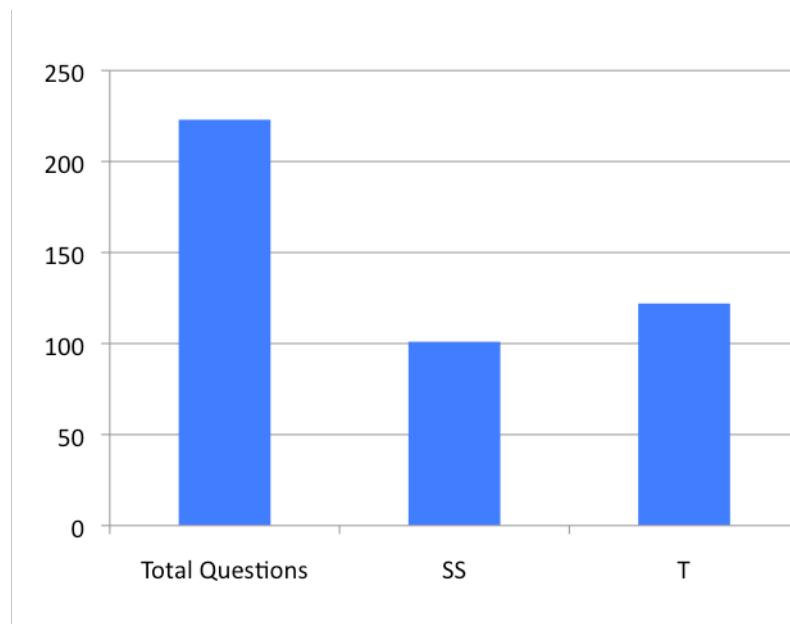


Figure 7: Total questions, with Student-Tutor distribution, Tutorial 1

Figure 7 shows that the tutor asked more than half the questions in this tutorial while the student participants asked approximately 45% (Cases 1 and 2 combined). This predictable finding can be looked at more closely to see how the questions are distributed between the two case discussions and what kinds of questions are asked.

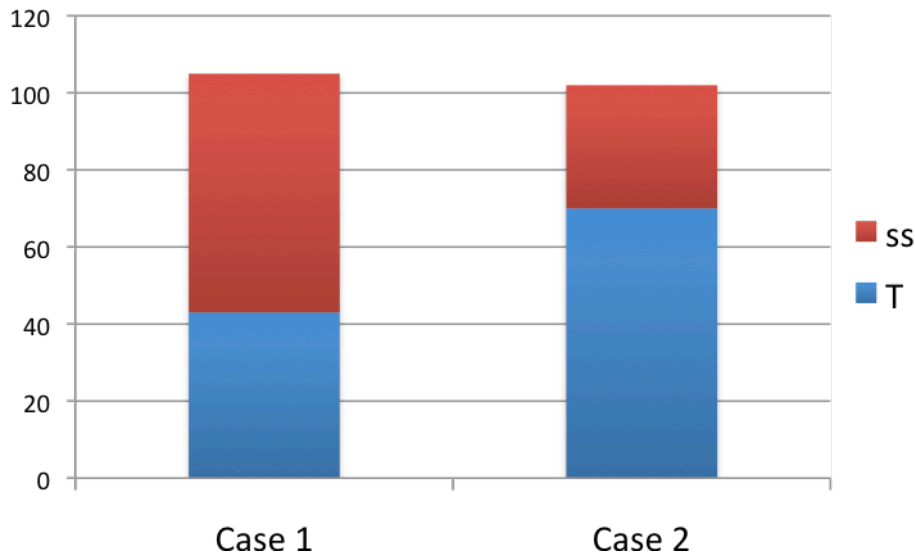


Figure 8: Questions, Tutorial 1, Case 1 and Case 2

The results in Figure 8 show that the distribution of questions in each of the cases was remarkably different. In Case 1 the student participants asked approximately 60% of the questions and the Tutor 40%, while in Case 2 the proportions were reversed with student participants asking 30% of the questions and the Tutor 70%. This difference may be accounted for by the different participation framework in the first case where we saw from the interactional mapping that students took more turns and Ron took up the roles of Chair and presenter while the Tutor intervened as teacher and as collaborative participant. The second case proved problematic as described in Section 5.2.1 with the mapping showing that the diagnosis was prematurely revealed. This early revelation thus removed the need to ask questions to arrive at a diagnosis. If we look again at the table showing the question types, we see further differences between the participants.

Returning to Figure 6 in Section 5.2.2, the number of yes-no questions and the number of open WH-questions asked by students and tutor in the tutorial was indicated. It showed that tutor and student participants asked 60% and 40% of closed

yes-no questions respectively, but 80% and 20% respectively of open wh-questions. One possible reason for the noticeably low number of open questions and high number of closed questions is that the closed questions were often abbreviated, as in “any choking?” indicating a high degree of shared knowledge similar to Labov and Fanshel’s (1977) notion of A/B events in which A events are known to the speaker, B events to the addressee and A/B events to both. When a party assumes that the other party shares the same knowledge, that is an A/B event, there is no need to elaborate.

I also developed a functional typology of questions building on Stivers and Enfield (2010), combining the categories of confirmation and agreement and introducing other categories as they emerged and were appropriate to the activity type. The categories were questions which asked for:

- factual information / information seeking
- clarification
- knowledge display
- confirmation/ agreement/ consensus
- opinion
- action

Questions asking for factual information or information-seeking questions included questions regarding symptoms, risk factors, causal relationships, severity, chronology and procedures. Questions for clarification referred to questions that sought to check factual information previously offered. Knowledge display questions were those that asked for the addressee(s) to display clinical or scientific knowledge. Questions that asked for consensus, agreement or confirmation, asked for agreement with a stated point of view as opposed to the next category of questions that asked for an opinion or evaluation of a proposition. The questions in the category of action were those that made a request that some verbal or physical event take place.

As we shall see in Chapter 8, the tutor uses both closed (yes/no interrogatives) and open questions including “known answer” questions (Chapter 3) to prompt displays of knowledge or to check or test students’ knowledge. While such questions may be said to afford opportunities for the display of knowledge and expertise as elaborated responses appeared to be preferred, in the data these questions often prompted brief responses, and in turn this prompted a follow-up question similar to the IRF sequence (Chapter 3). Example 5 in Section 5.2.3 also shows that a closed question such as the Tutor’s “so can we localise the lesion based on the history?” can prompt an extended answer as seen in Sue’s response: “this patient presented with um (^^) weakness of: uh left hemiparalysis and hemiparesis and without any cranial nerve deficits (.) from the history (.) so we would think that the lesions would be above the brain stem”.

There are examples of both open and closed information-seeking questions with their answers “unknown” to the questioner, but they could still be seen to have a pedagogic function in modelling the kinds of questions that should be asked and the kinds of information that are necessary. One challenge for the students is to discern when the function of the tutor’s question is pedagogical and testing, and when it is merely seeking to fill in missing information in the case history. This challenge may be seen in examples later in Chapter 7 where students respond inappropriately resulting in tutor reformulation or clarification.

Where the activity is shaped to the tutor’s agenda of checking knowledge and competence, questions demand a display of knowledge as well as interactional expertise. Questions are thus crucial in advancing the tutorial agenda whether it is a clinical one of explicating the diagnostic process, or pedagogic one in the collaborative construction/display of knowledge.

### 5.3 Summary

In this chapter I have carried out structural, interactional and thematic mapping of key sections of Tutorial 1, bringing out the structural phases and sub-phases of the PBL tutorial activity. I have shown two contrasting examples in Tutorial 1 of case presenting by Ron and Fay, and through the structural mapping have shown the key phases of the tutorial activity: case history presentation, and diagnostic reasoning which emerge as key focal themes while question-answer sequences emerge as the dominant analytic theme. The interactional mapping showed that, in terms of participation framework and role positioning, the presenters took the greatest number of turns in the activity, while the tutor also played a significant role, highlighting the relevance of roles in the tutorial setting. The remaining students participated to varying degrees in the question-answer sequences both during the history presentation phase and the diagnostic reasoning phases. The examples of structural and thematic mapping show how case presenting and diagnostic discussion or clinical reasoning are vehicles for the negotiation and display of expertise and the role of tutor expertise emerges as a third area for closer examination.

This analytic picture of a complete tutorial session forms a transition to the thematic analyses of chapters 6, 7 and 8. In these chapters I explore how the structural, interactional and thematic dimensions of the analytical framework manifest themselves in the tutorial activity. Chapter 6 focuses on how case presentation is affected by the activity type setting, that is the PBL tutorial. Chapter 7 examines how students shift between their activity roles in the question and answer sequences to reach agreement, taking into account the uncertainty inherent in questioning. The final analytic chapter, Chapter 8, examines how tutors shift between roles, notably in



question and answer sequences, and display different kinds of expertise and uncertainty.

## **Chapter 6: Case history presenting: the negotiation and management of expertise in clinical problem-based learning tutorials**

### **6.1 Introduction**

This analytic chapter focuses on case history presenting by clinical medical students and examines how case presenting is affected by being situated within the context of the clinical PBL tutorial activity – the second of my research questions. Within that context, I look at how these students negotiate and manage expertise and uncertainty, sometimes in the face of sustained questioning by the tutor (whose role is the focus of Chapter 8). As a prelude to my data analysis (in Section 6.2), I consider the findings of previous research into the case history as a professional genre and the role of the case history in medical education. I discuss the multiple settings in which presentations take place, and case presenting as a means of professional socialization, taking examples from the literature and from my own data. In Section 6.3 I then examine the case presentation as a focal theme emerging from the study data, in particular in terms of its structural and interactional dimensions.

The mapping in Chapter 5 showed that the case presentation is a key feature of these clinical PBL tutorials, where the case histories of current patients are presented to fellow students and their tutor. As set out in Chapter 2, the literature on case history presenting as a professional and educational genre has moved on from the early concern with professional socialization. It now ranges across role positioning and role sets, participation and thematic structure, affordances and constraints on interaction

imposed by relationship and institutional asymmetries, and the growing hybridity between professional and educational roles and expectations (Sarangi, 2005; 2010c).

To briefly recap the research setting, in the fourth and fifth years of the undergraduate medical curriculum at my university in Hong Kong students spend a great deal of time in hospital wards interviewing patients. In their Bedside PBL tutorials, issues arising from the patients' histories are discussed with specialist tutors. This activity differs considerably from the PBL tutorials of the pre-clinical years: in clinical bedside PBL, the "case" is a real, not a paper, case, discussion centering on the case of a patient admitted to the hospital where students are currently going through rotations. At this stage students are no longer complete novices, as they are already engaged in a degree of professional practice. In the Bedside PBL tutorials the patient is often co-present and therefore accessible, as are the notes that accompany the patient. Each week a different tutor – a clinical specialist – acts as facilitator, a contrast with the academic tutors of the pre-clinical years. All these contextual features are indicative of a trend towards embedding the educational dimension within the clinical professional context.

## **6.2 Studies on the case history as a professional genre**

This review builds on the empirical studies of professional socialisation in clinical settings and the genre of case presentations (see Chapter 2, Section 2.5). Early in their studies, medical students are expected to learn case presentations as a "routine" (Erickson, 1999: 111) or as Atkinson (1988: 149) puts it, as "ritualised formats". According to Erickson (1999: 112) the routine begins with the patient's personal details and presenting illness, that is, the problem the patient "presents" with, or chief complaint. This information is followed by what is usually a description of the

symptoms beginning with the onset of the complaint and subsequent, often chronological account describing the history, the location, duration and severity of symptoms. The next stage in the sequence is the patient's previous medical history, or other illnesses, trauma and surgery experienced previously by the patient. The final stages cover the family and social history, such as work and lifestyle issues, medication and drug allergies. The history or case presenting follows the interview with the patient. The history presenting is followed by a report of the physical examination, diagnostic tests or investigations and finally diagnosis and treatment.

The PBL case presentation in theory should follow the same pattern, although it may be subverted occasionally. Previous studies (e.g. Anspach, 1988; Hunter, 1991; Atkinson, 1999), did not consider the PBL context; so I am interested in seeing if the same sequence works and, more importantly, what role the presenter and the peer group play during case presentation in the PBL context. By undertaking the tripartite approach to analysis proposed here – structural, interactional and thematic mapping of tutorial participation – I hope to extend the understanding of the PBL tutorial as a clinical and educational activity that can make use of real cases and facilitate an evaluation of the application of PBL in the clinical context.

### **6.2.1 The case history as an expert account**

The goal of case presenting is to provide an account which – implicitly and/or explicitly – conveys the warrant for the diagnosis. The warrant derives from the information gleaned in the history taking. Therefore a constitutive element of the history taking process is the generation by the history-taker of diagnostic hypotheses, categorization and identification of the clinical problems and their underlying aetiology, and subsequently the determination of treatment. Erickson (1999) reports

that many clinicians believe that preliminary or differential diagnoses can be arrived at through the stage of history taking, before the physical examination takes place. Skill in the art and craft of history taking is therefore highly valued.

As a corollary to history taking, the presentation of the history is also valued: the presenter of the patient's history must be seen to (re)present the information provided by the patient, shaping the history to lead towards diagnosis and appropriate treatment, and taking the presentation as "a whole gestalt" to persuade superiors of the presenter's competence (Erickson, 1999: 112). This telling observation reflects the dual nature of presentations in the professional socialisation context: the presenter's concerns are not only with the clinical aspect but also with the educational aspect of how the superior will evaluate his/her performance (see Section 6.3.4 Example 10). Reflecting these concerns, Hunter (1991: 6) also viewed the case presentation as a way of "demonstrating the teller's understanding of the illness" and transforming the patient's story into a "narrative of education and control". Referring to the traditional requirement to memorise the patient's information, Hunter summarised the challenge and complexity of constructing the case presentation in such a way that it would lead to the diagnosis:

... [it is] not simply the prodigious recall of relevant biological and pathological information, but a ritualized storytelling: orally presented evidence that for this speaker, in this instance, the welter of clinical facts about a single patient constitutes a unity that hangs more or less inevitably together. (1991: 8)

Whether these requirements hold for case presenting in the PBL setting is a question this chapter seeks to answer.

Another view of accounts is that of Scott and Lyman (1968: 46): "an account is a linguistic device employed whenever an action is subjected to valiative inquiry."

They distinguish between excuses and justifications where the former is a denial of responsibility and the latter an acceptance but without any negative associations. As Sarangi (2010b: 403) explained, “accounts are always oriented towards the other and have a moral underpinning”. In PBL tutorials, the case presenter is oriented in particular towards the evaluation by the tutor.

### **6.2.2 Adopting a professional voice**

Erickson showed how participants in history presentations in the ward attempted to align themselves with each other, seeking a common “footing of collegiality”, and how case presenters sought to present a positive image of professional competence through adopting a professional “voice” (1999: 137). Erickson suggested that there are three conditions which contribute to or determine an “appropriation of voice”, that is, the professional voice. These are, firstly, responding inferentially to indirect teaching such as the tutor’s modelling; secondly, active participation by both parties in the interaction; and finally, the “desire on the part of the learner” (Erickson, 1999: 137-138) to identify with the role and discourse of experienced physicians. However, although Erickson acknowledged that only a longitudinal analysis can show this directly, he demonstrated how the encounter between experienced and novice physicians (interns) is an “*opportunity to learn*” (1999: 138, italics in original) and suggested that markers of growing expertise would be ellipsis, switching registers and confidence in diagnostic talk.

### **6.2.3 Discoursal marking in case presentations**

A range of rhetorical markers has been identified as contributing to the “professional voice” in presentation. Anspach described the presentation in clinical training as a

ritual for the display of credibility (1988: 371) through the demand for professional presentations within a learning context. For Anspach (1988) too, in her study of recently qualified interns and residents, the case presentation is a means of professional socialization, and she identified several discoursal features which on the one hand, she argued, lend the speaker greater credibility but, on the other, mitigate responsibility. She singled out three discourse features which, she felt, may indicate attempts to maintain a positive professional image: the use of the passive voice, the privileging of technology as agent, and the use of account markers to indicate patient subjectivity in contrast to the signs reported by the medical professional (see example below).

Anspach questioned the use of language which suggests “that biological processes can be separated from the persons who experience them”, and decried the way that clinical interventions are separated from those who perform them. “Using the passive voice while omitting the observer seems to imbue what is being observed with an unequivocal, authoritative factual status” (1988: 367). She offers two critical examples of the use of the passive voice from a presentation concerning the post-natal death of a baby, each offering a discernable motive for obscuring responsibility: “she was extubated” and “No betamethasone was given” (1988: 366). In each case these clinical decisions had critical repercussions for the baby, each allegedly contributing to her death.

I give examples from the current data to illustrate the use of the passive voice: it is used frequently, in seeming conformity to an institutional privileging of its objectivising properties. We can see its ritual use, and possible over-use in the first

example, in this extract from Ron’s presentation in Tutorial 1 (described in Chapter 5)

– the examples of passive voice have been italicised:

*Example 1 Tutorial 1 Case 1*

Turn	Who	Transcript
9	Ron	diagnosis <i>was made</i> to be a cluster headache together with the eye pain um and uh lachrymation uh: rhinorrhea (.) and the headache, uh but the headache persisted uh after the treatment and uh: together with a:: a:: blurring of vision on the right side, <i>it was not accompanied by</i> vomiting, there was no diurnal variation of the headache, <i>it was not preceded by any aura</i> , there was no pre dromal or post dromal symptoms, and there was no clear precipitating or relieving factors (.) for the sudden onset of left sided weakness our patient suggested that it was a sudden onset while he was sleeping, it occurs at two a.m. when the patient uh uh wanted to go uh for a toilet, (.) and: the uh the <i>weakness was not associated</i> with loss of consciousness

It is also worth noting that another verb form in this extract is the existential form “there was” which also conceals the agent.

As well as noting the “ritualised format” of presentations and their evaluative component, Anspach (1988: 360) drew attention to the “continuum of formality”, and the “de-personalising” technical terms (1988: 363), also seen in the example above: “there was no *diurnal variation* of the headache, it was not preceded by any aura, there was no *pre- dromal or post-dromal symptoms*”.

Atkinson (1995) acknowledged Anspach’s contribution but critiqued her account for failing to show how the rhetorical features combined “to produce a ‘case’” (1995: 94). Atkinson himself viewed the presentation as a “narrative ... of mystery and revelation” (1995: 99) and highlighted, among other features, the use of a temporal framework as an organizing principle. In his analysis of a case presentation, he



showed how the presenter used chronological markers to emphasise key points in the history and commented:

The physician's tale ...constructs a relative chronology of events, that is tied in to the absolute chronology of days and dates. The time-frames vary. The account is set within a broad temporal framework, with somewhat vague and general categories: 'over the last two years', 'with two recent admissions', ... 'past few months'. Against this broad, fairly impressionistic, background the current episode is established with greater clarity and precision: 'in August'. (1995: 99)

Atkinson showed how the features mentioned by Anspach (1988) were also evident in his data and went on to point out that contrasts in attribution of responsibility were another characteristic with other accounts of the case being marked, as in references to the actions of other physicians in a 'we-they' fashion.

In his study of presentations by interns in ward rounds, Atkinson (1999: 87) agreed that the presentation included a "standardized repertoire of narrative elements" but focused more on how a novice physician drew together different aspects of a case while taking on board repeated interruptions and corrections by a superior which challenged the credibility of the evidence. Atkinson also pointed out the asymmetry of the interaction and its evaluative aspect. He found that "shared understandings" of the patient's history arose from the question and answer sequences that interspersed the longer turns of the presentation, as we shall see in these tutorials. Several strands in the discourse served to distinguish between the presenter's understanding of the case and his understanding of others; between what Atkinson called "marked" and "unmarked" information where some information is certain and some uncertain, or between a reliable or unreliable interpretation: "The interplay between these features constructs a running play of evidentiality ... in which relative reliability is conveyed through language." (1999: 99). The verb forms used by Ron in the extract below from Tutorial 1 Case 1 indicate factuality:

### Example 2 Tutorial 1 Case 1

- 9      Ron      for the sudden onset of left sided weakness our patient suggested that it *was* a sudden onset while he was sleeping, ... uh the weakness *was not associated* with loss of consciousness, there *was* no increasing of the right sided headache, there *was* no head injury, (.) there *was* also a: a decreasing sensation on the left side, there *was* no chest pain, no fever: and there *was* no history of hypertension and diabetes

Examples also occur in the question and answer sequences which later continually interrupt the presentation. Atkinson viewed these sequences as a means of prompting the novice physician to achieve levels of detail and precision of evidence to make them more credible and competent. Atkinson found that all parties in ward rounds – consultants, junior doctors and students – engaged in discursively producing and negotiating “cases”: “Through the narrative unfolding of the case, the patient’s illness career and the trajectory of their condition is assembled” (Atkinson, 1999: 103). He suggested that such sequences contribute to the collaborative construction of the case history in a collegial professional manner.

#### 6.2.4 Providing and evaluating evidence in case presenting

Professional credibility is partly an outcome of the ability to give accounts through explanations and elaboration to support assessments, judgments or evaluations. I described in Chapter 2 how professional expertise is based on notions of professional responsibility and credibility.

These notions are indicated discursively in how evidence is presented to warrant the claims made: “Through the marking of evidence and aspects of the account, the division of labour is recapitulated and the zones of responsibility are limited” (Atkinson, 1999: 103). This is seen in the current dataset (Tutorial 1, Case 1) where

Ron switches from his more habitual use of the passive voice: “he [the patient] denied any injury to the head”; the use of the verb “denied” was noted by Anspach (1988) who claimed that its use “calls the patient’s account into question or casts doubt on the validity of the history” (1988: 368) and suggested that it is used when reporting “deviant habits” (“She denies tobacco, alcohol ...”) or allergies. Anspach argued that the use of this verb serves to protect the speaker so that if the patient suffered a negative reaction, for example to medication, “the responsibility would rest with the patient’s faulty account rather than with the physician” (1988: 368). Atkinson (1995) suggested another explanation: that the novice doctor indicates through the use of ‘denied’ that the question was actually asked of the patient. It is interesting to see if this occurs in the same way in the PBL context with novice physicians.

In the setting that is the subject of this thesis, expertise may lie in how tutorial participants negotiate the unfolding of the presentation interactively and discursively with reference to the goals of this activity type or whether they orient to the display of expertise seen in other settings such as precepting or clerkships in preparing for the eventual diagnosis.

The tension between the hybrid requirements of the professional genre in an educational setting has been described by Lingard, Garwood, Schryer and Spafford (2003) and Lingard, Schryer, Garwood, and Spafford (2003). In their study of professional socialisation in the clerkship setting, through observation of case presentations and interviews with students and faculty tutors, they suggested that students were socialised into the practice of case presentation through two “reciprocal forms of learning” (Lingard, Schryer, Garwood, & Spafford 2003: 612). The first form of learning was instruction on how to structure a presentation and how and what

to select for inclusion, and the second form involved the implicit learning of “the values, goals and professional boundaries of a clinical domain as they learn which aspects of the patient’s case it is necessary and relevant to talk about in that discipline” (Lingard, Schryer, Garwood, & Spafford, 2003: 612). They found that students saw themselves as participating in an educational genre while tutors presupposed a professional genre. Lingard, Schryer et al. concluded that the case presentation is both educational and professional and that the “discord” between the two genres may be a source of difficulty for the novice presenter. They suggested that students be made aware of the flexibility of the genre and that faculty needs to become aware of the “multiple iterations” of case presentations. Their study serves to highlight the tensions inherent in the hybrid nature of case presentation.

#### **6.2.5 Roles and hybridity in case presenting**

The adopting of a professional voice by apprentice physicians is indicative of the adopting of the professional role. This is what Erickson was referring to as “presentation of self” through the taking on of an identity (1999: 137). How scholars view this notion of identity is the subject of the following section.

Sarangi and Roberts (1999) concluded, from Erickson’s analysis of developing professional identity in the clinical setting, that students in hybrid clinical and educational settings have to manage to talk like legitimate participants while still learning to do so (1999: 68). Lingard, Garwood, Schryer and Spafford (2003) suggested that the case presentation offers an opportunity for the student to take a different identity, or a professional role. Sarangi (2010c) suggested that participants in an encounter have available to them a “role-set” (see detailed account in Chapter 3 Section 3.2.4) where they may shift their footing between different roles within an

activity. These roles include activity and discourse roles (Thomas, 1986). Activity roles arise from the nature of the activity the individual is engaged in (such as chair or scribe in PBL tutorials) while discourse roles reflect the relationship between the individual and what he or she says (e.g. reporter or questioner). At this level, case presentation within the PBL context is likely to be different from that of previous studies and, relating this to Erickson's comments regarding professional voice, we may predict that students will convey their role through the discourse they adopt. A number of key themes emerging from the clinically-related work reviewed above are pursued in the data analysis and interpretation below.

### **6.3 Data Analysis**

In the following sections exploring the mapping of the tutorial, I explore the issues raised above: in what ways the normative presentation structure is affected by the constraints of the activity; how the participation structure and role positioning shifts in response to the educational and clinical aspects of the activity and the rhetorical and discursive devices used.

The analysis in this chapter focuses on the role of presenters, both in their extended turns of presenting and in the subsequent or interspersed question and answer sequences in which further information is elicited by peers and tutors. The structural mapping (Section 6.3.1) and the interactional mapping (Section 6.3.2) in which I focus on participation structure and role positioning, are followed by the thematic mapping (Section 6.3.3) and analysis of longer data examples. Broadly based on the themes of expertise and uncertainty, these examples illustrate the presenting of the case history in the PBL setting (Section 6.3.4) and the challenges (Section 6.3.5). I offer an analysis of examples from the data corpus to show how expertise and

uncertainty are discursively constructed among the tutorial participants, through case presenting as a PBL activity (Section 6.3.4) and managing the challenges of PBL case presenting (Section 6.3.5). Finally, I compare and contrast my findings with related work on case presentations discussed above (Section 6.2).

The prevalence of question and answer sequences (Chapter 5) is one analytical theme which I look at below in the context of case presenting. While I have selected a different tutorial from that in Chapter 5 for comparison, particularly of the structural and interactional mapping, I take examples from several tutorials when focusing on the thematic mapping.

### **6.3.1 Structural mapping**

In this section I illustrate the unfolding of the case presentation phase. We have already seen two examples from Tutorial 1 (Chapter 5 Section 5.2.1), which showed the dispersed and recursive nature of the structural phases, where case history presenting provided the basis for the subsequent phases. The first case in Tutorial 2 (also containing two case histories), which is the subject of the structural mapping in this chapter, concerned the case history of a 61-year-old woman. The mapping shows how the presenting of the case history is similar to that mapped in Chapter 5, and is recursive and interspersed by diagnostic reasoning, mainly through question and answer sequences. The table below is not intended to indicate that diagnostic reasoning cannot be classified in terms of structural sub-phases: this is addressed in Chapter 7. Here I focus on the case presenting phase [See volume 2 Appendix C for the full transcript].

**Table 8: Structural mapping Tutorial 2, Case 1**

Turn nos.	Structural phases	Clinical sub-phases
1-3	<i>Orientation</i>	
4-8	Symptoms	Presenting problem (2 turns)
9-39	Diagnostic reasoning	
40-54	Symptoms	Chronology (10 turns) Onset (4 turns)
55-59	Diagnostic reasoning	
60-80	Symptoms	Description of symptoms (20 turns)
81-93	Diagnostic reasoning	
94-103	Symptoms	Social history (6 turns) Description of symptoms (2 turns)
103-111	Diagnostic reasoning	
112-119	Symptoms	Past medical history (8 turns)
120-127	Diagnostic reasoning	
128-168	Symptoms	Past medical history (24 turns) Family history (2 turns) Past medical history (3 turns) Social history (2 turns) Tests (7 turns)
169-187	Diagnostic reasoning	
188-223	Physical examination	Results (34 turns)
224-243	Diagnostic reasoning	
244-271	Investigations	Test results (26 turns)
272-274	Diagnostic reasoning	
275-287	Symptoms	Tests (9 turns)
288-300	Diagnosis	
301-318	Diagnostic reasoning	

The mapping exercise described in Chapter 5 showed that there are parallels between the two activities of bedside or clerkship case presentations and case presentations in a tutorial setting, in both structure and sequence, but that the normative sequence of presentation described by Erickson (1999) and others may be dispersed and recursive

in the tutorial setting. Here, in Tutorial 2, the mapping again shows a similar recursive pattern of talking about symptoms and diagnostic reasoning and departs from the normative sequence. Table 8 also shows that the number of turns devoted to the main phases of symptoms and diagnostic reasoning is very similar (approximately 160 turns are devoted to symptoms and 158 to diagnostic reasoning), an indication of the importance of these phases. In this tutorial, 36 turns focused on the reporting of the patient's past medical history (Turns 112-119, 128-152, 155-157). The phases of the physical examination, past medical history and discussion of investigations or test results all contain a similar number of turns (34, 35 and 35 turns each).

The mapping does not reveal the participation structure and roles taken up in this tutorial or whether question and answer sequences are common. These questions can only be answered by undertaking an interactional mapping.

### **6.3.2 Interactional mapping**

The interactional mapping of Tutorial 2 Case 1 detailed below bears some similarities to Ron's presentation mapped in Chapter 5. In Tutorial 2, Ron is also the presenter, the student participants are mostly the same, and there is a different tutor from Tutorial 1.

#### *Participation structure*

In this section, I give an overview of the participation structure to illustrate the interactional dynamics of the tutorial through role positioning and questioning. Interaction through question and answer sequences takes place either between the remaining students and the presenter, the tutor and presenter, or between tutor and student participants and the presenter. In this part of the tutorial, Tutorial 2, Case 1, the



Tutor took almost half the total number of turns (147), and the presenter 99 turns. The remaining students took 74 turns. The participation structure shows that, unlike Tutorial 1 Case 1, the presenter Ron was not made the chair of the discussion. This role was taken up by the tutor, a fact that clearly contributed to the tutor's number of turns. The presentation began as follows:

*Example 1 Role positioning Tutorial 2*

- 1 Ron uh my patient a sixty-one year old]
- 2 Tutor I ] would like you to just pre give me the uh: chief complaint first ]
- 3 Ron ] ok
- 4 Tutor then we can discuss to see whether this is a good chief complaint or not
- 5 Ron ok um our patient, sixty-one year old Miss Wong, uh:: a {ac} non-smoker non-drinker {dc} complained of acute onset bilateral lower limb progressive and ascending numbness for three days (.)
- 6 Tutor excellent (.) so: {gesturing to S} what do you think?

This pattern, in which Ron's presentation of a sub-phase of the history is followed by the tutor's request for diagnostic hypotheses, continued throughout this presentation, and is a feature that is returned to in Chapter 8 when I discuss the tutor's roles in the tutorials, and examine the questioning patterns. Ron was confined to the role of presenter and as such did not play a part in the management of the activity. In this tutorial, more than one-third of the Tutor's turns (61 out of 147) were questions. The pattern of students' responses is interesting: in several instances they respond with a question, a tentative implicit interrogative, as seen in this example:

*Example 2 Questioning Tutorial 2*

- 23 Tutor yes it's usually a viral infection so we are thinking about can this be: if it's a viral infection, what kind of terms would we give to that?
- 24 Sue myelitis? ]
- 25 Tutor ] yes myelitis, myelitis is possible, yes? {turning to Jan} (0.2) besides myelitis can this be just uh: some kind of uh:

Roughly half of the responses to the tutor's questions are similarly tentative, seeking confirmation; one student's sole contribution to the tutorial is perhaps unsurprisingly hesitant at this early stage of the case presenting and discussion:

*Example 3 Student hypothesizing Tutorial 2*

18 Cathy    uh I'm wondering about onset {ac} of the numbness  
              {dc} is it uh how acute is acute is is there may be like a  
              vascular cause say inflammatory cause so I'm  
              wondering like if there were any systemic symptoms (.)

Other questions are directed towards the case presenter, Ron, seeking factual information regarding the patient's symptoms. Here is a question by Sue on functional impairment:

*Example 5 Student questioning Tutorial 2*

Sue        what about functional impairment like activities of daily  
              living because any disturbance with ] (^^^)  
Tutor     ] can she walk  
Ron        uh yes she can walk (.) but uh: very clumsily uh because of  
              the residual illness of her past health which I will continue  
              ...

and by Fay, asking for information regarding the tests carried out:

*Example 6 Student questioning Tutorial 2*

Fay        was a lumbar puncture done at the time that encephalitis  
              was ] (^^^)  
Ron        ] yes it was done  
Tutor     you mean the last time or this time  
Fay        last ]time  
Ron        ] last ]time  
Tutor     ] last time  
Fay        what was the (finding) (0.2)

Overall, the interactional mapping shows that even where the tutor takes most turns and asks most questions, the presenter of the history plays a key role as a kind of knower or expert in the case. This presentation by Ron is in contrast to the earlier one in Chapter 5 where as chair he also controlled the interaction. This factor may have contributed to the higher number of questions asked by students in that case presentation, and may be a consideration for curriculum planners if one of the key goals of the PBL tutorial is to encourage student participation.

### **6.3.3 Thematic mapping**

For this part of the analysis I would like to return to Tutorial 1 Case 1, mapped earlier in Chapter 5, to illustrate in greater detail the role positioning of the participants, and the presenter in particular, vis-à-vis the themes of case presenting and diagnostic reasoning. The interactional mapping in Chapter 5 showed that the presenter, having interviewed the patient previously, played a dominant role in the tutorial as the chair and presenter of the patient's history.

Once again, I use as my main structural mapping categories for a case history the presentation of symptoms, of physical examination findings, and of diagnostic reasoning. As I have noted, earlier other phases such as family and social history and treatment and management also feature, and the occurrence of the key phases is highly recursive in response to participant interjection.

### **6.3.4 Case presenting as a PBL activity**

The following analysis focuses firstly on case presenting in the PBL tutorial setting and the management of questions and answers in relation to the presenting of the case history. Examples 7-10 are taken from Tutorial 1 Case 1.

*Example 7 Presenting the case history in PBL Tutorial 1*

- 5 Ron I'm going to present one ]
- 6 Tutor ] OK
- 7 Fay ] and I am going to present the other one
- 8 Tutor ] maybe the student who are presenting take turns, you know, to be the chairperson of this tutorial / OK so the time is running late, maybe we have to make a start (.)
- 9 Ron [looking at notes] my patient um Lam Siu An is um a thirty-five year old man an ex-smoker and non-drinker and worked as a driver he had a good past health and complained of a three day history of right sided headache, and sudden onset of left sided weakness (.) uh: for the headache the onset was three days ago, right sided, it was a constant pain, he consulted the uh: uh the outpatient department of Princess Elizabeth Hospital, and diagnosis was made to be a cluster headache together with the eye pain um and uh lachrymation uh: rhinorrhea (.) and the headache, uh but the headache persisted uh after the treatment and uh: together with a:: a:: blurring of vision on the right side, it was not accompanied by vomiting, there was no diurnal variation of the headache, it was not preceded by any aura, there was no pre dromal or post dromal symptoms, and there was no clear precipitating or relieving factors / (.) for the sudden onset of left sided weakness our patient suggested that it was a sudden onset while he was sleeping, it occurs at two a.m. when the patient uh uh wanted to go uh for a toilet, (.) and: the uh the weakness was not associated with loss of consciousness, there was no increasing of the right sided headache, there was no head injury, (.) there was also a: a decreasing sensation on the left side, there was no chest pain, no fever: and there was no history of hypertension and diabetes, (.) m~ so uh up to this point maybe we would like to discuss the um: clinical presentation and to uh postulate any differential diagnosis at this point, (.) so [ {ac} ] in some way this patient presented with a three day history of right sided headache and: sudden onset of left sided weakness (.)
- 10 Fay can I ask a question, like during these three days what happened what how has the condition progressed, like it's deteriorating or it's better?
- 11 Ron the headache was persistent despite the treatment/it persisted (.)
- 12 Fay and the weakness?
- 13 Ron it was sudden onset the night before admission / yes / (.)
- 14 Jan so for acute onset of weakness a vascular cause may be possible, (.)
- 15 Ron {[ nodding]} mm mm
- 16 Sue {[ nodding]} ] mm
- 17 Fay so the first the first differential diagnosis is stroke, (.)
- 18 Ron yes

The tutorial begins with an orientation by the tutor to the PBL setting. In turns 1 and 4 the Tutor defines the situation as a PBL tutorial and so in turn 8 assigns the role of chairperson to Ron, and at the end of the turn signals a move to the case presentation “we have to make a start”.

Ron, as chair and presenter, begins the case history in presentation mode in turn 9: he begins by identifying the patient and introducing aspects of the patient’s history “my patient um Lam Siu An is um a thirty-five year old man an ex-smoker and non-drinker”. It is arguable that reasoning already plays a role in the order in which Ron introduces information: for example, he immediately mentions aspects of the patient’s social history (ex-smoker, non-drinker) which in the classic case history presentation sequence (Erickson, 1999) would usually be introduced later (and see Chapter 5 Section 5.2.1). This early introduction may indicate that Ron wishes to dispense with non-contentious or irrelevant details early on and that Ron has the confidence to make this decision.

Ron introduces the two chief complaints of headache and left side weakness in turn 9. In this long presentation turn he mentions both the presence and absence of certain symptoms: “the uh the weakness was not associated with loss of consciousness, there was no increasing of the right sided headache, there was no head injury, (.) there was also a: a decreasing sensation on the left side, there was no chest pain, no fever: and there was no history of hypertension and diabetes”. By doing so Ron tacitly indicates that certain hypotheses might be preferred or dispreferred as a consequence. Towards the end of the turn Ron decides to halt his presentation, shifts to the role of chair and suggests that at this point differential diagnoses might be proposed: “so uh up to this point maybe we would like to

discuss the um: clinical presentation and to uh postulate any differential diagnosis at this point”, a recognition of what the activity affords him as a role-set.

Before a specific diagnosis is offered, in turn 10 Fay seeks further information on the progression of the complaints since admission: “can I ask a question, like during these three days what happ what how has the condition progressed, like it’s deteriorating or it’s better?” This information would clearly help to develop diagnostic hypotheses. The framing of the question shows her acknowledgement that she has a right to take a turn if her question is related to the case, and, equally, in Turn 11, Ron, in presenter role and holder of information regarding the case history, has the right to answer: “the headache was persistent despite the treatment / it persisted”. In Turn 14 Jan proposes a cause – “so for acute onset of weakness a vascular cause may be possible,” – which is related to the acuteness of the onset: in this she is providing a reason for her preference and by nodding or “mm mm” the other students indicate their agreement (Turns 15, 16). Fay explicitly proposes a diagnosis of stroke in Turn 17, and it may be assumed that both Fay and Jan have been building up to this diagnosis.

The example above illustrates how the presenter’s role may differ in PBL, particularly when allotted the dual role of chair. Instead of the tutor controlling the activity, the chair does so, and may manipulate the content to shape the discussion towards the activity goals. The example is also an indication of how the case presenting and reasoning process may be threaded together, with both implicit and explicit hypothesizing appearing to determine the course of questioning. In the following example, Ron’s expertise as case presenter in the PBL setting is displayed.

*Example 8 Strategic presenting of patient history in PBL Tutorial 1*

- 19 Sue is there any risk factors with this patient, associated with stroke
- 20 Ron yes exactly this {[hi]} the point is that this patient is a young patient thirty five years old, um: the only risk factor we can identify is (.) he is an ex-smoker, uh:: but he smoked very lightly (.) and: there is no other risk factor, but on further e further eh questioning um our patient did volunteer the history that he went (.) surfing uh two days before uh three days before the uh onset of uh left sided weakness (.) and also um there was a family history which his sister had a history of moyamoya disease presented with seizure with sudden collapse found to have right side intra cerebral hemorrhage (.) the patient's sister was now thirty three years old, the accident of intra cerebral hemorrhage happened when his pu sister was thirty years old (.) {[nodding]} um however for the surfing uh activity he denied any injury to the neck or to the head (.) {[nodding]}
- 21 Sue does he had hypertension or any (.)
- 22 Ron uh no he enjoyed good past health
- 23 Keith so the surfing occurred {[cough]} before or after the onset of the headache,
- 24 Jan ] (.)
- 25 Ron ] before the onset of headache
- 26 Sue ] before
- 27 Ron so he went surfing three days ago
- 28 Trudy ] the first episode
- 29 Ron and there was onset of headache and: three days later during the night he suddenly developed a left sided weakness

In turn 19, Sue seeks further information regarding risk factors: “is there any risk factors with this patient, associated with stroke”. This would help to either establish a stronger case or weaken the case for the diagnosis of stroke. At this point, in turn 20, Ron introduces new information concerning the social history and family history of the patient: “but on further e further eh questioning um our patient did volunteer the history that he went (.) surfing uh two days before uh three days before the uh onset of uh left sided weakness (.) ”. It becomes clear that the earlier history had been truncated and it appears that Ron had strategically stopped presenting the history to

allow initial diagnoses to be made. The new information, presenting the possibility of an incident while surfing, now complicates the clinical picture – although this incident was “denied” by the patient. Ron also introduces further family history of neurologic disorders, with a sister experiencing a brain hemorrhage: “and also um there was a family history which his sister had a history of moyamoya disease presented with seizure with sudden collapse found to have right side intra cerebral hemorrhage”. The fact that these items are introduced together may indicate that Ron sees relevance between them but he does not make this explicit. These late additions stray from the classic case history format and are strategically introduced by Ron at this point in his roles as presenter and chair. As chair he has the authority to do this, and as presenter he has the knowledge, which he chooses to withhold.

Sue pursues the question of risk factors in turn 21, and in turn 23 Keith seeks clarification on the timing of the surfing activity. Both these turns are evidence of students trying to establish causes and using reasoning to narrow the options and weigh up possible scenarios. In turn 30, Fay asks a question relating to the sister’s history of hemorrhage and at this point Ron again introduces new but very relevant information – that the patient himself had suffered a neurologic disorder (facial palsy or paralysis).

In the next phase of the tutorial we see (mainly) Fay and Ron negotiate consensus through a question-answer sequence on the likely irrelevance of a recent incident in the patient’s history (surfing).

*Example 9 Negotiating consensus in PBL Tutorial 1*

- |    |     |  |
|----|-----|--|
| 30 | Fay | apart from that is there any cerebral (speech) like any cranial nerve involved, like the facial palsy, any things like that, |
| 31 | Ron | ] mm mm: uh: during that episode of sudden onset of left   |



- sided weakness there were it was not associated with any right sided weakness however, in the:: uh:: three years ago our patient had lower motor neuron facial palsy and he was left with residual weakness and now there was a complete lower motor neuron weakness on the left side / (.)
- 32 Jan {[smiling]} so I just wonder whether the surf~ing have any relationship with this episode of weakness, because the surfing was three days ago: and
- 33 Ron ] yes
- 34 Jan it seems that there isn't any: any specific things that happened during that activity, (.)
- 35 Ron ] yes:
- 36 Jay ] and no injury
- 37 Ron ] yes that is what I was thinking
- 38 TS? ] does he go surfing regularly or
- 39 Ron uh no just that those two days of activities (.) it may be related and may be not related (.)
- 40 Fay {[hi]} I want to know more about the sister's condition, so the sister was found to have: intra cerebral haemorrhage at age of thirty, any investigations done of like what was the cause of uh:
- 41 SS moyamoya
- 42 Ron ] moyamoya diagnosed to have moyamoya disease
- 43 Fay (.) that
- 44 Jan moyamoya disease m-o-y-a
- 45 Keith ] m-o-y-a
- 46 Fay ] yeh but I don't know what is this disease
- 47 Ron moyamoya disease is uh:: (.) mm: was the uh as partial stenosis of the circle of Willis and on the digital subtraction scan there will be um: opening of collateral vessels uh to the brain, appear like a smoke like appearance uh supplying from the circle of Willis

Jan, in turn 32, ponders whether to use or discard the surfing information but in turns 34 and 36 she concludes that nothing untoward had been reported: "it seems that there isn't any: any specific things that happened during that activity". Ron concurs, and they reach a consensus on this issue. The question and answer sequences show the students working together to evaluate and then discard a hypothesis.

In this extract it seems that Ron makes use of the roles afforded to him as chair and presenter to achieve two goals related to the activity: to reach diagnostic consensus and generate diagnostic discussion. He employs two strategies to generate diagnostic talk: he withholds information and he also withholds his opinion. The withholding of information may be seen as similar to pre-clinical PBL where the paper case information is introduced in stages. This strategy is also similar to the tutor's technique in Tutorial 2 Case 1 in interrupting the presentation after each sub-phase of the case history presentation to ask for diagnostic hypotheses. The pedagogic and clinical roles are combined here in Ron's assumption of the roles of chair, presenter and possibly tutor.

The second strategy employed by Ron is the withholding of an opinion when asked about the relevance of the patient's surfing incident: "uh no just that those two days of activities (.) *it may be related and may be not related*" (my italics, Turn 39). In a similar vein, his minimal responses in Turns 33 and 35 hint at agreement but he offers no information at these points to supplement the current issue so this backchannelling type of response also supports the view that he has several roles available to him in his role-set which he may occupy at once.

The discussion then takes another direction. Fay asks Ron for an explanation of "moya moya disease", the patient's sister's previous illness and in Turn 49 he responds: "partial stenosis of the circle of Willis and on the digital subtraction scan there will be um: opening of collateral vessels uh to the brain, appear like a smoke like appearance uh supplying from the circle of Willis". Fay continues her questions in the following example.

*Example 10 Negotiating uncertainty in PBL Tutorial 1*

- 48    Fay      how could that cause intracellular haemorrhage?  
49    Ron      (.) um: I'm not particularly sure about this {[smiling and  
                 looking at T]} (.)  
50    Fay      because you said that it's the cause (.) cause like the  
                 collaterals is fragile vessels so (.)  
51    Ron      {[smiling and looking at T]} maybe  
52    Fay      you're not quite sure  
53    Keith     actually for the surfing was there any travel history  
                 involved with that?

The hybridity of the PBL tutorial at the clinical level has been highlighted and here we see how the hybrid nature of the tutorial influences the frame of the interaction and the activity role that a participant might take. Ron responds to Fay's request (Turn 48) "how could that cause intracellular haemorrhage?" which positions him as an expert or knowledge resource, but in Turn 49 it seems that he had previously been repeating "textbook" knowledge on moyamoya disease, as he is unable to provide further explanation, revealing his uncertainty: "I'm not particularly sure about that". His role ceases to be that of the chair, presenter, or expert on the case and the clinical frame becomes pedagogic as he shifts to the role of student participant with his glance at the tutor, indicating a concern for the tutor's response or a wish for guidance on the issue. Fay pursues the issue and Ron's discomfort is sensed as he smiles and looks at the tutor again and repeats his uncertainty. Keith intervenes and changes the topic back to the issue of the surfing.

### **6.3.5 Section Summary**

In discoursal terms, Ron reveals both his expertise and his uncertainty as shown in Examples 8, 9 and 10: he makes use of mechanisms to distance himself from the

patient. We have already seen how he makes use of the passive voice or “there is/was” when talking about the patient’s experience, thus avoiding the personal pronoun (Section 6.2.3). Additionally, he uses the verb “denied” which Anspach (1988) singled out for negative appraisal in its apparent imputation of lack of trust in the patient’s account. These linguistic devices – with rhetorical import – may be seen as adding objectivity to the case presentation along with his use of technical terms, and this in turn may be seen an indication of socialization into the discourse community (Lave and Wenger 1983). Lingard et al. (2003a) point out that such devices serve to maintain “unintended” professional values while indicating a growing expertise in the mastery of the genre. There are uses of modality which in one instance suggest expertise in managing the content of the presentation (“it may be related and it may be not related”) and in the other suggest a lack of knowledge (of moyamoya disease).

#### **6.4 Managing the challenges of PBL case presenting**

I would like to add to this analysis examples from two other tutorials which provide a contrast to the examples above. The participants in these tutorials were from the second tutorial group. I have selected these examples in order to offer a contrast with Ron’s presentation and how he positions himself as presenter and chair. The next extract illustrates the first challenge: how, in asymmetrical relations, the presenter encounters and deals with repeated interruptions from the tutor. While I focus in Chapter 8 on the tutor’s role, I illustrate here how the presenter responds to tutor questioning. This example shows the shifting of the interaction from the clinical to the pedagogic frame, and the presenter’s expertise in handling the questions in overly asymmetric interactive mode.

*Example 11 Asymmetry: Handling repeated questions from the tutor, Tutorial 3*

In this example, Zelda presents the history of Mr. Lau who had blisters on his hands and limbs.

- 18   Zelda   uh so uh Mr Lau um a sixty-five year old um retired um government servant um presented with um blistering um (.) blistering
- 19   Tutor   (^^)
- 20   Zelda   Blistering eruptions over uh bilateral uh palms also on the dorsum of the lower limb to the Accident and Emergency Department (.) um: so on the ninth ( {laughs} ) of November um and um the vesicles were uh itchy and uh painful but uh the pain is not so severe that would prevent the patient from sleeping (.) and the blisters gradually increased in size and um the one over the um lower limbs actually ruptured with some watery discharge and um ]
- 21   Tutor   ] actually you have been using on the one hand vesicle and on the other hand blisters (.) do you think there are any differences between these two terms? ]
- 22   Zelda   ] uh yes um: blistering is um refers uh to um a lesion that contains a fluid and vesicles are those smaller than 0.5cm and bullas would be greater than ]

Here, Zelda begins the presentation of the patient's history in a similar way to Ron in Extract 1. The description of the symptoms is similarly detailed and appropriate to case history presenting with the sequence of onset and development of the symptoms, and location of the blisters. The tutor's interruption at turn 21 begins by referring to Zelda's use of two terms, blisters and vesicles, and asks whether she thinks these are different. He phrases the question as if he were asking for Zelda's opinion, "Do you think..." and Zelda is able to provide definitions of different types of blisters with normative measurements. The key construct of professional categorisation (Goodwin, 1994) comes to the fore in this pedagogic interchange and test of the student's knowledge. Despite Zelda's skill in presenting the case, the tutor controls the topic through the classic pedagogic question and answer sequence of initiation, response

and feedback (IRF) through his question, Zelda's response and his follow-up question (Sinclair and Coulthard, 1975; Mehan, 1978 – see Chapter 3).

While the pedagogic frame takes over from the clinical frame in turn 21 with the tutor's question: "actually you have been using on the one hand vesicle and on the other hand blisters (.) do you think there are any differences between these two terms?", Zelda seems nevertheless able to give a competent account through definitions which include measurements and appearance, thus demonstrating her knowledge and her ability to categorise the clinical appearance of the blisters. Her response in learner role shows that she is aware of the shifting frame as the tutor tests her knowledge. She colludes with the tutor in sustaining the pedagogic frame in turn 22 through the alignment of her response: "uh yes um: blistering is um refers uh to um a lesion that contains a fluid and vesicles are those smaller than 0.5cm and bullas would be greater than...". The tutor's framing of the question, prefacing it with "actually you have been ..." is reminiscent of Erickson's (1999) view that tutors try to adopt a collegial approach despite the inherent asymmetry of their roles, so as not to diminish the status of the student presenter. It also supports Lingard, Schryer et al's (2003) view of the fundamental educational and evaluative nature of PBL tutorials despite the clinically-oriented discussion. The tutor's initial interruption might be seen as introducing a correction but because he frames the subsequent question by asking for Zelda's opinion ("do you think...") he mitigates the effect of the correction (Pomerantz, Ende and Erickson, 1995). Overall, despite continuous interruptions by the tutor, Zelda's presentation comes across as robust which is in contrast to the next presentation by Harry. While the tutor's repeated interruptions are an indication of the asymmetry that is present in the encounter, where he feels able to interrupt at any time

by virtue of his role as teacher, both parties manage the shifting of frames and role positioning to minimise the asymmetry of roles.

Harry is tasked to present the case of an elderly patient, Madam (Mrs) Wu who is suffering from “generalised weakness” in all four limbs. Harry provides the other participants and tutor with information about the case in this long turn, which veers between following the normative presentation structure and deviations from it.

*Example 12 Managing the sequence in case presentation Tutorial 4*

- 10 Harry Madam Wu (.) a eighty-three-years old woman uh presented with three week history of generalised weakness (.) previously uh: Miss uh: Madam Wu has been activity of daily living dependant and having coughing and dressing needs to be held by others (.) three weeks ago uh the patient uh uh uh noticed to have generalised weakness involving all the four limbs and the patient can only raise her arms but she uh cannot eat or write (.) and also the patient prefers can walk with a quadropod but three weeks ago the patient start to (.) unable to walking, umm further questioning there wa have been un no history of dysarthria, diplopia or respiratory distress from the patient and it was not associated with any sensory deficits or um uri uh urinary or bowel incontinence (.) her weakness is not associated with any (^^) ability and also (^^) muscle tenderness (^^) from further questioning the patient had changed his hypertensive medication and had a flu vaccination a month ago, otherwise the patient didn't have any alcohol history or chronic liver disease or diabetic (.) um um the patient also have some specific complaints and headaches for one year (.) .....(5 lines omitted) from the history taking the patient also have some depressive symptoms and the patient have been unhappy for about a few months (.) and (.)

In this extract, Harry begins the case history presentation at turn 10 in the classic fashion with the patient's name, age and presenting problem. Harry begins his presentation dealing with onset – “three week history” – and moves on to the presenting complaint “generalised weakness”. He then brings forward information from the patient's past medical history: “Madam Wu has been activity of daily living

dependant and having coughing and dressing needs to be held by others”. Harry may have wished to give this information greater prominence but as we saw in the previous examples, the bringing forward of information in this way appears to reduce relevance. This seems the case here as Harry immediately returns to the onset – “three weeks ago” – and describes the symptoms with factual information as to what the patient is able or unable to do: “the patient can only raise her arms”, “she cannot eat and write”. Harry also mentions those symptoms which are absent: “no history of dysarthria, diplopia...”. His remark that “the patient uh uh uh noticed to have generalised weakness” could mean ‘the patient was noticed to have’ or ‘the patient noticed she had’: Harry supports this claim with examples which presumably were proffered by the patient. The mention of the onset might have led his listeners to expect a chronological narrative (Atkinson, 1995) but instead he merely repeats “three weeks ago” and the presenting problem. His slightly inexperienced presentation is couched in formal terms, an impression created by his use of the slightly anachronistic Hong Kong form of address for a widow “Madam Wu”; his use of the negative for absent symptoms as in “there wa have been un no history of dysarthria, diplopia or respiratory distress” and the problem as passive agent “it was not associated with”; and stock phrases such as “generalised weakness”, “activity of daily living dependant”, and “respiratory distress”.

To a certain extent, Harry’s expertise is demonstrated by adherence to the case history format: the inclusion of onset, location, duration and extent of symptoms, the use of medical terms and the salience of information. The mention of absent symptoms indicates the pursuit and rejection of possible diagnostic hypotheses, and is also an indication of thoroughness in history taking. Harry is able to distinguish what the



patient told him through his use of attribution, as in the patient “noticed”, or “claimed” (cf. Anspach, 1988; Atkinson, 1995).

Harry also highlights certain aspects of the history while downplaying others (albeit in an unexpected position in the sequence of presentation). Thus in the second line of this turn he gives prominence to the fact that the patient had not been an active person prior to the onset of the weakness, “activity of daily living dependant”, indicating that the presenting complaint of weakness had reduced the patient’s capabilities. Harry departs from the classic sequence as he brings forward items of information regarding changes in medication, a recent vaccination and the absence of a history of drinking. Inclusion of these details at this point might suggest relevance to certain diagnostic possibilities but could also result from the challenge of organizing the presentation. This difficulty may reflect the fact that in addition to description of symptoms and the challenges of presentation, Harry is also assessing the information he has gathered, challenges presented by his activity and discourse roles.

Following a description of other complaints such as chest pain and headache, the presenter goes into some detail on the patient’s depression: “the patient also have some depressive symptoms and the patient have been unhappy for about a few months”. This elaboration might indicate a certain emphasis but this is not pursued or clarified and at this point the tutor intervenes to solicit questions from the other participants. The intervention is an indication of role change and a shift from the front stage presentation mode in which the presenter controls the floor to the bringing forward and inclusion of the audience members, that is, the other ratified participants in the interaction.

The question and answer sequences are an integral part of the case history in this setting and allow a dynamic movement between the clinical and pedagogic frames and between the sub-phases of the history presentation phase. The sequences differ considerably depending on which frame is dominant and on who is asking the questions. In the next section I focus on how presenters respond to challenging student participants' questions and analyse the presenters' management of these to show how participants move between frames, and shift roles from presenter to learner or examinee in relation to diagnostic reasoning.

#### **6.4.1 Managing student questioning**

In the presentation of the case of Madam Wu, following Harry's monologue, the student participants who had previously filled the role of listeners questioned Harry, shifting their reception role to that of discussants and, while they were able to take the floor and select topics through questioning, they remained in a subordinate role to the presenter, Harry, with his knowledge of the case.

It seems that the presenter is likely to orient to the pedagogic frame when the tutor asks questions and orient more to the clinical frame when the peer group poses questions. I noted earlier that in Zelda's responses to the tutor's knowledge testing questions she was able to provide appropriate detailed answers, suggesting that her management of the questions was an indication of her ability to shift between clinical and pedagogic discourses and to display her knowledge through elaborated responses. In the example that follows we return to the tutorial concerning the case of Madam Wu. This extract shows the students asking questions of the presenter, Harry, whose uncertainty contrasts with Ron's management of the group's questions (Example 9),

where he displayed a degree of control of the trajectory of the discussion by virtue of his dual roles as presenter and chair.

*Example 13 Presenting information in question-answer sequences Tutorial 4*

- 17 Tutor OK OK I I I may have come across this lady already (.) so anyone who wants to ask the questions about this old lady
- 18 Zelda umm I want to ask about the onset of the generalised weakness when did it come on and under what condition
- 19 Harry three weeks ago (about)
- 20 Zelda no I mean um was it a gradual or acute [ onset
- 21 Harry ahh [ yes it is gradual
- 22 Zelda gradual [ onset
- 23 Harry gradual [ yes
- 24 Zelda and under what circumstances she first noticed it?
- 25 Harry (0.2) mm: I didn't ask about this (.) but the patient said that then she cannot walk (.) previously she can walk with a quadrupod but she she cannot walk since three weeks ago
- 26 Zelda mm mm
- 27 Martin is there any reason the patient need to walk with a quadrupod
- 28 Harry uh:: because the patient complain of uh lower limb weakness before
- 29 Martin already have lower limb ] weakness
- 30 Harry yes ] but there have been no history of stroke
- 31 Zelda but does she um complain of like pain in her knees or
- 32 Harry uh it's not pain related
- 33 Zelda ] it's not pain related
- 34 Martin ] just weakness

In this extract the questions clearly serve to move the diagnostic reasoning discussion forward. The clinical frame is dominant and questions focus on structural sub-phases in description of symptoms (the duration and severity), and the social history – the patient's lifestyle and ways of coping. Most of the student questions are information-seeking (13 of 18): e.g. "... was it gradual or acute onset?" and "which part of her body is most suffering?" and are a mix of open and closed questions.

A pattern emerges here of students beginning a sequence with an open question and following this up with a repetition sometimes framed as a yes/ no question. For example, Zelda's request for factual information "I want to ask about the onset of the generalised weakness when did it come on and under what condition" (turn 18) is followed up by "...was it gradual or acute onset?" (Turn 20). Martin's question "is there any reason the patient need to walk with a quadropod" (turn 27), a "why" question, is followed up by Martin's repetition of Harry's response "because the patient complain of uh lower limb weakness before", which offered a significant addition to the history and to the details of the onset (examined further below). This kind of repetition is seen in Zelda's repeating of Harry's response "gradual onset" which may point to difficulties arising from the preceding monologic presentation. While Harry described the onset merely in terms of its temporal occurrence, he failed to describe the nature of the onset or any relevant factors preceding it, a level of clinical detail necessary to support further diagnostic reasoning.

The echoing type of repetition of the presenter's response, in the area of psychotherapy has been seen as a means of alignment where repetition or echoing may signal agreement or information taken on board (Ferrara, 1984; Sarangi, 2010a). However, in this context, in these echoings there appears to be no seeking of alignment, perhaps because the activity roles are less asymmetrical and alignment does not need to be established.

While minimal responses such as "but the patient said that then she cannot walk" may offer confirmation, a response such as "yes but there has been no history of stroke" provides an opportunity to elaborate reasons for discarding this hypothesis but none is

forthcoming: for ease of reference I repeat the interchange between Harry and Martin from Example 13 above:

- 27 Martin is there any reason the patient need to walk with a quadrupod  
28 Harry uh:: because the patient complain of uh lower limb weakness before  
29 Martin already have lower limb ] weakness  
30 Harry yes ] but there have been no history of stroke

Here Martin's question in turn 27 and the repetition suggest that this information should have been provided earlier. While Harry's response in turn 30 infers a reason for Martin's question, this information "no history of stroke" might also have been provided earlier. It may be argued that the participants' shared understandings make extended explanations unnecessary and if the pedagogic frame were predominant more detailed explanatory accounts might be expected. However, these examples indicate that within the clinical frame a certain level of information should be provided. In other instances, negative answers lack accountability: "I don't know", "I didn't ask about this" and "I didn't specify" may all imply a failure to carry out a full, professional patient interview.

In the next example, the extracts illustrate the use of discursive devices in relation to case presenting.

*Example 14 Responding appropriately Tutorial 4*

- 35 Eddie did you say the patient couldn't eat and write  
36 Harry uh: because of the weakness of the muscles of her: hand  
37 Eddie of her hands  
38 Joy which part of her body is most suffering from the generalised weakness (or is it equally distributed)?  
39 Harry umm the generalised weakness is symmetrical and for the upper limbs it is the distal part that is more affected (.) for lower limbs I think the whole limb is affected

- 40 SS {whispering} (0.2)  
 41 Gerry for the lower limb weakness how long have it been start  
 42 Harry uh: she she said that it's about three weeks or so  
 43 Zelda [ so (^) quadropod (for three weeks)  
 44 Harry [ uh for several years  
 45 Zelda for several years (0.2) uh does the so for the lower limbs  
 is there like the onset of the weakness does it start in the  
 lower limbs first or the upper limbs first or does it start ]  
 46 Harry toge]ther (0.3)  
 47 Zelda ] together (0.4)  
 48 Tutor Oops  
 49 Zelda (^)]

In this extract we see the questions focus on the patient's mobility and although the sequence begins with a yes-no question seeking confirmation, again we see open questions such as those in turns 38 and 41 offering Harry the opportunity to expand on the patient's weakness as he does in turn 39. Eddie, presumably satisfied with the information provided so far, moves the discussion forward and shifts the topic to mobility. Further questioning follows a similar pattern to that described above, with open questions followed by a yes-no question such as Zelda's in turn 45.

Also of note here is the way in which the presenter invokes other resources to support what might be seen as deficient responses. Harry's recruitment of the patient in turn 42 is in response to a question regarding the chronological progression of the weakness. This strategy, while emphasizing the subjectivity of the patient's account (Anspach, 1988), also distances the speaker in his role as presenter from responsibility for the account. This is also shown in Example 15 below.

*Example 15 Recruiting support Tutorial 4*

- 50 Tutor so: satisfied ] with all the history?
- 51 Zelda umm no uh so you said she was ADL dependant who is it she lives with and who is she dependant on?
- 52 Harry uh she is living in a old age home, for fam for social history, uh: she has a husband but died and she has a son but working in Macau so nobody so no body take care to take care of her, so she is living in an old age home (0.5)
- 53 Zelda mm mm and you mention about depressive symptoms have you actually assessed her suicidal risk?
- 54 Harry [ ummm
- 55 Becky [ actually we have read uh by the time we are clerking the case, a psychiatrist um is coming to consult her, and we can read from the notes that um she is suicidal
- 56 Zelda uh but you didn't ask her
- 57 Becky um we didn't
- 58 Zelda mm mm but did she actually attempt it in the notes
- 59 Becky um: (.) not ] attempt
- 60 Harry ] not attempt
- 61 Zelda not attempt but ] (trying to)
- 62 Becky ] but trying to kill ]
- 63 Zelda ] was there any plans [ or
- 64 Becky ] (^^^)
- 65 Zelda I just thought ]
- 66 Becky [ planning to die (^^^)

This example begins with the tutor asking the questioners whether they are satisfied with the history (Turn 50). Zelda displays confidence in her negative response (Turn 51) and moves the topic to the sub-phase of social history, again beginning with an open question “who is it she lives with and who is she dependant on?” Harry’s response “she is living in a old age home.... so nobody so no body take care to take care of her, so she is living in an old age home” appears adequate as Zelda continues with a yes-no question that moves the discussion to the patient’s mental health: “have you actually assessed her suicidal risk?”. Again there is the repetition of responses and also incomplete utterances by Harry and Becky as well as Zelda in the sequence

in Turns 56-66. Becky, who accompanied Harry in the patient interview, refers to the notes and the visit of the psychiatrist to the patient (Turn 55): “we have read uh by the time we are clerking the case, a psychiatrist um is coming to consult her, and we can read from the notes that um she is suicidal”. This kind of “coding” or use of the “cited figure” (Goodwin, 1994), is discursively marked as we have seen already through the use of reported speech, as Anspach (1988) noted. In case presenting, the cited figure is usually the patient (as in “she said that it’s about three weeks” in Turn 26) but may also be other health professionals or the patient notes as in Turn 55, or test results. While the cited figure may be used to give factual status to a remark, it is also a form of distancing the speaker from adherence to the claim made. Similarly, while the case notes may be assumed to present factual information as in Turn 55, their veracity may be doubted. The interchange in Turns 56-66 (“mm mm but did she actually attempt it in the notes”, “um: (.) not ] attempt”, “[ ] not attempt”....” might indicate some embarrassment on Harry’s and Becky’s part at having omitted to gather more detailed information regarding Mrs Wu’s depression.

The next example (Example 16) looks at how an account may be offered to explain a diagnostic preference.

*Example 16: Offering an account Tutorial 4*

- |    |        |  |
|----|--------|--|
| 67 | Martin | mm (0.3) is is is the weakness started after the depressive symptoms (.) or is it because he she can cannot walk or something like that that she develop depressive symptoms |
| 68 | Harry  | um:: I think um: just the depressive symptoms have been for several months but uh because it’s about three weeks only (0.2)  |
| 69 | SS     | mm mm (0.5) {whispers}   |
| 70 | Eddie  | then do you [ think  |
| 71 | Joy    | how ] you first you first you first  |



- 72 Eddie do you think it's possible in this case the generalise weakness it is due to psychogenic factors
- 73 Harry um: it is possible but medical factors um: seems to be more more reasonable (.) because from the investigation results the patient has um: the sodium level of the patient is uh reduced]
- 74 Eddie mm ]
- 75 Harry so I think that generalised weakness can be due to hyponatraemia
- 76 Zelda mm (right)

In the sequence above, Martin makes a connection between the depression and the physical weakness (turn 67). Harry responds rather indirectly to Martin's either-or closed question by referring to the difference in the time of onset of both problems (Turn 68). The way in which questions can help the diagnostic process to move forward is explicitly indicated by this question: "is is is the weakness started after the depressive symptoms (.) or is it because he she can cannot walk or something like that that she develop depressive symptoms" but Harry's response "um:: I think um: just the depressive symptoms have been for several months but uh because it's about three weeks only" seems inadequate, perhaps reflected in the long pause following the students' whispering together in Turn 69. Eddie's direct yes-no question in Turn 72 – "do you think it's possible in this case the generalise weakness it is due to psychogenic factors" – forces Harry to respond. He does so by giving an alternative account, suggesting a reason for the weakness and then a tentative diagnosis in Turns 73 and 75: "medical factors um: seems to be more more reasonable (.) because from the investigation results the patient has um: the sodium level of the patient is uh reduced] ...[Turn omitted] so I think that generalised weakness can be due to hyponatraemia" where his justification precedes his claim and appears credible.

At the same time, in his presentation of the history, Harry has failed to mention the patient's medication and this omission is highlighted in the next sequence.

*Example 17 Managing omissions Tutorial 4*

- 77 Martin what but what hypertensive any hypertensive medication  
is the patient taking
- 78 Harry um: I can recall uh she she was on a HCI and also on a  
diuretic
- 79 Martin aah ]
- 80 Zelda where is she following up for her hypertension?
- 81 Harry I didn't ask because she was quite tired at that time
- 82 Zelda oh: so um but uh did she mention the reason for  
changing her medication a month ago?
- 83 Harry uh no
- 84 Martin so you mean the new drug has been added to the ]
- 85 Harry ] the dose have been changed
- 86 Martin oh change in dose
- 87 Harry Yes
- 88 Eddie that means uh still the two drugs for the hypertension
- 89 Harry Yes
- 90 Zelda have you assessed her compliance
- 91 Harry No
- 92 Becky we think we think that um she is living in an old age  
home, uh so ]
- 93 Zelda so] uh people are taking
- 94 Becky likely (0.3)
- 95 Martin (^^^)
- 96 Becky [ (^^^)
- 97 Zelda how about ] her hyperlipidaemia is she on any  
medication
- 98 Harry um:: yes yes
- 99 Zelda oh on on statins,
- 100 Harry I think so (0.4)

This sequence shows a similar pattern with the new sub-phase of past medical history and medication introduced by open questions: “what but what hypertensive any

hypertensive medication is the patient taking” (Turn 77) and Zelda’s “where is she following up ..” (Turn 80). Harry’s response in which he gives an excuse for not asking the patient about this is in contrast to the account he offered immediately before his differential diagnosis in the previous extract. Here, he appears to be making an excuse for his failure (Scott and Lyman, 1968). Responses such as those in Turns 81 and 91 do not position Harry as an expert in or “knower” of the patient’s history.

It may be argued that these omissions stimulate questioning rather like Ron’s withholding of information in Tutorial 1 Case 1. Here, however, Harry makes his questioners put together the sequence of the history and link its pieces of information, something that the presenter should do to construct the “whole gestalt of the presentation” (Erickson, 1999). The final example from this tutorial also illustrates how Harry’s responses fail to suggest a professional presentation. The extract begins with Zelda returning to the sub-phase of the patient’s previous medical history:

*Example 18 Displaying expertise and uncertainty Tutorial 4*

- 101 Zelda any so how about her past medical history any previous (0.1)  
stroke or
- 102 Harry uh no previous stroke and only hypertension hyperlipid  
lipidaemia and a minor surgery
- 103 Zelda minor surgery?
- 104 Harry thyroid for (nodule ^^^)
- 105 SS mm mm
- 106 Harry (so total) for that (0.3)
- 107 Martin [mm
- 108 Zelda mm]
- 109 Eddie did the patient have any uh hypothyroid symptoms?
- 110 Harry because it was a (^^^ ) so I so I don’t think she has she she has  
she has a problem (.) and from the medication they have no  
history of long term thyo(^^^ ) so I think the: thyroid function  
should be OK
- 111 Zelda but the thyroid nodule was it functioning or diseased

- 112 Harry I can't know about this because it was done in 1994 and the patient has no idea about it
- 113 Zelda so how was it discovered (0.3)
- 114 Harry mm: I don't know (0.6)
- 115 Tutor {coughs} so so far can you just with the history come up with any differential diagnoses (0.1) before you go to exam of patient you know some of the questions are quite valid (.) so uh I know you are think thinking something so (.) can you just list (.) on the possible (.) make it a um possible (orders) for (^^) diagnosis for this lady (.) anyone can do that (.) or the one who clerked

This sequence shows that while participants are displaying their expertise through asking relevant case-specific questions in order to build diagnostic hypotheses, the presenter's responses are mostly minimal. In addition, Harry introduces new information which might be highly relevant in mentioning "minor surgery" in Turn 102. Zelda's repetition of this "minor surgery" in Turn 103, as in the repetitions mentioned previously, suggests that this fact should have been introduced earlier. Zelda and Eddie then pursue this topic (turns 109 and 111) with closed questions that clearly aim for a direct answer. Harry finally provides a justification for his assumption that the patient has no current symptoms of a thyroid problem as she has no medication that would indicate this (turn 110). Despite this, his subsequent responses of "I don't know" and "I can't know about this...and the patient has no idea about this" again underscore his failure to fulfil his role as presenter and expert on the case. At this point, the tutor intervenes to ask for the questioners' differential diagnoses.

#### **6.4.2 Section Summary**

These examples show how presenters manage the challenges of case presenting in the PBL setting: how they manage the presenting of case information, the normative sequence, the questioning by tutors and students, and the giving of accounts. A

complex picture emerges of how expertise is differentially distributed over the trajectory of the case presenting phase and that management of the PBL activity is a component of how expert and professional the presenter appears to be.

## **6.5 Summary**

In this chapter I have reviewed the views of case history presenting in the literature and focused on the case history as a professional genre and expert account (Section 6.2), and an opportunity for display of a professional voice (Section 6.2.1). I presented findings from Anspach (1988) and Atkinson (1995) to illustrate the discursive devices such as formality and the passive voice, technical terms, temporality which contribute to professional voice notwithstanding the critique offered by Anspach (Section 6.2.3). I also brought in key notions of evidence and credibility (Section 6.2.4), and in Section 6.2.5 I discussed roles and hybridity in case presentation settings such as the clerkship (Lingard, Schryer et al., 2003).

I approached the data analysis through the activity analysis framework beginning with structural mapping of case presenting sequences in the data (Section 6.3.1), followed by interactional mapping (Section 6.3.2) and thematic mapping (Sections 6.3.3 – 6.3.5) which I divided into a section on case presenting in the PBL setting (Section 6.3.4) and meeting the challenges of presenting in the PBL setting (Section 6.3.5).

The research question I targeted in this chapter is: How is case presenting affected by being situated within the context of the Bedside PBL tutorial activity type? I found that several aspects of the case presenting activity were affected by the PBL setting. As in Chapter 5, structural mapping revealed that while predictably the most prominent sub-phase was presenting symptoms, the case presenting sub-phases were recursive rather than linear, as tends to be the pattern in clerkship case presenting.

Interactional mapping showed a similar pattern to that found in Chapter 5 where the tutor took most turns, followed by the presenter and then the other participants. I showed how the participation structure was affected by whether or not the presenter or Tutor took up the role of chair, a feature of the PBL setting. While I found many similarities in terms of discoursal markers between the findings reported in other settings in the literature (e.g. the use of the passive voice, temporal markers, formality and technical terms, and the distancing of the clinical role through cited figures and reported speech), differences arose in the management of the case presenting sequence and in the management of expertise and uncertainty through the question and answer sequences depending on whether the presenter was able to take up the role of information provider or knowledge resource in appropriate ways.

Findings indicated that presenter expertise emerges through participants' awareness of the activity-specific constraints and affordances in the PBL setting, and the ways in which sequences are framed, as well as their movement between the hybrid clinical and educational contexts in participation and role performance. From these extracts, it is clear that in the PBL setting, the presentation of the case history is a crucial trigger for diagnostic reasoning and that the presenter of the case history plays a key role in shaping the discussion and moving it forward. The participants appear to share understandings and the questions are not seen as unexpected. Greater expertise appears to lie partly in knowing when and how to provide more detailed elaborations or justifications for uncertainty or perceived ignorance.

The analyses above support the view of the case presentation as a hybrid activity (Lingard, Schryer et al., 2003) where the frames shift between the clinical and the educational. However, there are significant differences between the clerkship activity

described by Lingard, Schryer et al., (2003) where presenters aim to get through their presentations with as few interruptions as possible, and the PBL tutorial activity where questioning is an integral feature of the clinical and educational discourse. In the tutorial encounters above, participants are afforded roles from within a given role-set through which they can make a positive self-presentation as presenters or chairs or questioners or diagnosticians. The ways in which the presenters take up these roles is key to how the participants achieve the activity goals.

What emerges here in addition is the significance of the ways in which the presenter develops the presentation and how the presenter negotiates the question and answer sequences in response to tutors and students. I have suggested that presenters display an awareness of the particular goals of the activity in the strategies they adopt such as withholding information (as in Ron's presentation), but they may also fail to convey a "positive self-presentation" in their roles as presenters when unable to give an adequate account for missing or unknown information (as in Harry's presentation).

Analysis of data examples has shown how participants shape the presentation to the demands of the activity, and also how the activity affords opportunities for the presenter to display expertise in case presenting and the provision of evidential information. In the next chapter, I expand further on the key phase of diagnostic reasoning and particularly the negotiation of expertise and uncertainty in the PBL tutorial setting.

## **Chapter 7: The role of evidence and uncertainty in the marking of expertise in diagnostic reasoning**

### **7.1 Introduction**

In this second analytic chapter, I focus on the reasoning process by which medical problems are typically addressed in clinical diagnostic discussion. The chapter develops the discussion and findings in Chapters 5 and 6 through a mapping of the diagnostic reasoning phases of Bedside PBL tutorials. In Chapter 5, I examined a prototypical tutorial through activity analysis using structural, interactional and thematic mapping. I found that the key structural phases were case presenting and diagnostic reasoning. The interactional mapping showed the main parties in the interaction: the presenter, the tutor and the other participants. The thematic mapping indicated that the main underlying themes were those of expertise and uncertainty. In Chapter 6, I looked at the case presenting theme and key structural sub-phases of case presenting sequences and found that in Bedside PBL the presentation shared many characteristics of case presenting in other settings. In these tutorials however, the display of expertise was related to how presenters took up the roles that were available to them and displayed discursive expertise in the case presenting genre and question and answer management.

In this chapter, I move on to the second major structural phase and focal area. As I suggested in Chapter 6, diagnostic reasoning occurs during case presentation and in this chapter I focus on the diagnostic reasoning phase of the case presentation. Specifically, I look at the discursive manifestation of clinical reasoning, and how this



reasoning is infused by degrees of uncertainty. My research questions are:

- how, in a problem-based interaction setting, do students shift between activity roles vis-à-vis question and answer sequences as a means of reaching agreement or consensus?, and
- how does their management of uncertainty (as evidenced in their questions and answers) relate to the negotiation and distribution of expertise?

I argue that shifts in activity roles – among chair, presenter, scribe or discussant - are evident in how claims are made, and that these promote or undermine “zones of credibility” (Atkinson, 1995). Generally, a competent professional impression is presented through the manner of articulating claims and supporting evidence or warrants.

I present an analysis of a number of extracts that highlight student participant interaction, particularly in the diagnostic reasoning phase. Using the activity analysis approach and integrating Glenn and Koschmann’s (2005) functional breakdown of diagnostic reasoning into my analysis, the structural mapping identifies sub-phases in the sequences of diagnostic reasoning (Section 7.3.1). The interactional mapping indicates the participation structure (Section 7.3.4). In examining the contexts in which certainty and uncertainty feature, having already identified discoursal markers of certainty and uncertainty in the presentation of the case history (as we saw in Ron’s presentation examined in Chapter 6), I examine the discoursal evidence of such markers in the diagnostic reasoning phase (Section 7.3.3). In Chapter 5 we saw how this structural phase features the highest level of interaction by the student participants and here I examine how participants manage the shifts and overlaps between clinical and pedagogic frames in the diagnostic process.

In most of the tutorials in the dataset under examination, the focus of discussion was the generation and evaluation of differential diagnoses, based only on the reported information gleaned from the patient interview and physical examination. Although within the pedagogic setting students want to appear informed, the very nature of the tutorial and the PBL context means that students may have many uncertainties. When there is uncertainty, questions are asked in the hope of reducing it. In the PBL tutorial setting, there is thus a tension between the discussants' wish to display competence in appropriate professional ways, and to be credible discussants, in their discourse role of questioners and their activity role as novice physicians.

## **7.2 Studies on diagnostic reasoning and uncertainty**

In this section I review key concepts relating to diagnostic reasoning of which uncertainty is most pertinent to this study. An inevitable feature in the articulation of clinical or diagnostic reasoning in the tutorial setting is the expression of uncertainty, or its corollary, likelihood, as participants discuss and weigh up the evidence for or against differential diagnoses. This is particularly true of the PBL tutorial where problems are ill-structured and open-ended. In Chapter 2, I reviewed the evolving perspectives in the literature on the role of uncertainty in clinical discussion by students and novice physicians. Atkinson problematised the view of uncertainty in clinical discourse as carrying connotations of incompetence and incomplete knowledge. He argued that, given the evidence-based nature of clinical discussion and clinical reasoning, both certainty and uncertainty are ways of “warranting” claims and are highly context dependent as their participation is mediated by the roles afforded to them. Building on this perspective, I also make use of Atkinson’s (1995) notion of evidentiality, and introduce Antaki’s (1998) notion of accountable practice in relation to evidence, warrants and responsibility, before moving on to consider studies in the

PBL setting for their insights into tutorial participants' views of uncertainty in the case presentation and diagnostic reasoning process.

Let me recap briefly the arguments presented by Fox and Atkinson. Fox (1959) argued that student uncertainty was a result of incomplete mastery and understanding of medical knowledge and asserted that students were unable to distinguish between the limits of their own ignorance and the limits of medical knowledge. Atkinson (1995) on the other hand, taking the perspective that uncertainty is dependent on context, argued for a more nuanced understanding in which personal experience and knowledge are valued as warrants for certainty (rather than uncertainty). He also argued that certainty has practical and moral value in terms of responsibility and agency. This relates to the view of reasoning as “accountable practice” (Antaki, 1988). The provision of evidence or warrants to account for diagnostic and general epistemological claims may be seen as an indicator of a developing professional discourse in medical education and practice. As Duchan and Kovarsky (2005:4) note, “what counts as evidence ... and what counts as appropriate reasoning” are keys to understanding the diagnostic process and this can only be conveyed through discourse.

We have already seen how Harry, during the case presentation phase, failed to provide adequate accounts in Chapter 6 (Section 6.3.6) and how he shifted responsibility for claims to the patient. It is clear that diagnostic reasoning in the PBL setting would be particularly marked by uncertainty and, as the case history unfolds, as discussed in Chapter 6, information may be withheld in the PBL context (as Ron appeared to do) to generate discussion. While this kind of strategy may be used by the

presenter, the other participants, as discussants, seek to reduce their uncertainty and make credible contributions to the discussion.

Making credible contributions involves an assessment of evidence and the discursal marking of this through what Atkinson called evidentiality (1995: 210) where “utterances are marked in various ways to suggest that the evidence they report on is not certain, or that the interpretation of that information is unsure, tentative or contested.” Sarangi and Clarke (2002) proposed the notion of “probable knowledge” in genetic counsellors’ interpretations of genetic risk. Sarangi and Clarke pointed out that good reasoning builds on both certainty and uncertainty and that participants in an encounter may justify their claims through the provision of evidence, expressed along a spectrum of certainty/uncertainty. The quality of evidence is expressed through probability, a relationship Sarangi and Clarke referred to as “a marriage of the logical and the psychological, the subjective and the objective aspects of how probability is discursively realized in everyday settings.” (2002: 10) They highlighted the relevance of inference in evaluating evidence and go on to offer a binary division of probability, one that is to do with confirmation and the other to do with frequency through notions of range and normalcy which can be qualified or “guarded” assertions (2002:10).

Although Sarangi and Clarke’s analysis focused on the professional genetic counsellor, the notion of “probable knowledge” features in my data in both clinical and pedagogic discourse, as knowledge which students have recourse to in their hybrid roles as novice physicians and students. Through the strength of their “knowledge” claims, medical students may establish their academic and professional

credibility. So how reasoning is introduced through linguistic and rhetorical devices is significant.

In order to provide credible evidence, especially in the context of making a diagnosis, it might be expected that there would be a preference for certainty, in the form of factual evidence and scientific knowledge, as “warrants for certainty” to use Atkinson’s expression (1984). Uncertainty has been reported as a central concern of students. Knight and Mattick (2006), in interviews with second year medical students on their beliefs about knowledge, found that they “display[ed] different levels of uncertainty in the limits of their own knowledge, of evidence, of patients’ accounts and of scientific knowledge” (2006: 1085). Knight and Mattick found that more sophisticated conceptualizations saw that there was a “need to evaluate evidence due to the ill-structured nature of the problems” but some students saw this as a way of “justifying their beliefs rather than as a way to form opinion” (Knight and Mattick, 2006: 1094). The latter perspective contrasts with Atkinson’s (1995) view of opinion as an evaluation of the warrant or evidentiality. The tracing of evidentiality “creates a story, which first, brings the reported events under the single unifying rubric of a case or a history, and, secondly, creates different domains of credibility and zones of competence” (Atkinson, 1995: 121).

Moving to studies of PBL tutorial interaction, in a study of the diagnostic process as evidenced in first and second year PBL tutorials, Glenn, Koschmann and Conlee (1999) and Glenn and Koschmann (2005) showed how, in a PBL tutorial, reasoning through an interactive and iterative process is carried out in the context of diagnostic reasoning sequences. Their data examples showed hypotheses or “theories” being introduced, discussed and discarded and replaced or accepted. In the earlier paper,

Glenn et al. (1999:130) showed how students “orient to theorizing as a central activity” in which theories are “process[ed]” through agreement, disagreement and questioning. This interactional and collaborative theory-building, they emphasised, is a “primary virtue of the PBL process” (1999: 130): “Theories survive or fall in a rhetorical, intersubjective, communicative context ...[a theory succeeds] not because of any inherent “truth” or rightness it possesses but as a result of talk that follows it” (1999: 130). In other words, theory-building is afforded by the activity in which they are participants. According to Glenn et al, theories are evaluated against one another and group members give the formulator of the theory space to present it and thus make it an accountable practice (Antaki, 1988). Glenn et al. also suggested that group interaction has two organizing frameworks: group problem solving and teacher-student interaction, and that there may be tensions between these. As I note repeatedly in Chapters 5 and 6, this echoes the tension between the clinical and pedagogic frames.

The later paper by Glenn and Koschmann (2005), using the same tutorial data and a conversation analysis approach, examined how participants initiated, and responded to differential diagnoses or hypotheses. Glenn and Koschmann suggested that as group members orient themselves to the pedagogic demands of the assessment context they move “on-stage” (2005: 172), and show an awareness of the need to display their learning. They point out that “whatever happens in the mind of someone coming up with a diagnosis, it gets constituted through language-in-interaction, produced in and for social contexts that may involve judgments of the competence or expertise of the diagnoser” (2005: 153).

There are similarities in Glenn and Koschmann's (2005) description of the stages of the diagnostic process to what was found in Tutorial 2 Case 1 (see Chapter 6, Section 6.3.2). Just as I noted that the tutor in Tutorial 2 Case 1 asked for hypotheses at each stage of the history presentation, Glenn and Koschmann found that "group members are expected to produce many hypotheses in brainstorming fashion" (2005: 172). They go on to focus on how participants "*occasion, present and respond* to hypotheses" (2005: 155, italics in original) and point out that both tutors and students may cause hypotheses to be produced. To a certain extent these elements have already been seen in Tutorial 2, Case 1 in which the patient Ms Wong had suffered an "ascending numbness": the tutor asked for diagnostic hypotheses immediately following Ron's presenting of the patient's chief complaint. In our data, in response to the tutor's question, Sue volunteered a hypothesis: "I would uh think of some spinal cord problem or peripheral nerve problem". In contrast to this, under Ron's chairing in the case concerning the young man who had been surfing (Tutorial 1 Case 1), students were seen to take the initiative to generate hypotheses as I shall show in the detailed analysis later in this chapter.

In terms of the discursual mechanisms by which participants discuss their theories, Glenn and Koschmann (2005: 160) noted the ways in which theory presenters "mark their relative confidence in, or commitment to" their diagnostic claims through declarative intonation, interrogative intonational contours, questioning, and uncertainty markers such as modals. The response to hypothesis presentation is seen in acceptance, rejection, repair, questioning and proposing further tests or actions to confirm or reject the hypothesis. Importantly, Glenn and Koschmann illustrated how several of these "components", as they refer to them, work together to produce a consensual decision. However, while they mentioned how students orient to the

diagnostic discussion phase they did not investigate how this could be mediated through the activity and discourse roles that they take up. I turn to analyse and discuss the discursive markers deployed in diagnostic reasoning in the data in the final section (Section 7.5).

### **7.3 Mapping of the data**

In this analytical section of this chapter, I focus on how the reasoning process develops through question and answer sequences, the display of evidentiality and management of uncertainty. In particular, I focus on the contributions of the other student participants, that is not the student presenter or tutor, as they engage in diagnostic reasoning and take up roles in the activity. I draw on Glenn and Koschmann's (2005) work in my structural mapping, Sarangi and Clarke's (2002) view of the importance of role, likelihood and normalcy, Atkinson's (1995) notion of a "cline", or degrees of, certainty/uncertainty, all of which have been reviewed and discussed in Chapter 3.

#### **7.3.1 Structural mapping**

In the structural mapping of a diagnostic reasoning sequence I have selected a sequence from Tutorial 1 Case 1, already familiar from the analysis in Chapter 5, in which Ron has presented the case history of a young man who appears to have suffered a stroke. Taking as my starting point the initiation of the diagnostic discussion, or "occasioning" to use Glenn and Koschmann's term (2005), I identified sub-phases within the key structural phases. I termed each key phase a hypothesis, thus diagnostic hypothesis 1, diagnostic hypothesis 2 etc. In the process of mapping I found that Glenn and Koschmann's sub-phases of occasioning, presenting and responding to hypotheses matched what appeared to be happening in my data and



have used their terms. I added the phase “Closure” and a sub-phase “Reaching consensus” to signal the end of the recursive or iterative pattern.

**Table 9 Structural mapping of diagnostic reasoning phases Tutorial 1**

Turn nos.	Structural phases	Sub-phases
229 - 256	Diagnostic hypothesis 1	Occasioning (2 turns)
		Presenting (5 turns)
		Responding to (20 turns)
257 - 274	Diagnostic hypothesis 2	Occasioning (1 turn)
		Presenting (1 turn)
		Responding to (25 turns)
275 - 291	Diagnostic hypothesis 3	Occasioning (1 turn?)
		Presenting (4 turns)
		Responding to (12 turns)
291 - 301	Closure	Reaching consensus

The structural mapping in Table 9 shows that three hypotheses are presented in this phase and these are occasioned each time by one or two turns as in turns 229-231. While the presenting of the hypothesis appears relatively brief in number of turns, responding to the hypothesis predictably takes up most turns as this is where the discussion takes place. Of interest in the first sub-phase is who occasions the presenting of the hypothesis and how this occurs, and, similarly, how participants move from one structural phase to the next and who signals this move. Finally, the question arises as to what form responding to the hypothesis takes and who participates in this. These issues can be explored by undertaking interactional mapping which follows.

### 7.3.2 Interactional mapping

The interactional mapping reveals the participation structure. The number and volume of turns taken by the participants in the whole sequence is shown below:

**Table 10: Distribution of Number and Volume of turns**

	Ron	Tutor	Keith	Jan	Trudy	Sue
No. of turns	28	21	14	12	3	3
Volume of turns (by word count)	296	284	98	120	27	27

Ron, the presenter and chair, takes most turns, followed by the tutor and this is matched in terms of volume. Keith and Jan have 14 and 12 turns respectively, but Jan's turns are longer than Keith's (120 to 98 words) while Sue and Trudy have three turns each of the same volume. In previous chapters we have noted the predominance of questions; in this sequence only thirty per cent of the total turns are questions (23 of the total 73 turns). Previously, the overall pattern was that the tutor asked most questions, but in this diagnostic reasoning phase we see a different pattern:

**Table 11: Distribution of Questions**

	Keith	Tutor	Jan	Ron	Trudy	Sue
No. of questions	7	5	2	3	1	1

In this phase, of the student participants, Keith asks most questions (7) with the other participants asking one, two or three each. The tutor asked 5 questions. The number of questions asked by participants appears to be unrelated to the number of turns or volume of turns by participants. While question and answer sequences do not appear to play a particularly prominent role in this diagnostic reasoning phase, the function of the questions is nevertheless of interest. The tutor's questions for example, are all

open, wh-questions concerned with the key agenda here: identifying the site of the lesion that has caused the patient's symptoms and testing the students' knowledge in relation to this. The questions asked by Keith, who asks most questions, are almost all information-seeking, except "could it be (possibly) multiple sclerosis?" However, several reasoning statements might also be categorised as questions in that they appear to seek confirmation. I turn to this question in the following section on thematic mapping.

### 7.3.3 Thematic mapping

I go on to analyze the thematic interplay between certainty and uncertainty, its contingency on the roles the participants were playing at the time, and how this interplay afforded or constrained the display or management of expertise. In the diagnostic reasoning sequence selected, I also coded the markers of uncertainty, or evidential markers, including rhetorical expressions of factuality, and probability or likelihood such as modalising verbs, adverbs and adjectives, trust (reported speech, cited figures), and numerical data. I then attempted to group these intuitively and compared the groupings with themes referred to in the literature to see if any affinities could be found. The table below shows examples of uncertainty markers in this phase of the tutorial (excluding factual indicators such as "was/were" and knowledge seeking questions):

**Table 12: Examples of uncertainty markers Tutorial 1 Case 1**

Speaker (Turn no.)	Uncertainty markers (uncertainty markers italicised)	Coding
Jan (32)	{[smiling]} so I <i>just wonder whether</i> the surf~ing have any relationship with this episode of weakness, because the surfing was three days ago: and	Evaluative
Jan (34)	it <i>seems</i> that there isn't any: any specific things that happened during that activity, (.)	Evaluative
Ron (37)	] yes that is what I was thinking	Evaluative

Ron (39)	uh no just that those two days of activities (.) it <i>may be</i> related and <i>may be not</i> related (.)	Evaluative
Fay (46)	] yeh but <i>I don't know</i> what is this disease	Knowledge limits
Ron (49)	(.) um: I'm <i>not particularly sure</i> about this {[smiling and looking at T]} (.)	Degree of uncertainty
Ron (51)	{[smiling and looking at T]} <i>maybe</i>	Degree of uncertainty
Fay (52)	you're <i>not quite sure</i>	Degree of uncertainty
Ron (64)	mm: I didn't particularly ask about the headache but it uh <i>seems</i> that it was constant pain, and troubled him so that he consulted outpatients OPD	Evaluative
Sue (134)	this patient presented with um (smile) weakness of: uh left hemiparalysis and hemiparesis and without any cranial nerve deficits (.) from the history (.) <i>so we would think</i> that the lesions <i>would be</i> above the brain stem	Hypothesising
Sue (136)	<i>if</i> it is the spinal cord problem at least it <i>should be</i> at the cervical region that it <i>would affects</i> both upper limb and lower limb {ac} but then uh it <i>should be</i> uh both side um would be weak instead of hemipares hemiparalysis	Conditional reasoning
Ron (140)	] so <i>it's suggested</i> that the lesion <i>should be</i> uh above the uh brain stem	Hypothesising
Jan (231)	<i>so suppose</i> the high mental function is alright: <i>then</i> it is something sub-cortical, <i>I guess</i> , because there's uh due to the distribution of the weakness and the sensation on the same side <i>so</i> we have mentioned that it's <i>like need</i> to be above: the spinal cord since cranial nerves are intact <i>so it should be</i> above the brain stem so:: (.)	Conditional reasoning
Jan (233)	and <i>because</i> sensory is also involved <i>so</i> it's not in the internal capsules <i>so I guess</i> it's <i>somewhere</i> sub-cortical: (.) (shrugs)	Conditional reasoning
Sue (236)	but <i>I'm not sure</i> how does the Horner's relate to the: sub-cortical lesion (.)	Uncertainty / limits of knowledge
Ron (247)	yes it's <i>possible</i>	Evaluative
Keith (249)	so it <i>may not be</i> the stroke that caused the Horner's syndrome	Hypothesising
Ron (255)	] I also <i>do not know</i> how to correlate the Horner's with uh the this clinical picture	Uncertainty / Limits of knowledge
Keith (278)	multiple neurological lesions <i>could it be (possibly)</i> multiple sclerosis?	Hypothesising
Ron (279)	I <i>guess</i> multiple sclerosis <i>would be</i> uh progressive onset rather than: the patient come uh sudden onset complete paralysis	Evaluative

Ron (291)	I want to ask <i>if</i> there is a stroke in a internal capsule <i>can</i> the sensory be affected?	Uncertainty / Limits of knowledge
-----------	--	---

Table 12 illustrates the types of uncertainty markers used by the presenter and student participants in the first case in Tutorial 1. They are placed in order of appearance to give the flavour of the reasoning process as it moves between the evaluation of symptoms, hypothesising, conditional reasoning, degrees of uncertainty and limits of knowledge. The markers include modals such as “may”, “could”, “would”, and “should”; modal adjectives or adverbs such as “possible” or “possibly”; and verbs such as “seems”. They also include verb forms such as “it’s suggested” and thought verbs such as “I wonder” and “I guess”, adjectives such as “sure” and “unsure”, and logical connectors that indicate reasoning such as “so”, “suppose” “if” “then” and idiomatic expressions such as and “like”. I return to these discoursal markers in Section 7.5. In the following paragraphs I present an analysis of each structural phase in more depth.

## 7.4 Diagnostic reasoning: data analysis

### 7.4.1 Presenting a hypothesis

I analyze two long excerpts below and have broken them up for ease of reference. The first group of excerpts is taken from the tutorial chaired by Ron, discussed in Chapter 5, Tutorial 1 Case 1, and are used here to show how each structural sub-phase is occasioned, and how participants orient to this and to the collaborative construction of reasoning, and in particular to show how activity roles and discourse roles can shift in the diagnostic reasoning phase. I then comment on the types of evidence, and the discoursal devices through which participants display their reasoning. The three diagnostic hypotheses are:

- i. the symptoms have been caused by a sub-cortical lesion
- ii. the symptoms have been caused by the same lesion that caused the patient's Horner's syndrome
- iii. the symptoms are a result of a multiple sclerosis lesion

This excerpt is taken from halfway through the tutorial, in the latter part of Case 1. Ron was made chair at the beginning of the tutorial and he is also the presenter of the history. At this point, previous to turn 229, the other participants have questioned Ron on the case history findings.

*Example 1: Occasioning and presenting a diagnosis, Tutorial 1*

- |     |       |   |
|-----|-------|---|
| 229 | Ron   | no (.) actually the partial ptosis I had noticed from the case notes and I only noticed the right sided miosis yes (.) (nods) so um what are the uh uh how can we correlate the physical finding with the history in this patient?  |
| 230 | Tutor | so first question is: get the answer you know the question where is the site of the lesion? (.)   |
| 231 | Jan   | so suppose the high mental function is alright: then it is something sub-cortical, I guess, because there's uh due to the distribution of the weakness and the sensation on the same side so we have mentioned that it's like need to be above: the spinal cord since cranial nerves are intact so it should be above the brain stem so:: (.) |
| 232 | Tutor | mm mm   |
| 233 | Jan   | and because sensory is also involved so it's not in the internal capsules so I guess it's somewhere sub-cortical: (.) (shrugs)  |

In turns 229-231 we see both Ron and the Tutor working towards the first hypothesis in this phase. Ron had just mentioned the noticing of the patient's ptosis, and at the start of Turn 229, admits that he had read about it in the case notes. Perhaps in order to deflect attention from this failure to "stick to the rules" and *not* look at notes, Ron reverts to his activity role as Chair and puts a question to the group: "how can we correlate the physical finding with this patient?". The tutor

follows up in Turn 230, in his activity role as tutor but also taking over Ron's role to an extent, to advise students to diagnose the site of the lesion. At this point, with "so..." in turn 231, Jan steps into the frame and presents the first part of her hypothesis that "it [the lesion] should be above the brain stem", with supporting evidence. While Jan's uncertainty is indicated by "suppose", "I guess", "it's like" "so it should be", these are uttered in the context of her activity and discourse roles as PBL participant and discussant, and she displays her stance while not committing herself fully to the diagnostic hypothesis she is articulating. It is significant that there are few questions in these sub-phases but that in presenting a hypothesis the presenter nevertheless appears to seek confirmation or rejection.

In the next example we see students applying common sense reasoning based on their knowledge of the coldness of the hospital air-conditioning.

*Example 2: Responding to a diagnostic hypothesis, Tutorial 1*

- |     |       |   |
|-----|-------|---|
| 236 | Sue   | but I'm not sure how does the Horner's related to the: sub-cortical lesion (.)          |
| 237 | Keith | were there any marks of sweating on the face? Did the patient notice any?               |
| 238 | Ron   | no (.) I notice: uh from the case notes that there is anhidrosis on the right side      |
| 239 | Jan   | uhhh (laughs) how can you feel anhidrosis in the hospital air-conditioning environment? |
| 240 | Ron   | mm so I only observe it on the case notes (general amusement)                           |
| 241 | Keith | did you ask the patient afterwards?   |
| 242 | Ron   | (shakes head) ]   |
| 243 | Sue   | ] but it's difficult to notice that   |
| 244 | Jan   | ] you   |
| 245 | Sue   | you don't even sweat in the uh hospital   |
| 246 | Keith | but the Horner's could have occurred previously?  |
| 247 | Ron   | yes it's possible (nods)  |
| 248 | Jan   | (laughs)  |

- 249 Keith so it may not be the stroke that caused the Horner's syndrome
- 250 Ron (nodding) yes
- 251 Jan ] (laughing) ohh
- 252 Ron (shrugs)
- 253 Keith ] (.) (.)
- 254 Tutor mm so
- 255 Ron ] I also do not know how to correlate the Horner's with uh the this clinical picture
- 256 Tutor ] mm (general nodding) well you have a good learning objective (.) what are the different causes of Horner's syndrome, (.) you know (.) so where where is the site of the lesion if a person has Horner's syndrome

Sue's statement in turn 236 restores the discussion to the clinical frame despite her admission of uncertainty – “but I'm not sure how does the Horner's related to the: sub-cortical lesion”. In the subsequent discussion, the participants look for connections between the patient's symptoms and Horner's syndrome to help determine their acceptance or rejection of the first hypothesis. In the next turn (237), Keith asks whether the patient had experienced decreased sweating – anhidrosis – a symptom of Horner's syndrome. Here we see the students collaboratively trying to reduce the level of uncertainty through reasoning, including common sense reasoning. For instance, Jan laughingly asks (239) “how can you notice anhidrosis in the hospital air conditioning environment?” The case notes also play a role here: on the one hand, Ron in his role as presenter, produces information from the notes as evidence in his discussion of claims and, in the sequence from turn 237 to turn 255, he admits that the absence of sweating was not his own observation but from the case notes, causing amusement among participants.

In this sequence, Jan's disaffiliative laughter (Glenn and Koschmann, 2005: 160) and question in turn 239 have the effect of casting doubt on the facticity of the notes. So



we see Ron in turn 240 humorously downplaying his responsibility or attachment to this claim by stressing “so I only observed it from the case notes” and aligning himself with Jan. Ron’s responses in this sequence put him initially in the role of presenter of the patient’s history with knowledge of the case, but then his lack of commitment – “it’s possible” (247), and shrugging response in turn 252 – while they could be seen as an indicator of his role as chair and controller of the PBL agenda, not wishing to pre-empt further discussion, may also point to a wish to align himself with his peers. especially when there are uncertainties to be resolved. In turn 249 Keith concludes “so it may not be the stroke that caused the Horner’s syndrome”, and all agree. Finally, in turn 255, Ron admits to sharing a lack of understanding and at this point the tutor steps back into tutor and chair roles to set a new learning objective on the causes of Horner’s syndrome and this sub-phase comes to an end.

#### **7.4.2 Occasioning and presenting the second hypothesis**

The second hypothesis is whether the lesion causing the patient’s Horner’s syndrome is related to the patient’s stroke symptoms. This is presented through a question to the group: “you know (.) so where where is the site of the lesion ... if a person has Horner’s syndrome(.)” (Turn 256)

In the excerpt above, the Tutor, in his pedagogic role, occasions the discussion of the hypothesis with the students, prefacing his question with “so”. The implication of his question is that knowing the site of the lesion for Horner’s can help to establish whether the patient’s stroke symptoms are connected to the same lesion or another. It seems that an indirect question can also suggest a hypothesis and prompt reasoning.

### 7.4.3 Responding to a diagnostic hypothesis

*Example 3: Responding to a diagnostic hypothesis, Tutorial 1*

257 Ron upper (.)  
258 Tutor ] if the autonomic system is compromised  
259 SS ] sympathetic ganglion  
260 Tutor mm mm (.) you know the sympathetic system  
supplying the the the: where does this locate do you  
know?  
261 Trudy T1 to L2  
262 Tutor mm mm (.)  
263 Ron it's in the sympathetic trunk  
264 Tutor ] yes  
265 Ron (.) column and in this case the Horner's syndrome is  
suggested for cervical sympathetic trunk (.) affected  
266 Tutor mm mm (.)  
267 Ron and it can be due to compression, ischemia,  
vasculitis,  
268 Tutor mm mm  
269 Ron different causes  
270 Tutor mm mm (.)  
271 Ron so actually in this case ]  
272 Tutor ] so you don't think the facial palsy is relevant for  
this case? (.)  
273 Ron mmm: I: don't think so  
274 Tutor mm mm (.)

The pedagogic frame is set up by the tutor and the student participants have an opportunity to display their knowledge while at the same time being led through the reasoning steps. In his pedagogic role, the Tutor is checking the students' knowledge of the causes of Horner's syndrome, but he is also moving the discussion forward as the information would help students to decide whether such a lesion might be related to the stroke. The use of questioning to model reasoning and scaffold the learning process is discussed in Chapter 8 on the tutor's role. The tutor uses questions to move the discussion forward in turns 256-258 and 260 and his

non-committal backchannelling responses prompt Ron to respond further and elaborate on his earlier answer. Trudy's response in turn 261 also meets with this response.

#### **7.4.4 Occasioning and presenting the third hypothesis**

The third hypothesis is occasioned by Keith who through a short phrase suggests a diagnosis of multiple sclerosis, repeating this tentatively in question form in turn 278.

##### *Example 4: Occasioning the third hypothesis, Tutorial 1*

- |     |       |   |
|-----|-------|---|
| 275 | Keith | mm (.) multiple neurological lesions occurring,                             |
| 276 | Ron   | nn?   |
| 277 | Jan   | ] nn?   |
| 278 | Keith | multiple neurological lesions could it be (possibly)<br>multiple sclerosis? |
| 279 | Jan   | oh:   |

Keith's unsolicited hypothesis in turn 275 – “multiple lesions occurring” – seems to be met with some surprise by Jan and Ron, so Keith then phrases his suggestion more tentatively: “could it be (possibly) multiple sclerosis?” Like the laughter earlier, the sounds of surprise prompt a tentative and uncertain presentation of the hypothesis.

#### **7.4.5 Responding to a diagnostic hypothesis**

The response to Keith's hypothesis illustrates how different forms of evidence may be introduced to support or reject a particular hypothesis. In Example 5, Ron refers to his knowledge of ‘normal’ presentations of multiple sclerosis along with factual evidence from the case history.

*Example 5: Responding to a diagnostic hypothesis, Tutorial 1*

- 280 Ron I guess multiple sclerosis would be uh progressive onset rather than: the patient come uh sudden onset complete paralysis
- 281 Keith (^^^)
- 282 Jan ] not that acute not that acute
- 283 Keith how acute was the sudden left side weakness at 2 a.m.?
- 284 Ron yes our patient can tell the exact time when he felt the weakness
- 285 Keith does that mean he was woken up by it or he was still asleep
- 286 Ron ] he was woken up (.) he was want he was going to the toilet, and he found he had a weakness he found he cannot walk ]
- 287 Jan ] mm mm (.)
- 288 Keith this means he couldn't walk but he also how about his upper limbs?
- 289 Ron mm
- 290 Keith muscle (.) function
- 291 Ron there was also paralysis of the left upper limb (nodding) so it's a total left body paralysis with a sudden onset (.)

Ron adopts his role as presenter and expert on the patient history by contrasting the typical symptoms of multiple sclerosis with the patient's presenting symptoms, which seem atypical – an interesting instance of normalcy referencing (Sarangi, 2002) in comparing the patient's symptoms with those that are normally seen in cases of multiple sclerosis. Jan suggests that the onset of symptoms was not so sudden. Ron couches his disagreement in tentative terms, presumably not to indicate uncertainty but to mitigate the effect of his disagreement with Keith's hypothesis: "I guess multiple sclerosis would be uh progressive onset rather than ...sudden onset". Following Jan's "not that acute not that acute"(Turn 282), Keith pursues his line of reasoning with "how acute was the ...weakness" (Turn 283) and then asks about the

extent of the patient's paralysis. Ron's response – "there was also paralysis of the left upper limb...so it's a total left body paralysis with a sudden onset" (Turn 291) – has the effect of bringing this line of reasoning to a close.

#### 7.4.6 Reaching consensus and closure

I stay with the same tutorial as other examples of closure in the dataset feature frequent tutor interventions, which I discuss in Chapter 8. In this tutorial, in the last sub-phase, we see the students reaching a consensus on the diagnosis.

##### *Example 6: Reaching consensus and closure, Tutorial 1*

- |     |        |   |
|-----|--------|---|
| 291 | cont'd | actually I want to ask if there is a stroke in a internal capsule can the sensory be affected?  |
| 292 | Tutor  | yes possibly  |
| 293 | Ron    | Yes   |
| 294 | Jan    | ] but isn't it that the sensory fibres not really directly passing through the internal capsule?<br>[5 turns omitted]   |
| 300 | Jan    | mm:   |
| 301 | Ron    | I would think it is uh the site of lesion would be uh: the sub-cortical region on the right side affecting the mid s: mid ce m the mid cerebral artery region (that's it) |

Jan takes part in the discussion with a question: "but isn't it that the sensory fibres not really directly passing through the internal capsule?". The form of the question with the preceding "but isn't it that" suggests that she feels able to disagree with the Tutor and Ron in this setting. The Tutor offers an explanation and clarification and in turn 299 repeats his initial question from the beginning of the phase, the question which occasioned the interaction described in the analysis above: "where is the most likely site of the pathology" (the lesion). Ron's response with no interjections from other participants indicate consensus.

What is noticeable in the examples above is the nature of questioning in diagnostic reasoning. In Section 7.3 the number of questions was found to be unrelated to the number of turns or volume of turns by participants.

#### **7.4.7 Section summary**

In the diagnostic reasoning phase we have seen a shift in the roles taken up by the participants. The activity roles of student participants and novice physician are also part of their role-set, while the Chair, who may take on these roles, is also seen as a provider of information. The evidence used to support reasoning ranges from types of clinical knowledge (e.g. of Horner's syndrome, multiple sclerosis) to common sense knowledge or personal experience (the absence of sweating and the hospital air-conditioning). Here and throughout the data (See Appendix, Tutorial 1), the management of uncertainty is expressed syntactically and semantically by modal verbs, adjectives and adverbs, "thought" verbs such as "think" or "wonder" (cf. Atkinson, 1984, 1995; Sarangi and Clarke, 2002, Lingard, Garwood et al., 2003). As mentioned above, the expression of uncertainty depends on the speaker's attitude to or belief in the claim or hypothesis.

In the following section, I highlight the discoursal mechanisms used by the student participants to express uncertainty and likelihood in diagnostic reasoning sequences.

#### **7.5 Discoursal marking of uncertainty in diagnostic reasoning**

Participation in the activity, if it contributes to the achievement of the activity goals, can heighten credibility (Atkinson, 1995; 1998). We have seen how in discourse roles such as questioner and discussant, likelihood and possibility are resources for the interpretation of the evidence for claims. In the PBL context, questioners and

discussants prompt the raising of new issues and explore different possibilities, thus moving the discussion forward. The discourse may contain indications of doubt and uncertainty but these may have the effect of displaying an astute assessment of the issue at hand, and an awareness of what is necessary in the context. Consider the marked and explicit uncertainty of a contribution by Jan:

“so *suppose* the high mental function is alright: then it is *something* sub-cortical, *I guess*, because there’s *uh* due to the distribution of the weakness and the sensation on the same side so we have mentioned that it’s *like* need to be above: the spinal cord”

This suggests a degree of expert reasoning but also, possibly, an alignment with the speech of her peers in “I guess” and “like”. This might even be seen on the one hand as an attempt to downplay her expertise but the evidential markers also downplay her degree of support for the line of reasoning she is proposing.

Participants do not always make their warrants explicit: they may instead assume a shared knowledge, following Labov and Fanshel’s notion of A/B events in which the two parties in an encounter assume a shared knowledge (1977). Jan’s earlier doubtful remark “I wonder if the surfing had anything to do with the injury” (see Section 7.3.3 Table 12) does not make explicit her interpretation or the assumption underlying this – that surfing can cause injury to the neck and head and is therefore one hypothesis available to the students – but this is evident to the group. This kind of ellipsis is noted by Erickson in his analysis of diagnostic talk (1999). The indication of uncertainty here – “I wonder if...” – does not affect her credibility; on the contrary, it indicates a willingness to participate, and a sense of responsibility for participation in the discussion.

Student participants play several roles within the tutorial activity: the role-set at their disposal is a resource for participation. The shift of roles, both discourse roles and

activity roles, for example from questioner to respondent, or presenter to chair, reflects awareness of both clinical and pedagogic frames and how to respond in each scenario and manage uncertainty.

I turn now to the discoursal features of the diagnostic reasoning phases to show how student participants negotiate uncertainty. I take examples from Tutorial 2 Case 1 as representative of the other tutorials in the dataset. These examples show students using evidential markers such as conditional forms to indicate contingent reasoning as they describe what further evidence they would need, and making use of markers of uncertainty such as modals when proffering differential diagnoses. In Tutorial 2 Case 1 the Tutor asks students to brainstorm and list differential diagnoses after each sub-phase of the presentation. It is not surprising that participants do not immediately respond with a diagnosis but instead point out what kind of knowledge they would need before volunteering a hypothesis. Consider the following examples in which discoursal markers have been highlighted: for example, Sue uses ‘whether’ to indicate conditional reasoning (Turn 12 Tutorial 2):

um from the chief complaint we know that um uh the deficits mainly involve the sensory but *I would still like to know whether* the motor is involved (.) and um from the chief complaint we know that it’s involving the lower limbs, (.)]

Sue continues (Turn 16 Tutorial 2):

um:: it *seems* mainly involving the lower limbs but *I would still like to know whether* the upper limb is spared and um *if* it is involved the lower limb I *would think* more about uh: pathology in the spinal cord, um *if* it is involving the spinal cord I *would like to know* whether there is any uh sphincter disturbance, um so I um after these few questions I *would uh think* of some spinal cord problem or peripheral nerve problem (0.2)

Sue’s use of “seems” may not indicate her own uncertainty but is rather a function of the tutor’s question at this early stage of the tutorial. It might sensibly reflect her



understanding that there is a great deal more information to come and as such is an indicator of her expertise in responding to the tutor's request. There is use of conditional reasoning with "if it is involved" and "if it is involving" and the subsequent "I would like to know..." which is dependent on the condition being met. Sue is therefore articulating questions to which the answers would provide further evidence to confirm/disconfirm hypotheses.

In the diagnostic reasoning sequences in this tutorial, we see uncertainty expressed in modals such as "seems" and the "thought" verbs such as 'would like to know', 'if', 'I would think' and the subjunctive form "would". For example, in Tutorial 2 above, Cathy's single tentative utterance suggests her thought processes:

"uh *I'm wondering* about onset {ac} of the numbness {dc} is it uh how acute is acute is is there *may be* like a vascular cause say inflammatory cause *so I'm wondering like if there were* any systemic symptoms"  
(Turn 18, Tutorial 2).

This accords with the earlier observations of Atkinson (1984, 1995) and Lingard, Garwood et al. (2003) regarding thought verbs and the use of modality. Again in Tutorial 2, Fay (Turn 22, Tutorial 2) suggests a diagnostic hypothesis – "it could be viral infection" – with the modal expressing a degree of possibility, while Sue offers "myelitis?" (Turn 24), as discussed in Chapter 6. After the presenter provides more information regarding the onset of the complaint, its chronology and symptoms, Keith suggests "myelitis transverse myelitis" (Turn 82) while Fay offers the following hypothesis but immediately offers a negative assessment of its likelihood – as "could be a presentation of multiple sclerosis but uh: at age of sixty-one the onset is a bit late" (Turn 84) – bringing in the notion of normalcy. Following Sarangi's (2002) discussion of normalcy in the genetic counselling situation, here we see the use of contrast to weaken a diagnostic claim. Later in turn 87, the tutor also makes use of

normalcy to assert what “usually” occurs in multiple sclerosis. In this example, we also see the use of contrast, concession, and evaluations of evidence in terms such as “typical”, “unlikely” and “usually” and the connector “therefore” to indicate the result of the argument. Here participants compare the specific case they are discussing with what is the norm. Another example is seen in Tutorial 4 in Martin and Eric’s interchange in the case of Madam Wu where there is an implied comparison with the normal age at which menopause begins and osteoporosis might set in:

- 323 Martin yeh ***I think*** that fifty something is still too young to have  
uh significant osteoporosis ]  
5 turns omitted
- 329 Eric ***depends on*** when uh when did the menopause start

After the provision of further history in Tutorial 2, the tutor asks students what else they would like to have information about and why. This offers the students an opportunity to display their clinical knowledge: Fay, for example, says “I would ask if the patient has diabetes” and when the tutor asks her why, she is able to explain “because for peripheral neuropathy it can it’s also uh ascending from the most distal part first”. These examples are used within the clinical frame and rather than diminishing the participants’ credibility, their contributions come across as being professional.

## 7.6 Summary

In this chapter I have presented an analysis of a number of extracts that highlight student participant interaction, particularly in the diagnostic reasoning phase, making use of activity analysis and Glenn and Koschmann’s (2005) functional breakdown of diagnostic reasoning. The structural mapping of diagnostic reasoning sequences

identified, in addition to the sub-phases of occasioning, presenting and responding to hypotheses set out in Glenn and Koschmann's model, the sub-phases of closure and reaching consensus (Section 7.3.1). In the interactional mapping I found that there were fewer questions in the diagnostic reasoning phase and that the students asked the great majority of those questions (Section 7.3.2). In the thematic mapping (Section 7.4) I showed how the focal theme of diagnostic reasoning was discursively indicated by markers of uncertainty as participants provided evidence for or against the hypotheses. In Section 7.5 I analysed the reasoning sequence in depth and compared my findings with that of another tutorial.

Regarding the first of the two research questions focal to this chapter, it is clear that the activity roles taken up by participants in diagnostic reasoning sequences affect the management of uncertainty and the participants' "zones of credibility". Presenters have opportunities to display more certainty in their roles of knower or information provider, depending on the thoroughness of their patient interview. Where there is collegial discussion, uncertainty is a marker of evidentiality and reasoning. The student participants seem to be moving towards a professional rhetoric of expertise, which embeds an increasing "professional rhetoric of uncertainty" (Lingard, Garwood et al., 2003) in the clinical frame. In line with Anspach's (1988) and Atkinson's (1995) advocacy of greater use of discourse analysis in studies of professional socialization, I have looked at discursive markers of diagnostic reasoning in relation to expertise and uncertainty and, in terms of the students' professional socialization, found that discursive versatility lends credibility to their contributions to diagnostic reasoning sequences.

In answer to the second of my two research questions focal to this chapter, I found that student participants' display of formulations of likelihood and uncertainty to some extent supports views of the role of uncertainty as an indicator of lack of knowledge, and thus credibility, but these formulations also illuminate the role of uncertainty, probability and likelihood in the evaluation of evidence. While there are many instances in which tutors provide evidence for the likelihood of a disorder or symptom, and refer to what Atkinson called "tried and tested routines", students lack the experience with which to justify such claims. However, they do refer to a notion of normalcy (Sarangi, 2007) as in the mentioning of menopausal age, and make some use of common sense evidence, as in the discussion of the hospital air-conditioning. In the data the comparison with what is normal or what is generally known is implied. This might be seen as a type of experiential reasoning, though not necessarily based on clinical experience. Such formulations also make use of the 'if-then' conditional structure, which again implies knowledge of an underlying relationship or rule.

In the next chapter – "The role of the tutor" – I consider in more detail what I have touched on in this chapter: the tutor's role. I also look specifically at how in a problem-based interaction setting, tutors shift between the activity specific roles vis-à-vis question answer sequences and consider how these affect the display and negotiation of expertise and the management of uncertainty. The next chapter foregrounds how the teacher's role in clinical PBL tutorials is to keep a balance between the clinical and pedagogic frames and to this purpose utilise his (experiential, procedural and substantive) knowledge and expertise.

## **Chapter 8: The Tutor's role in Clinical PBL tutorials**

### **8.1 Introduction**

Having focused chiefly on the roles of the presenter and the other student participants in the previous chapters, I now look at the activity-specific roles taken up by the tutor in the tutorials, notably in the many question and answer sequences. I have shown how the tutorial interaction is characterised by hybridity in its shifting from clinical to educational frames. Such shifts can be triggered by the students, but the tutor plays a critical role in introducing and sustaining an educational frame. The mapping exercise in Chapter 6 and 7 revealed the key features of case presenting and diagnostic reasoning and, discursively, question and answer sequences. Shifts in activity-specific roles entail shifts in clinical and educational frames and this is accomplished through the question-answer sequences. The interactional mapping in Chapter 5 revealed how the role of the tutor is a key component of the participation framework of the tutorials, with the tutor asking more than half the questions and taking up over one third of total turns. With my focus now fixed centrally on the role of the tutor, I address these research questions:

- how, in a problem-based interaction setting, do tutors shift between the activity specific roles within their role-set vis-à-vis question answer sequences?, and
- how do these shifts affect the display and negotiation of expertise and the management of uncertainty?

I structure this chapter in terms of the tutors' roles and role-set and how role and frame shifts are accomplished through question-answer sequences. I first present studies on the role of the clinical tutor in medical education contexts (Section 8.2.1), notably the precepting (supervising) context which, through the focus on case history presentations, has parallels with the PBL setting. I also draw on the PBL literature on the tutor's role (Section 8.2.2). The data analysis (Section 8.3) begins in the same way as in the previous chapters through structural, interactional and thematic mapping of the tutor's participation in Bedside PBL tutorials. Examples from the dataset are then used to illustrate the ways in which the tutor's role emerges and shifts and is negotiated in the management of the trajectory and substantive focus of the tutorial (Section 8.4). I focus particularly on question-answer sequences.

## **8.2 Studies on the role of the tutor in medical education**

In this section, I first discuss research studies on the tutor's role in precepting in the ward teaching context, a setting (referred to in Chapter 2 Section 2.5.4), like the clinical tutorial, centred on case presentations by interns. As detailed in Chapter 2 (Section 2.5.4), the key prior work on tutor management behaviour in this setting was conducted by Pomerantz and colleagues (Ende, Erickson and Pomerantz 1995; Pomerantz, Fehr and Ende, 1997; Pomerantz, 2003). They focused on how the tutor's role shifts to manage not only the activity and content of the precepting discussion but also the relationships with the interns. In this chapter, I first discuss the role of the tutor in the precepting setting and follow this by reviewing findings from previous interactional studies of the tutor's role in PBL tutorials in medicine.

### **8.2.1 Tutor strategies and role**

When Ende, Pomerantz and Erickson (1995) speculated on the rationale behind preceptors' student management strategies, a setting with implications for the PBL context due to the core activity of case presenting, they noted that teachers' beliefs regarding how people learn might influence their interactive practices, and what roles they take up in the hybrid teaching setting of the hospital ward. Of particular interest in relation to the PBL setting, are the strategies Ende et al. (1995) identified as preceptors' correction strategies: for example, they found that preceptors used covert strategies such as silence to show "non-acceptance" of an answer. Ende et al. termed these tutor strategies "opportunity spaces" (1995: 226) and suggested that such an approach offered interns an opportunity to reflect on and revise their responses. I discuss evidence of such covert strategies in my own data later in this chapter.

The preceptors were also found to modify their paraphrase or summary of the interns' answers to approximate correct answers, while seeming to indicate approval of what the intern had said: "In many, if not most, of the corrections noted, the preceptors corrected in a fashion that made their corrections, at least at first glance, seem as if they were not correction at all." (Ende et al., 1995: 224). Ende et al. described this as "mitigation of corrections" (1995: 228), where tutors reformulated their questions to guide interns towards a more appropriate response rather than making overt corrections of their answers, a similar strategy to that described by Zemel and Koschmann (2011) later in this chapter (Section 8.1.3). Since other-initiated correction could be seen as a threat to professional expertise, preceptors might soften the force of the correction by adopting a more collegial manner, a mitigation of authority that Goffman (1961) described as "role distancing", as such strategies work

to preserve the intern's "positive face" while minimizing the speaker's own authoritative role. Ende et al. argued that the overall aim of these face-sensitive strategies is to help maintain a cooperative and collaborative footing, where the preceptors align themselves with interns. They point out that this approach may not succeed if the interns are not socialised into the discursive constraints of the precepting context, thereby failing, for example, to appreciate why the supervisor is being so indirect. Ende et al. also found from interviews with preceptors that they used these strategies to encourage greater autonomy and less tutor-reliance in their interns. They suggested these strategies were simultaneously motivated by tutor concern for both patient care and the intern's professional development, "self-discovery", sense of responsibility and their continuing collegial professional relationship.

In the problem-based learning literature, the tutor is frequently referred to as a facilitator or guide: "The teacher acts as a facilitator to guide student learning through the learning cycle" (Hmelo-Silver, 2006: 236). Hmelo-Silver (2004) describes the role of the tutor as critical in contributing to the success of PBL: the tutor "helps guide the learning process through open-ended questioning designed to get students to make their thinking visible and to keep all the students involved in the group process" (Hmelo-Silver, 2004: 239). The role of the tutor's "open-ended questioning" is seen as integral to this facilitator role with regard to maintaining student participation and discussion of reasoning. However, the tutor's role as guide or facilitator is only one of several that may be afforded by the PBL setting.

Tutors are also seen as being able to offer content expertise and several studies have compared specialist clinical content-expert tutors, with non-expert tutors, with no



experience of clinical practice, such as laboratory scientists, with inconsistent results regarding effectiveness. Schmidt and Moust (2000) reported studies correlating levels of student achievement and type of tutor, also with conflicting results. They suggested that the “effective facilitator” had a “suitable knowledge base regarding the topic under study, a willingness to become involved with students in an authentic way, and the skill to express oneself in a language understood by students” (2000: 47). Gilkison (2004) concluded that clinical content tutors tended to be more oriented to content knowledge than to the educational process. Svinicki (2007), in an overview of PBL research, found that the tutor’s role could be a constraint on collaborative work, and emphasised the need for tutors to find the “correct path” between constraining and promoting learning (2007: 58). Barrows and Tamblyn (1980) suggested that an expert tutor was preferable, defining the tutor’s expertise as lying not only in the PBL problem’s content area but making the point that they also required skills to guide the students and evaluate their learning.

A number of studies have sought to find out how medical students perceive tutor style and effectiveness. Grove, Rego and O’Rourke (2005) asked students to rate their tutors and found that while tutors with clinical expertise were rated as able to make use of their expertise to facilitate group learning, there was no difference in the assessment of tutors’ overall effectiveness as, similar to Ende et al. above, they surmised that students might not be sensitive to the ways in which tutors display expertise, similar to Ende et al.’s concern above. It might be argued that most teachers would engage in facilitating roles and that facilitator in relation to activity specific roles in PBL and within clinical/pedagogical frames is just one of the roles that tutors may take up. In a review article, Maudsley (1999) noted that students valued the tutors’ clinical expertise, but suggested that tutors should only make use of their

expertise occasionally so as not to pre-empt discussion. Maudsley also noted that when areas of content expertise were discussed the tutors were more directive, spoke more and “presided over exchange patterns that were predominantly tutor to student” (1999: 659), which shows the tutor in a different role, that of managing content.

A recurring theme in the survey literature is that student participation is supported not only through content expertise but also through social or affective means. Schmidt and Moust (2000), basing their findings on student ratings, suggested that tutors need to develop both “cognitive congruence” with their students, i.e. the “ability to understand and to express him or herself at the student’s level of knowledge”, and social congruence, a “sensitivity” (2000:43) to when to intervene, and how best to contribute. They suggested that the tutor is, however, a “last-resource device”, of whom students can ask questions “when everything else fails” (2000: 40). In order to investigate how precisely tutors intervene in and contribute to tutorial participation, a few studies have taken a discourse analytic approach, and these are discussed in the following section.

### **8.2.2 The tutor’s role in scaffolding learning and modelling expertise**

Scaffolding is a Vygotskian term for the use of strategies or resources to support learning. Its use in PBL tutoring has been extensively reported upon, notably in a special issue of the journal *Discourse Processes* (ed. Koschmann, 1999). In this volume several researchers, from different perspectives, analyzed the same video clip of a PBL group meeting in which students were raising and discussing diagnostic hypotheses. Frederiksen’s (1999) cognitive analysis of the data found that the tutor’s moves helped scaffold an organised and coherent approach to reasoning and diagnostic inquiry. He based this conclusion on his finding that the tutor initiated the

main steps in the reasoning sequence, which he identified as reviewing the medical history, establishing the body system(s) or pathological process(es) involved, deciding upon a diagnosis, and finally reviewing the evidence for that diagnosis. Frederiksen offered the example of the tutor asking “so if it’s vascular did he have a stroke or a transient ischaemic attack?”, an example almost identical to one occurring in my data, to be discussed in Section 8.3.1.

In subsequent analyses of the same data as that used by Frederiksen (1999), Palinscar’s sociocultural study showed that the tutor played an important role in creating a culture in which the participants could work to reach consensus, validate each other’s ideas, and establish norms (Palinscar, 1999). The tutor was shown to require expertise in both the clinical frame but also in the educational frame. Palinscar (1999) illustrated how these frames overlap in the following “talk-in-interaction” analysis of a PBL tutorial in medicine with third year students who are looking at a chart depicting the brain:

...the coach seeds the conversations at important junctures, enabling the group to proceed. For example, four of the participants in lines 17-31 are offering their conjectures as to the location of the hippocampus when the coach, in line 33, helps the group find an appropriate view in which to find the hippocampus. Similarly, in line 104, when the students are jointly constructing an argument in favor of a space-occupying lesion, it is the coach who provides the counterevidence that would need to be explained to support this particular argument (i.e., "So why do the leg findings go away?"). In lines 124-126, ["so if it’s vascular did he have a stroke or a transient ischaemic attack” (TIA)] the coach plays a pivotal role in modelling the process of building an argument when he urges the students to consider the differences between a stroke and a TIA as a means of evaluating the evidence in favor of one or the other diagnosis. Finally, as the dialogue bogs down and approaches a near standstill around line 152, it is the coach who breathes new life into the conversation with his question, "So which one did he ha:ve?" (1999: 168)

We see the tutor use questioning to model the reasoning process and manage the tutorial content, and he manages the activity by bringing the group to a diagnostic

decision, with the request for a decision “So which one did he ha:ve?”. While not focusing specifically on the tutor’s role, the papers in this volume (1999) by Frederiksen, Palinscar and Glenn, Koschmann and Conlee have given useful insights into the tutor’s roles as guide, model and teacher, notably on where the tutor guides students’ reasoning, encouraging them to consider further and/or different evidence and to evaluate that evidence.

Other more non-directive tutor strategies have been identified in PBL research. Koschmann, Glenn and Conlee (2000), in their analysis of “knowledge display segments” in a second-year PBL tutorial discussion of the use of CT (computerised axial tomography scans) in pregnancy and its possible risks, show the tutor withholding information when the discussion reveals a lack of knowledge on the part of the students. Instead of giving the students the answer, the tutor encourages students to “think it through” - “Wel-wt think-think it through what does the X-ray beam have to do in ordinary X-ray, how much en- what does the energy have to do,” (Koschmann et al., 2000:60) - and allows the group to share their understandings and their uncertainty until they decide to establish this as a new learning issue. Koschmann et al. note that rather than offer “direct instruction” (2000: 64), the tutor uses non-directive scaffolding to facilitate reasoning, allowing students to evaluate their uncertainty, thereby helping them to specify more clearly the area of knowledge about which they are uncertain.

The tutor’s behaviour in withholding information and encouraging exploration of a particular knowledge segment is significant, Koschmann, Glenn, and Conlee (2000) suggest, as it shows the tutor’s role as one of facilitation through scaffolding “in that they offer a framework for reasoning about the topic and applying prior knowledge”

(2000: 63). Koschmann et al. compare this approach with what they refer to as a “traditional” or non-PBL tutorial in which the IRE (Initiation-Response-Evaluation) sequence (see Chapter 3, Section 3.5.1) is the predominant discourse pattern and the tutor provides the answers to the students: “the different strategies utilized by the tutors suggest that they are pursuing different set of goals in the two settings” (2000: 64). Koschmann et al. note the similarities between the traditional tutorial and PBL settings: “joint problem-solving” and “an asymmetric exchange in which the tutor assumes a distinguished role and is called on to model expert problem solving strategies” (2000: 67). They stress that in PBL, however, “there are norms ...that do not apply to more conventional tutorial interaction” and suggest that this is reflected in the apparent chaos of PBL interaction in which “a more precise order can be seen to emerge” (2000: 67). These findings suggest that in PBL tutorials the characteristics of the activity type are significant in establishing the activity goals and tutor roles in both the management of content and the tutorial process.

A close parallel to this study is a recent study by Zemel and Koschmann (2011) of PBL tutorials featuring third year students and an experienced clinical tutor, which looked more closely at the IRE (or IRF) sequence. They point out that although in theory PBL should facilitate student identification of gaps in their knowledge and what students need to know:

Tutors routinely participate in PBL sessions since it is acknowledged that recognizing a deficit in what one knows or understands can be difficult if not locally impossible to achieve without some kind of guidance from someone whose competence or expertise exceeds that of the students. (Zemel & Koschmann, 2011: 476)

Their study focused on the third part of the IRE sequence, the Evaluation, in which tutors have opportunities to reformulate the question they asked in the first part, so

that students may repair or correct their response. They show that the third part reformulation can also be used for tutors to self-correct, and give an example where the tutor's first question is:

Tutor: Movin' right along before we fo:llow he:r (.) do you all know the action of Doxicillin? How it uh how it affects the organism?

When the answers to this question appear inadequate, instead of offering an evaluation, the tutor in the third part of the IRE sequence reformulates the question:

Tutor: So what's it ↓do (0.8) ↑to the poor little Chlamydia

The tutor reformulates yet again with an either/or question:

Tutor: Does it kill ↑off the bacteria or ↓does it just >hold them still.<

This strategy appears to be akin to Koshik's (2005) "other-initiated repair" of the "trouble source" or alternative question repair. In Zemel and Koschmann's example, the students eventually realise the shortcomings of their knowledge and turn to their reference books before identifying their error and establishing a new learning issue.

Zemel and Koschmann summed up the tutor's role as follows:

Getting students to think in particular ways may not occur if a teacher just presents a version of the reasoning process as a correction to student errors. Getting students to actually think in unfamiliar ways may require guidance and manipulation of the students' own reasoning as it is accomplished in situ. Questions provide a mechanism for doing just this, for calling on students to check their thinking (Zemel & Koschmann, 2011: 486)

Zemel and Koschmann (2011: 486) suggested that the tutor can use this type of questioning strategy to facilitate convergence in thinking: "The tutor achieved this convergence incrementally and interactionally with the students by avoiding explicit evaluation in the third position of the IRE and instead reinitiating the sequence with new questions". It is worth noting that the tutor in these examples moves from open questioning to a closed either/or question, which may be seen as both limiting and

aiding the preferred response. I suggest that in the examples discussed by Zemel and Koschmann, the tutor takes up hybrid roles as s/he manages the tutorial process, and the uncertainty in student knowledge – which appeared not to be evident to the students until the tutor had used the IRE sequence to advance their reasoning. The tutor may also be seen to be managing the display of expertise by students in giving them opportunities to do so.

In summary, it has been widely shown that the role of the tutor is crucial in sustaining a PBL environment, from both a pedagogical and clinical perspective, but how this actually comes about has not been explained adequately in the literature. Although Koschmann et al (2000: 67) assert that they have reconceptualised the role of the PBL tutor in renaming the tutor a “coach”, and have noted the asymmetric exchanges and “distinguished role” of the tutor, they do not break down the concept of role further. Analysis of my data (in Chapters 6 and 7, but covered in more detail below) shows that tutors have a range of roles at their disposal and that many of the tutors’ interventions in the discussion take the form of questions. We have seen how question and answer sequences contribute to tutorial interaction and, in Chapter 6, how students take up certain activity roles in case history presenting. In this chapter, we examine how a range of activity roles are taken up by the tutor, in the context of diagnostic reasoning sequences. I explore how tutors negotiate their roles in the management of tutorial participation, and orient to the focal themes of diagnostic reasoning, expertise and the management of uncertainty.

### **8.3 Mapping the tutor’s participation**

I begin the analysis with a structural and interactional mapping of a question and answer sequence in the diagnostic reasoning phase of Tutorial 5 to identify the sub-phases in the

structure. I have selected the sub-phase in which the participants are responding to different hypotheses as to the cause of the patient's chief symptom of "dizziness". The sequence is fairly representative of many of the question and answer sequences in the data with a high level of tutor involvement. Other examples from a range of tutorial sessions in the dataset are also provided in the further analysis.

This tutorial was preceded by a case presentation in the ward where the tutor and students carried out the physical examination together. On entering the tutorial room, discussion of the symptoms began with the chief symptom, dizziness.

### 8.3.1 Structural mapping: responding to diagnostic hypotheses

The structural mapping of the first part of Tutorial 5 charts the functional progression of the discussion. In this tutorial the participants embarked immediately on discussion and diagnostic reasoning as, two days previously they had interviewed the patient and reported the history to the tutor at the bedside of the patient in the ward and identified learning issues, the first of these being the symptom of dizziness.

**Table 13: Responding to diagnostic hypotheses**

Turn nos.	Structural sub-phases
1-3	<i>Orientation</i>
4-	Categorization of "dizziness"
5-46	Symptoms of central and peripheral vertigo
47-86	Differences between central and peripheral vertigo
87-96	Causes of peripheral vertigo
97-232	Differences between central and peripheral vertigo
233-239	Relating causes to patient
240-253	Differential diagnosis (TIA)
254-276	Central or peripheral cause
277	Diagnosis (stroke)
278	Location of stroke lesion



The structural mapping of this section of the tutorial begins with Eddie's categorization of the lay category of dizziness into clinical terms (Turn 4). There then ensues a lengthy discussion (approximately forty turns) of the symptoms of one kind of dizziness, vertigo, and the two types of vertigo, central and peripheral (Turns 5-46). In the next sub-phase (Turns 47-86), the participants focus on differentiating between the two types and then (in a shorter sequence) identifying the causes of peripheral vertigo (Turns 87-96). The discussion returns to the differences between the two types of vertigo in the very long sequence from Turns 97 to 232. At the end of this phase the participants relate their discussion to the current patient (Turns 233-239), and between Turns 240 and 253 debate a possible diagnosis of a transient ischaemic attack (TIA). At this point the discussion returns again to whether the patient is suffering from central or peripheral vertigo (Turns 254-276) and in Turn 277 the diagnosis of stroke is made. The discussion then moves on to identification of the site of the lesion causing the stroke.

The structural mapping highlights features of diagnostic reasoning, such as translating the patient's symptoms into clinical terms through the categorisation of symptoms and explanation of causes (Goodwin, 1994). It is apparent from the structural mapping that distinguishing between the two types of vertigo might be problematic as these sequences take up most of the turns. However, the structural mapping does not reveal why this may be so nor does it tell us about the tutor's participation, so in order to look more closely at the participation frameworks we need to turn to interactional mapping.

### 8.3.2 Interactional mapping

The interactional mapping shows that the tutor took almost as many turns as the rest of the participants combined (130 out of a total of 266 turns). Of the student participants, Zelda, Martin and Chris took approximately 30 turns each. Looking more closely at the types of turn, the following is typical of this tutorial.

*Example 1: The tutor as tester, Tutorial 5*

- |    |        |   |
|----|--------|---|
| 46 | Tutor  | = cerebellum yeh could be acting on the cerebellum as well so it could be central isn't it so drugs need not necessarily just only act peripherally they can act centrally as well ....are there any thoughts I mean how are you going to distinguish between central and peripheral causes but also on the |
| 47 | Martin | central causes by the history of the  |
| 48 | Tutor  | = louder, talk to your  |
| 49 | Martin | = you mean by the history of the physical examination   |
| 50 | Tutor  | yeh any features  |
| 51 | Eliza  | as mentioned by K, um peripheral peripheral causes of vertigo are often associated with hearing problem, tinnitus while for central causes uh like cerebellar uh space-occupying lesions the patient uh may complain of nausea, vomiting, headache  |
| 52 | Tutor  | would you get that in peripheral as well, nausea vomiting would you get those   |
| 53 | Eliza  | uh depending but the pattern  |
| 54 | Tutor  | = you seem to be shaking your head would they get it  |
| 55 | Eliza  | I think so  |

Here we see the tutor's use of a closed question "are there any thoughts", which functions as an open question in its desired response as indicated by the reformulation in the open question in Turn 46, "how are you going to distinguish between peripheral and central causes...". The remaining tutor questions (Turns 50, 52 and 54) are closed, or abbreviated or full yes-no questions.

Overall, in this tutorial, the majority of tutor questions are yes-no questions (approximately 50), while wh-questions amount to about 20. The count is approximate as many of the tutor's questions are reformulations and are in statement form. The tendency to use yes-no questions may be a factor in the brevity of the student responses. Despite these limitations the tutor is clearly controlling the activity and student participation, but in what way and why is not clear from the interactional mapping, so for further explication we need to turn to thematic mapping.

### 8.3.3 Thematic mapping

As noted in Chapter 5 (Section 5.2.3), thematic mapping considers the propositional and procedural content of the turns taken by participants in an encounter; where the scope of the mapping extends to an entire tutorial or case, it is more useful to identify recurrent themes in the activity type, what Roberts and Sarangi (2005) refer to as focal themes. The thematic mapping of the sequence of turns in Tutorial 5 indicates that the tutor is concerned with the extent of student knowledge and student participation, that is knowledge management and activity management.

**Table 14: Themes in Tutorial 5**

<b>Tutor Turn</b>	<b>Interaction transcript</b>	<b>Theme</b>
46	how are you going to distinguish between central and peripheral causes	Knowledge management
48	louder	Activity management
52	would you get that in peripheral as well,	Knowledge management
54	you seem to be shaking your head would they get it	Activity management

This pattern is representative of the tutor's approach and is seen from the beginning of the tutorial. It shows that there is an alternation to some extent between the clinical and pedagogic frames with knowledge management emerging through the tutor's role in scaffolding student reasoning, and managing the activity as a pedagogic endeavour where the tutor tries to engage students in the discussion. All of this is enacted through questioning.

## 8.4 Data analysis

### 8.4.1 Questions and the tutor's role

In this section, we see how the tutor uses a range of questioning strategies to manage the trajectory of the tutorial. In the first part of Tutorial 5, Eddie, in his role of scribe, presents his understanding of the symptom of vertigo and at the same time writes notes on the whiteboard.

#### *Example 2: Tutor as activity and learning manager, Tutorial 5*

- 4 Eddie Uh ...when we clerk cases uh... dizziness is a very common complaint uh that we encounter and under dizziness uh we could interpret it uh under three categories uh one is uh syncope [writing on board] and the second one could be vertigo ...and the last one it could be uh disequilibrium uh which is um motion sickness ...and under each category uh there is a list of differential diagnosis that we need to consider uh say in vertigo as in my case, vertigo we could differentiate under central and peripheral causes ... [7 lines omitted]  
yeh that's for the vertigo ... and then for the syncope
- 5 Tutor before you go on any thoughts or comments on what he's said so far do you want to add to that one let's just consider vertigo first before we go to syncope anybody wants to add, correct, amend .... you look as if you want to say something
- 6 Kevin He's presenting quite good [laughter]
- 7 Tutor Right OK anybody no anybody thought want to add on to this discussion ....
- 8 Kevin Maybe the characteristic of the vertigo in central ....

- 9 Tutor OK ... well perhaps you'd like to just add to that
- 10 Kevin Well in the case of uh central vertigo usually it is more severe constant and not related to position and do not have any ear symptoms like tinnitus and hearing loss and sometimes associated with cerebellar sign ... while that for peripheral vertigo it's opp it's just opposite but the but this not always true you may have hearing tinnitus or hearing loss in the case of central not a hundred per cent....
- 11 Tutor Any other thoughts? .... any other thoughts?
- 12 Harry I think the (in deciding the) exact lesions]
- 13 Tutor ] speak a bit louder
- 14 Harry Oh I think (....) exact lesions in the brain um drugs or alcohol can cause vertigo
- 15 Tutor So you think that there could be other drugs as well acting where peripherally centrally?
- 16 Harry Peripherally
- 17 Tutor You think so? Drugs adding,
- 18 Harry Um on the on the
- 19 Tutor ] such as what
- 20 Harry aminoglycosides
- 21 Tutor ] so aminoglycosides OK aminoglycosides where would that act mainly
- 22 Harry on the inner ear
- 23 Tutor on the inner ear OK autotoxicity OK alright drugs any other drugs since you are on the (.) topic of drugs?
- 24 Harry alcohol
- 25 Tutor alcohol ... yes,
- 26 Harry that's all I can think of
- 27 Tutor that's all / any other any other thoughts on drugs? Can you think of any other side effects of drugs that could give you ....cerebellar signs or cerebellar symptoms

At the beginning, in the pedagogic frame, the tutor asks yes-no questions, soliciting responses from students, such as “before you go on any thoughts or comments on what he’s said so far do you want to add to that one let’s just consider vertigo first before we go to syncope anybody wants to add, correct, amend.... you look as if you want to say something” (Turn 5), “right OK anybody no anybody thought want to add on to this discussion” (Turn 7) and “any other thoughts any other thoughts” (Turn 11). The controlling of the activity is seen in his intervention in Eddie’s presentation and

his control of the content as he asks students to elaborate Eddie's contribution. Kevin's initial response in Turn 6 "he's presenting quite good" occasioned laughter from the group in its inappropriateness but could also indicate that he was surprised to be targeted as "knower" in this break of frame. He appears not to have realised that the frame of the tutorial had changed from a clinical frame in which Eddie as presenter was in control, to a pedagogic frame in which the tutor had taken back the floor from Eddie and targeted Kevin as a student to test. The tutor does not comment on Kevin's response and asks for other contributions on the topic.

In the interchange with Harry (Turns 12-27), the tutor uses reformulation to elicit further elaboration: "So you think that there could be other drugs as well acting where peripherally centrally?" (Turn 15) and in several instances he prompts further information as in "You think so? Drugs adding, ..." his rising intonation cueing the completion of the statement by the student. This sequence of questions, rather than reflecting problems with the questioning (Zemel & Koschmann, 2011), shows instead a wish for elaborated responses.

Where the content is clinical but the tutor is using "known answer" questions there is an overlap between the clinical and pedagogic frames. The tutor's questions seek the general or "normal" effects of aminoglycosides or drugs on cerebellar symptoms rather than being related to the particular patient and are clearly testing the student's knowledge. They begin with a wh- or open question such as "[...] so aminoglycosides OK aminoglycosides where would that act mainly" (Turn 21) but often continue with abbreviated yes/no questions: "that's all / any other any other thoughts on drugs? Can you think of any other side effects of drugs that could give you.... cerebellar signs or cerebellar symptoms" (Turn 27) where despite the closed question "can you think of

...” the meaning understood by participants is more likely to be “what are the other side effects?”. Later the tutor follows up a request for participation and further information with a more specific knowledge checking question, “anti-convulsants.... such as?” (Turns 29-35). After several questions of this type he identifies an apparent disjunction in student responses: “you seem to be shaking your head would they get it” (turn 54) and “so your colleague seems to disagree with you” (Turn 56) and takes an approach to the management of the activity which puts the students in adversarial positions.

This degree of control over the tutorial activity is an indication of the asymmetry of roles (Thomas, 1983; 1996) that participants take up. The tutor by virtue of his authority as tutor and expert clinician tests student knowledge and orchestrates disagreement through knowledge discrepancies. The pedagogic frame is dominant although the content of the discussion is clinical. The tutor maintains control of the interaction, and his leading yes-no questions and open questions scaffold student reasoning and aim to reduce uncertainties of knowledge. This may be contrasted with the thematic mapping exercise discussed in Chapter 5 (Section 5.2.3) where the tutor sometimes took up the role of collaborative participant as his questions suggest in the sequence below:

*Example 3: The tutor as collaborative participant, Tutorial 1*

- |     |       |  |
|-----|-------|--|
| 123 | Tutor | so any speech problem, any,  |
| 124 | Ron   | ] no dysarthria (.) no dys uh dysphasia (.)                                  |
| 125 | Tutor | any swallowing problem:? (.)   |
| 126 | Ron   | I asked him whether he choked on food or drinks and he said he did not / (.) |
| 127 | Tutor | so the patient remained: conscious all along?                                |
| 128 | Ron   | yes yes there was no episode of loss of consciousness no head injury:        |
| 129 | Tutor | mm how about the vision:?  |

While the questions in Turns 123, 125, 127 and 129 also include abbreviated yes-no questions apart from the open question in Turn 129, they establish a clinical frame as they function to seek factual information regarding the patient whose case is being discussed rather than to test or ask for a display of knowledge which would establish a pedagogic frame. However, an underlying theme here might be that through his questions, the tutor is modelling expert reasoning patterns, by showing the students what is relevant and needs to be covered in the diagnostic process.

This mapping exercise has suggested that the hybrid nature of the activity type affords tutors a range of roles and that movement between these may depend on how asymmetrical the roles they take up are, how the questions they use frame the activity, and how these determine the tutor's agenda, activity frame and the nature of student participation.

In the following discussion, I present further examples of tutor questions from a range of tutorials including the one discussed above to illustrate tutor roles and to show how tutors shift between the activity specific roles within their role-set vis-à-vis question answer sequences and how these affect the display and negotiation of expertise and the management of uncertainty. I proceed by examining several key roles that have emerged in the thematic mapping: scaffolding learning, modelling reasoning and being a collaborative participant, and acting as a knowledge provider. I take examples from different tutorials and from the case presenting and diagnostic reasoning phases to support my claims.

#### **8.4.2 Scaffolding learning through questioning**

In the case presenting stage, tutors may intervene in the presentation to check student learning and in so doing scaffold the learning process. They make use of a range of



questions such as the display or known answer question (Sinclair & Coulthard, 1975; Mehan, 1979; Cazden, 2001; Bereiter & Scardamalia, 2004) in conjunction with the initiation, response and feedback or evaluation (IRF or IRE) sequence. This is seen in the first example below, in which the tutor poses a sequence of questions to Trudy, the student presenter of the patient's case history. Trudy had presented the case history in a previous session (observed but not recorded) but not (apparently) to the satisfaction of the tutor. Trudy is therefore presenting the patient's history for a second time. The following case concerned a patient with a heart problem. Trudy had interviewed the patient and is the presenter of the case history, while Jan is the Chair of the tutorial.

*Example 4: Scaffolding learning, Tutorial 7*

- 1     Chair   first of all after yesterday it's about the investigation of uh]  
         /Jan
- 2     Tutor   ] no it's not that
- 3     Chair   about the history of this patient
- 4     Trudy   well I went back to the patient uh yesterday so uh regarding  
         the: uh chronic rheumatic disease uh it was discovered about  
         uh thirty years ago uh patient had uh: malaise at that time  
         and went to see a private doctor and he was also diagnosed  
         with hypertension in that time but he did not take any drugs  
         until about (.) until about ten years ago um
- 5     Tutor   you may .... at the side. *{Noise of chairs scraping floor as  
         late arriving students come in and sit down}*
- 6     Ron     OK
- 7     Trudy   so the antihypertensive medication was prescribed about ten  
         years ago by a private doctor and uh for the]
- 8     Tutor   ] just a moment how (.) you still have not given us sufficient  
         detail (.) this is still the history of the present illness (.)  
         WHY was he diagnosed with rheumatic heart disease thirty  
         years ago? he may might have forgotten but he can say that  
         he might have forgotten but why did he go to see the  
         doctor?
- 9     Trudy   he said he has some generalised malaise
- 10    Tutor   and then how was it diagnosed first?
- 11    Trudy   he said the private doctor diagnosed it
- 12    Tutor   mm for the first time....

- 13 Trudy (nods)
- 14 Tutor and he was only given drugs for the hypertension?
- 15 Trudy twenty years after
- 16 Tutor I know I know but he he is not given any drug for the rheumatic heart disease?
- 17 Trudy {shakes head} and uh for the warfarin um I asked him why was it necessary and he couldn't say (.) and uh for the ]
- 18 Tutor ] when wa the when was he started warfarin?
- 19 Trudy he wasn't started ]
- 20 Tutor ] when was he suggested to have had warfarin? (.) what information would that how would that information help you?
- 21 Trudy um with the onset of the atrial fibrillation
- 22 Tutor yes not the onset (.) the first detection atrial fibrillation
- 23 Trudy I asked him when was the onset of the atrial fibrillation and he said at the same time when the chronic rheumatic heart disease was
- 24 Tutor so thirty years ago ....are you surprised? (0.2)
- 25 Trudy I think it should occur later]
- 26 Tutor ] thirty years ago
- 27 Trudy ] than the onset
- 28 Tutor why?
- 29 Trudy maybe (.)
- 30 Tutor I thought you had all read up on rheumatic heart disease (.)
- 31 Chair so the rheumatic heart causes damage to the valves and like  
/ Jan if there's MS there may be affecting the atrium
- 32 Tutor mm mm
- 33 Jan so leading to
- 34 Tutor so how does it affect the atrium?
- 35 Chair Increasing the atrial pressure

The tutor's knowledge-seeking questions in turn 8 – “WHY was he diagnosed with rheumatic heart disease” and “why did he go to see the doctor” – initiate a question and answer sequence that extends to turn 30 and includes ten tutor questions. These questions in Turn 8 establish the pedagogic frame, with the Tutor's assessment of the adequacy of Trudy's presentation: “just a moment how (.) you still have not given us sufficient detail (.) this is still the history of the present illness (.) WHY was he

diagnosed with rheumatic heart disease thirty years ago?” at once indicating that he felt that Trudy had moved on prematurely from the history of the present illness and that more detail should be provided. Through his intervention the tutor shows that it is necessary to give further explanation. His information-seeking questions continue in turns 10, 14, 16 and 18. In these turns, rather than being a collaborative participant, the tutor appears to be seeking to fill in gaps in Trudy’s presentation and thus instructing her, by pointing out her omissions, as to what should be included in her presentation. Turn 10 may be seen as an example of other-initiated repair as it offers an alternative question to the first one.

Trudy’s reformulation of the question signals that she misunderstood the original question, and seems to be an invitation to correct her original response (Zemel & Koschmann, 2011; Koshik, 2005). As Zemel and Koschmann suggest, this may indicate that the trouble source might be the tutor’s original question. Although the tutor is taking up a role as information seeker and the questions position the tutor as “unknowing”, the prefacing evaluative remarks and the emphasis given to the question words signal a pedagogic frame, where the questions serve to indicate the need to warrant the original diagnosis of rheumatic heart disease in the case history. The tutor’s open question in turn 10 - “and then how was it diagnosed first?” - also serves to maintain the pedagogic frame and indicate to students what should be reported in the case history. These open questions give Trudy the floor and invite her to give a full explanation, but she does not pursue these options. Instead, Trudy relays the voice of the patient: “he said he has some generalised malaise” and “he said the private doctor diagnosed it”.

By marking the patient as an actor and voicing his words, such responses may be seen to remove agency and responsibility from the student presenter, as she appears to distance herself from the original claim (Sarangi, 2002). This may be compared with Ron's use of reported speech in Chapter 5 (Section 5.2.3), which had the effect of highlighting the fact that he had asked the patient the particular question rather than as a means of distancing himself from his role as expert presenter of a case history (Sarangi, 2002; Atkinson, 1995). In the example above, the tutor is scaffolding Trudy's presentation by allowing her the opportunity to fill in the gaps (Ende et al., 1995).

The tutor then shifts (Turn 20) from scaffolding the presentation content to a question that tests Trudy's reasoning: "when was he suggested to have had warfarin? (.) what information would that how would that information help you?" Trudy's response to the first question - "with the onset of the atrial fibrillation" - is corrected by the tutor as he gives a more precise answer in Turn 22: "yes not the onset (.) the first detection atrial fibrillation". As already discussed in Chapter 5, tutors may use "known-answer" or display questions to test students' clinical knowledge and reasoning skills. Such questions are ones to which the tutor already knows the answers and we can assume that in turns 18 and 20, in addition to asking open, information-seeking questions to ascertain the chronology of the drug treatment, the tutor interjects a known-answer question "...how would that information help you?", inviting participants to make connections between aspects of the history. Here we see a clear shift to a pedagogic frame from the information-seeking "when was he suggested to have had warfarin", to a test of the students' reasoning abilities, and opening up the question for contemplation by all participants, thus controlling both activity and content. Once again Trudy seems reluctant to grasp the opportunity to take the floor for a longer

turn; her response in Turn 21 consists of a short phrase - “with the onset of the atrial fibrillation” – perhaps indicative of a desire to yield the floor. When the tutor in turn 22 corrects Trudy’s use of the word “onset”, replacing it with “detection”, he appears to be indicating to all participating students the expectation of greater precision in their history presentations. The tutor’s questions help to scaffold the learning of an important component of the case history presentation, the chronology. The questions serve to establish a clear chronology of previous illness and treatment by channelling the student towards particular answers.

In the context of the reporting of past medical history, the tutor makes use of declarative closed questions – e.g. “and he was only given drugs for the hypertension?” - asking for confirmation of his understanding that no drugs were prescribed for the rheumatic heart disease. His follow-up question in turn 16 – “he is not given any drug for the rheumatic heart disease?” – is a result of Trudy having misunderstood the tutor, offering him a further comment on hypertension when he was maintaining his line of questioning on the original diagnosis of rheumatic heart disease. The repetition also serves to warn the other participants that Trudy’s response was inappropriate, thus, as we saw above, a remark that appeared to be addressed to one participant may be taken on board by other ratified participants (Levinson, 1992[1979]). In turn 17, Trudy shakes her head in a negative response with no elaboration but then proceeds to offer information on the prescription to the patient of the drug *warfarin*, commonly prescribed to patients with heart disease. In her framing of this response Trudy again appears to fail to provide an adequate account (Scott & Lyman, 1968), although the patient’s reported failure of memory may to some extent excuse this.

The tutor continues to maintain a pedagogic frame in turn 24 when he asks a yes-no closed question: “are you surprised”. This appears intended to elicit further elaboration, rather than be taken at face value, since he follows up immediately with a request for elaboration - “why?” - in his next turn (28), testing the student’s grasp of the significance of the time period. This contrasts with what follows on from the tutor’s next statement “I thought you had all read up on rheumatic heart disease” (turn 30), as he specifically addresses the other participants, who until this point had merely formed an audience for the interchange between Trudy and the tutor. The Chair, as one of the ratified listeners, gives the kind of account that was missing from Trudy’s answer, and the tutor’s backchannelling (“mm mm”) indicates his concurrence with the Chair; in Turn 34 he asks an open known answer question – “how does it affect the atrium?” – to which the Chair responds by displaying her clinical knowledge, sharing what she knows and serving as a model to other participants.

The tutor’s questions in the long extract (8) above are a mix of open and closed questions, the latter often taking a declarative form. While the question-answer sequences may be seen to follow an Initiation-Response-Evaluation pattern, the open questions asked in his role as information seeker also guide students to what constitutes an appropriate history presentation. As such, they serve to elicit information and maintain the pedagogic frame. The questions provide opportunities for students to elaborate their answers and account for their claims, as the student Chair finally does at the end of the sequence. It is also significant that at this point, Turn 21, the Chair shifts from her role as Chair to that of a participant who is able to contribute to the discussion. In accepting this, the tutor may be seen as creating a flexible climate more characteristic of PBL, where anyone can contribute if it furthers the learning agenda – but where the tutor maintains control of the topic.

We have seen how the tutor's questions function as a means of indicating the qualities that are expected in a patient history: precision, substantive knowledge and thoroughness, all of which may contribute to perceptions of credibility (Atkinson, 1995). As in the earlier extract the tutor maintains control through questions, seeking to fulfil the pedagogic goals he presumably sees as important: the presentation of an orderly, detailed case history and the ability to give extended explanations for clinical symptoms. The tutor shifts between the roles of tester (when asking questions to which he knows the answer) and information seeker (when asking questions that would fill in information in the history) resulting in overlapping clinical and pedagogic frames.

#### **8.4.3 Scaffolding reasoning**

The four examples that follow, appearing consecutively in the data, are taken from the tutorial that was the subject of the mapping exercise at the beginning of the analytic section of this chapter. They provide further illustration of how tutors may maintain a pedagogic frame through the roles they take up and the questions they pose. In this tutorial, the tutor took the discourse role of questioner, as well as the activity role of chair, to engage the participants in a series of question and answer sequences. As mentioned earlier (Example 3) the tutorial did not begin with the presenting of the history. It began with the assigning of the activity role of scribe to Eddie, who also began the session with a description of the main learning issue for discussion, the symptom of dizziness or vertigo.

The following extract, from roughly halfway through the tutorial, follows a lengthy testing by the tutor of the students' knowledge of the symptoms of central and peripheral vertigo.

*Example 5: Questioning and prompting, Tutorial 5*

- 236 Tutor actually yeh bed two let's go back because the chap had tinnitus I mean he didn't have tinnitus but he had vertigo he had dizziness? OK?
- 237 Kevin Yes
- 238 Tutor so:: and he also had other (.) features didn't he? (0.3)
- 239 Kevin the: vertigo is uh: constant and sustained (.) but subside after I think (.) uh subside after one to two day (.) of the symptom of the]
- 240 Tutor ] so what are you trying to say (.) with this?
- 241 Kevin so it is self-limiting but it is central
- 242 Tutor so I see you think it's self-limiting

Here, the tutor asks students to relate the knowledge just discussed of peripheral and central vertigo to the patient's symptoms. In this way he manages the PBL agenda within the pedagogic frame and directs students towards a diagnostic claim. The tutor asks all of the questions in this extract which illustrates the role of questions in the reasoning process as the tutor asks Kevin to draw a conclusion from the symptoms he has found in his interview with the patient. The tutor's role appears to be to scaffold the reasoning process as we saw in Example 3. In turn 236 the tutor orients discussion to the case of the patient who had been interviewed in "Bed two" and the symptom of vertigo which Kevin gives in Turn 237. In turn 238 the tutor makes an assertion that he asks Kevin to agree with, a yes/no question with a tag, "so:: and he also had other (.) features didn't he didn't he", with falling intonation to elicit agreement, as in Labov and Fanshel's (1979) A/B events where both parties are assumed to share the same information, with the implication that Kevin knows what the features are and so should give a more detailed history of the symptom.

In scaffolding learning in the way described above, the tutor is letting other participants know that an elaborated response is more acceptable. The tutor, in Turn 240, poses an open question asking for an interpretation of clinical features thus



leading Kevin to try to make use of the earlier categories of peripheral and central vertigo and make a diagnostic claim in Turn 241 “so it is self-limiting but it is central”. Here, as Zemel and Koschmann (2011) also showed, the tutor’s role as scaffolder of learning, but also as tester of knowledge, is crucial in moving the discussion forward by prompting the student to offer a tentative diagnosis. It may be said that the tutor is bringing students to a realization of gaps in their knowledge, a goal of PBL in terms of identifying further learning issues, and also bringing students to a realization of gaps in their performance as competent novice physicians (Lave & Wenger, 1991).

The following example is taken from the same tutorial and continues the debate on whether the patient suffers from peripheral or central vertigo. Zelda opens this extract by explaining her causal analysis.

*Example 6: Prompting reflection and evaluating, Tutorial 5*

- 242 Tutor so I see (you think it’s self-limiting)
- 243 Zelda (no no I think) because a vascular cause is just like when you take history then somehow collaterals develop or they just improve a bit you get you get some perfusion it’s due to the vascular cause rather than the central peripheral that ](^^^)
- 244 Tutor ] does that make sense?
- 245 Martin yeh it can be seen transient ischae(mic)]
- 246 Tutor ](no) louder does it]
- 247 Martin ](it can be)
- 248 Tutor ]make sense?
- 249 Martin it can be some transient ischaemic attack]
- 250 Tutor ] do you think this was a transient ischaemic attack?
- 251 Martin uh:: (0.2) how long how long has the patient been admitted?
- 252 Kevin the patient was admitted uh three days (ago)
- 253 Martin (oh) then uh mm not likely (^^^)

The tutor uses the same challenging technique to prompt the students to reflect on their reasoning. The tutor does not comment but, in Turn 244, his yes-no question “does that make sense” transfers the evaluation of Zelda’s explanation to another student, Martin. This strategy again maintains the pedagogic frame: although the tutor “opts out” temporarily he passes on the role of assessor to Martin: “does that make sense”. After accepting the possibility of a transient ischaemic attack, (Turns 245, 247 and 249) Martin realises that the tutor is still asking the same question “do you think this was a transient ischaemic attack” and, in Turn 251, Martin withholds an answer. In order to respond, he needs more information to support or disconfirm his claim, and asks Kevin how long the patient had been in hospital. Kevin’s answer in Turn 252 leads Martin to relinquish his diagnostic claim. The tutor’s strategy in his questions such as “does that make sense” may seek wider and increased student participation but the closed yes-no question form at the same time constrains participation to short answers if taken literally and students may be reluctant to elaborate given the rapid question and answer sequences. On the other hand, within the pedagogic frame the tutor in the role of chair directs students towards a differential diagnosis.

*Example 7: seeking commitment to an opinion, Tutorial 5*

- 254 Tutor (so it’s not) a transient ischemic attack (.) what do you think it was then? (0.2)
- 255 Martin (mmm)
- 256 Tutor (you think) it was a peripheral cause
- 257 Martin I still think it’s a central cause
- 258 Tutor but why do you agree with him? {pointing to K}
- 259 Martin Yeh
- 260 Tutor you are agreeing with him, that he’s saying that it’s a peripheral cause
- 261 Martin he’s saying a peripheral cause?
- 262 Tutor because he’s saying that it’s self-limiting hence it must be

- peripheral
- 263 Kevin no no no (laughter) I'm saying it is central but I don't know why self-limiting (because it's)]
- 264 Tutor ](but) what about your colleague she just mentioned to you (.) do you accept her argument? (0.2)
- 265 Kevin yes yes I accept (.) there may be some (.) perfusion back to the brain stem area that that (.) that supply the inner ear so maybe (0.3)
- 266 Martin collateral (^^^)
- 267 Tutor do you think he's talking nonsense (laughter) or do you think he's uh? (0.3)

Here we see the tutor in the role of teacher and chair, urging Martin and Kevin to commit to a particular diagnostic opinion. In Turn 254 the tutor repeats Martin's conclusion that the patient had not suffered a TIA and follows this with an open question asking for further diagnoses. Martin hesitates to answer (Turn 255) and the tutor, in Turn 256, makes a statement implying "was it or wasn't it" (an implied tag question) which is basically a yes-no question. As part of the pedagogic frame and where the tutor's role is as controller of the tutorial agenda, this form can make it more difficult for the student to disagree. However, the tutor may be seen as trying to push Martin to commit to a position, and Martin responds in the negative. In Turn 259 the tutor asks explicitly for an explanation for Martin's agreement with Kevin that it is a peripheral cause – prompting Martin to ask with some surprise in Turn 260 whether Kevin in fact did say it was a peripheral cause.

In turn 262 the tutor mis-repeats Kevin's earlier claim so that in Turn 263 Kevin is forced to make a denial and then repeat his claim. The laughter that occurs at this point may be due to the fact that it is unusual for the less powerful speaker to make a denial or contradiction of the more powerful participant's contribution; but it may also be prompted by the sudden reversal of roles as it is the tutor who has misunderstood what Kevin was saying. It may also be embarrassed laughter as Kevin

has to justify his position and correct the tutor, and, while admitting a lack of understanding, is about to explain further when the tutor in turn 264 asks a yes-no question about Zelda's earlier explanation. In Kevin's acceptance of Zelda's explanation he rephrases the argument regarding perfusion but the tutor in turn 267 asks a yes-no question again, with laughter greeting the first part of the either/or "do you think he's talking nonsense", indicating that the students do not have to answer this. While they do not respond, Kevin takes the floor, to reformulate his response, as we see in the next extract.

*Example 8: Evading control, Tutorial 5*

- 268 Kevin I mean there is some perfusion reperfusion back to the (.)  
lesion in the brain or brain stem so there is resolution of the  
vertigo (.) do you mean that? (addressing Zelda) (0.2)
- 269 Zelda it's it's just like when you have the hemiplegia I don't know  
to me all vascular causes the onset is acute, and then when  
you take the history you usually after several after a longer  
time they improve (a bit)
- 270 Tutor (right)
- 271 Zelda that's just a cause that will make me think of a vascular cause  
but doesn't stop um it's not a feature that helps me to analyze  
if it's a central or peripheral cause of (^^^ of vertigo )

This example shows an example of students evading the tutor's control, and steering the discussion to reach some closure amongst themselves. Kevin turns to Zelda to ask for confirmation of his interpretation of her account, having rephrased his account of the cause of the patient's disorder. Zelda responds in turn 269 and 271 by extending her explanation, drawing an analogy with hemiplegia. The tutor's single utterance of "right" suggests that he is happy to see the students engaging in constructive clinical discussion.

In these examples (5-8), questions play a key role in both facilitating and constraining the reasoning process. The tutor asks almost all of the questions and by this controls

the floor and the topic, addressing specific students and inviting them to answer. The tutor's questions take several forms: yes/no questions (5), statements or repetitions serving as questions (tag type questions with implied or explicit tags) (4), and open questions (3). He also prefaces several questions with phrases such as "do you think", "are you agreeing", "what are you trying to say", all questions which aim to prompt what Craig and Sanusi (2003) call "think talk", a strategy to promote critical thinking. Each question indexes a move in the reasoning process.

The use of the first two question types, yes-no questions and repetitions, is indicative of the way in which the tutor maintains a focus on the agenda, which is to establish whether the vertigo had a central or peripheral cause, information which would contribute to a clearer diagnostic picture. However, it is clear that these questions constrain the responses, positioning the recipient to give one of two answers or agree with the questioner's polar question (Raymond, 2003). The second type, the statement question, takes the form of repetition of the previous speaker's turn or part of it, sometimes with a tag, and works to prompt reflection on the previous claim and initiate further explanation. It also serves as a challenge to the previous speaker. In some of these turns the tutor voices the previous speaker's words: "he's saying that it's a peripheral cause" and "he's saying that it's self-limiting". This may be seen as placing a burden on students as, interactionally, and, as Thomas (1983) suggests, in terms of relative roles, it is difficult to interpose a contradiction.

The three open questions directly prompt extended reasoning or interpretation (Turn 240), further hypothesizing (Turn 254) and the final example in Turn 259 specifically asks for reasons "Why do you agree with him?" While the tutor's questions both facilitate and constrain the students' responses the overall technique the tutor adopts

is to place students in opposition to one another, an adversarial approach which is arguably less conducive to the kind of collaborative reasoning that might be expected in a problem-based tutorial but which may also prompt the kind of critical reflection and the application of knowledge and reasoning which is valued in both educational and clinical settings.

The tutor is clearly the dominant speaker in these sequences: in his role as Chair and by virtue of his status as clinical tutor, he establishes a pedagogic frame and manages tutorial content. We have already seen how the tutor repeats students' words to elicit responses; this may be seen as "metapragmatic acts" (Thomas, 1983) referring explicitly to the pragmatic force of the other participants' utterances. Thomas identified three types of acts: what she called illocutionary force indicating devices or IFIDs, metapragmatic comments and upshots and reformulations. The device of IFID is seen in "you are agreeing with him" while a metapragmatic comment is "so I see you think it's self-limiting" although this may also be seen as an upshot, and reformulation may be seen in "he's saying that it's self-limiting hence it must be peripheral". Thomas (1983) suggested that through these devices the dominant speaker prevents others from slipping into "pragmatic ambivalence" and this appears to be the case here where the tutor as chair and teacher urges the students to be precise in their stance. This type of device differs from the reformulation described by Ende, Pomerantz and Erickson (1997) (discussed in Section 8.2.1) in which tutors reformulated interns' answers to approximate correct answers and protected interns' positive face. Here the challenging way in which the reformulation is made makes it difficult for the less powerful speaker to respond, so may actually challenge the speaker's positive face.

#### 8.4.4 Role shifting in pedagogic and clinical frames

Up to now we have looked at examples where the tutor has predominantly operated within a pedagogic frame. We have seen this in the controlling forms of questioning as the tutor attempted to channel participant interaction toward a narrow set of options, a strategy similar to that described by Zemel and Koschmann (2011) where the tutor began with open questions and moved towards an either/or question. In the next two extracts, we see a more collaborative approach as the tutor seeks to proceed within a more clinical frame. As Sarangi (2008:236) pointed out, “questions can be either empowering ... or authoritative”. From the extracts we have examined so far, it is clear that the authoritative mode of communication aligns more closely with the pedagogic frame. In the two examples we look at below we see the tutor engaging more in a clinical frame in which a more collaborative, empowering approach is in evidence.

The participants in this tutorial were the same fourth year students as in Extracts 2-5 and 7 above. Parts of this tutorial were discussed in the mapping exercise in Chapter 5 and in Chapter 7 on student reasoning but here the focus is on the tutor.

##### *Example 9: Shifting roles, Tutorial 1*

- |    |       |   |
|----|-------|---|
| 74 | Tutor | ] do you find any significant (.) functional impairment?<br>{[lo]}  |
| 75 | Ron   | yes / on physical examination the uh muscle power on the<br>left side u-upper limb was zero and the lower limb was<br>one / (.) that means it was   |
| 76 | Tutor | ] just based on the history / because some patients are (.)<br>figuring out you know their complaint you know (.) we<br>don't know whether this so-called weakness is genuine or<br>not (.) so a functional history is very important |
| 77 | Trudy | could he walk?  |
| 78 | Tutor | ] can he walk yes very good {[lo]}  |
| 79 | Ron   | no he could not walk it was actually a right sided paralysis  |

uh

80 Keith ] left sided

81 Ron ] left sided (.)

82 Tutor so how about the upper limbs?

83 Ron definite it was paralysis

84 Jan he have has to use the right upper limb to move his left upper limb

85 Keith so the right side was five five

86 Ron yes the right side was intact (.)

87 Keith {nodding} how about the sensation?

88 Ron there was a decreasing sensation on the left side mm {nodding} {K making gestures with arms to ask R to move on?} (.)

89 Fay is there any bowel symptoms, urinary symptoms?]

90 Tutor ] yes very good

91 Ron uh hh (.) {looking at J} I did not ask about this (.)

92 Tutor any incontinence, any accidents? ]

93 Fay (^ ^ ^)] (.)

94 Keith ] did the patient have a diaper?

95 Ron no the patient did not had {K nodding} (.)

96 Keith how long has the patient been in hospital uh since:: you clerked him (.) before you clerked him?

97 Ron he was in the hospital since thirty-first of May so it was: two days

98 Fay (.) ah since you clerked him?

99 Ron uh it was two or three days (.) in hospital {nodding} (.)

100 Tutor I think everyone knows about the approach in: making a neurological diagnosis (.)

The tutor began the session by handing the floor to the Chair and presenter, Ron, who as we saw in the earlier chapters presented the patient history of a young man with a sudden onset of headache and weakness on one side of his body. The tutor's relinquishing of control and acceptance of an audience member role, allows the clinical frame to be maintained through the first part of the student discussion even beyond the tutor's first intervention at turn 70 with a closed question seeking information regarding the nature of the patient's headache. Following another turn



(72) also seeking information the tutor then intervenes in the student discussion at turn 74 to seek information regarding the patient's "functional impairment", that is, the extent to which the patient's movement and activities were restricted by the 'weakness'.

Having quietly initiated the new topic of functional impairment in turn 74, following Ron's reporting of the results of part of the physical examination, in turn 76 the tutor clarifies his original cue by beginning with "just based on the history..." that is, the results of the patient interview, and invokes a pedagogic frame. It is interesting that the tutor justifies this pedagogic intervention in turn 76 with an extended explanation. The students display their recognition of what comes across as the tutor's advice and respond by asking the presenter Ron a series of questions to establish the extent of the functional impairment. At turns 78 and 90 the tutor positively evaluates their questions by repeating the question with a remark of approbation in turn 78, and again in turn 90. In his pedagogic role he offers guidance and positive feedback, while in turns 82 and 92, he appears to shift his role to that of collaborative participant in the discussion and contributes two questions in a similar abbreviated style to those of the student participants: "so how about the upper limbs?" and "any incontinence, any accidents?" He reverts to his pedagogic role in turn 100 only after the discussion has moved away from the patient's symptoms and he brings the discussion back to the medical agenda of establishing differential diagnoses.

In the sequence above we see the tutor's questions contributing to the case history construction alongside the questions of the student participants, using similar abbreviated yes-no interrogatives that were noticeable in the questions of the student participants in the same tutorial. These tutor questions appear to be genuine questions

related to the patient, and diminish the asymmetry of the participant relationships, thus creating a more egalitarian atmosphere in which all participants jointly construct the case. It is also noticeable that, in turn 100, the tutor makes a declarative statement which might have been phrased interrogatively: “I think everyone knows the approach in: making a neurological diagnosis”. While his statement assumes a shared knowledge, as in Labov and Fanshel’s (1977) A/B events mentioned earlier, interestingly students go on in subsequent turns to display their knowledge. Clearly, they interpreted the tutor’s declarative statement as such an invitation, thus indicating a merging of the pedagogic and clinical agendas.

We have seen how a range of activity roles are taken up by the tutor, in the context of diagnostic reasoning sequences: as evaluator, tester, or corrector of knowledge, as knowledge seeker, as modeler of diagnostic reasoning, or simply as collaborative participant. These roles have been identified through the question and answer sequences and the framing of the discussion as clinical or pedagogic, with the way in which the tutor orients students to the discussion at the beginning of the tutorial as one element. Other indicators of role positioning, for example, to indicate collaborative participation on the part of the tutor, include the asking of genuine questions in seeking information, seeking alignment with students, and the student response.

The tutor also serves as a model of expert talk (Ende et al., 1995; Erickson, 1999; Sarangi & Clarke, 2002). While we have seen that this may be done through questioning, the data has shown that tutors, when giving information, offer explanations and information as evidence. Sarangi and Clarke (2002) refer to a second level of expertise, which is experiential and relies on experience as well as test results

and other types of evidence. This type of expertise is also seen in the tutor's performance, along with the marking of evidence through the use of modality and the use of reported speech to indicate the degree of support or belief in a claim.

The following table offers a summary of the different sub-roles taken by the tutors, with discursive examples of each type.

**Table 15: The range of tutor roles**

Frame	Sub-role	Examples of each type
Educational/ pedagogic	Scaffolder (of learning/ reasoning)	“so this is something that you should go over with every (0.2) uh:: patient that you see then then you’ve got some symptoms what are the possible things that occurs in <u>this</u> particular patient (.) alright (.) <u>now</u> for example let’s take hip pain (0.2) what is possible (0.3) uh in this lady” (Tutorial 6)
	information giver/ knowledge provider	“it’s a vessel uh inside of the vessel the intima and the thelimum (.) which gets lipid deposit, you get a plaque, right (.) and then the plaque somehow well various things get it enflamed, somehow the plaque may rupture and block the the thrombus” (Tutorial 6)
	model (of reasoning)	“you can simplify because history of how many years of SLE might not be that important, but then including SLE in the chief complaint does have a meaning because (.) due to (.) hypertension, diabetes, because SLE per se can give rise to these symptoms” (Tutorial 2)
	tester	“Can you think of any other side effects of drugs that could give you ....cerebellar signs or cerebellar symptoms” (Tutorial 5)
	activity manager	“so far can you just with the history come up with any differential diagnosis (0.1) before you go (to exam of patient) you know some of the questions are quite valid” (Tutorial 4)
Clinical	collaborator	“do you find any significant (.) functional impairment? {[lo]}” (Tutorial 1)

#### 8.4.5 Discoursal devices used by tutors

In a comparison of student and tutor use of modalising devices I found marked differences between those used by the students and those used by the tutors, most notably in the kinds of modalising devices used. While the students' range of modalising devices ("can/ can't", "could", "possible", "maybe") were more restricted they indicated some degree of evaluation of possibility. Tutors, however, used a wider range in order to indicate probability, such as likelihood indicators "I would say pretty unlikely" and "tell me which amount uh categories are unlikely", "so this is less likely as a prospect" and "is it common", "which is more common" "I would say even it's rare". Other examples offer assessments based on a comparison with what is normal or common: "in this particular case it is the globulin which has gone up quite a lot (.) almost double yeh (.) considered higher than the than the normal range which is a lot" and "non-smoker the chances of malignancy is well {shrugging} probably less, should be less". These examples are an indication to students of the kinds of evidence that demonstrate expertise in knowledge and experience. Unlike the tutors, students do not have the substantive or experiential knowledge that forms the basis of such calculations of likelihood or probability.

Another kind of evidential marker used by tutors and students is that of reported speech which embeds one participation framework inside another. Tannen (1989) called this "constructed dialogue" and Schiffrin described it as a site "whose *raison d'être* is the construction of multivocality" (Schiffrin, 2003: 549) that transforms the original. I have already discussed the use of the cited figure (Goodwin, 1994) and role distancing (Sarangi, 2010c) in the reporting of the patient's words, the notes and test results. Tutors were found to use this rhetorical device most frequently when

revoicing the student's words ("you have mentioned that ...", "you said he was not given any drugs", and "are you saying that..."). While Hmelo-Silver and Barrows (2008) saw this as a neutral or positive strategy on the part of the PBL tutor, Cazden (2001) understood revoicing to be a means for the teacher to position him/herself in relation to students as a validating authority or a "continuing negotiator" where students can come back with an evaluation of the teacher's reformulation (2001: 86) this ignores the asymmetry inherent in the relationship which may make the student hesitate to respond. At the same time, the tutor may be seen as marking the student's responsibility for the utterance or claim.

## **8.5 Summary**

In this chapter examining the tutor's role with regard to question and answer sequences in these clinical tutorials, the data have tended to confirm that the primary role of the tutor is to scaffold the students' learning experience when questioning takes place within a pedagogic frame. We have seen this done through the modelling of the clinical reasoning process via questioning and tutor displays of clinical reasoning. As Zemel and Koschmann found:

Getting students to actually think in unfamiliar ways may require guidance and manipulation of the students' own reasoning as it is accomplished in situ. Questions provide a mechanism for doing just this, for calling on students to check their thinking. (2011: 486)

Tutors are clearly mindful of their roles as managers of the students' case presentation, and follow-up discussion, notably by restraining students' inclination to reach a premature conclusion, and reminding them to remain focused on the patient's history. We saw this in Extract 4 where the tutor urged Ron to restrict his discussion to the history and delay moving on to the physical examination and in Extract 1 where

the tutor gave a negative evaluation of a presentation which had moved on too quickly. Tutors also managed the activity through statements such as “do not refer to case notes” and “speak louder”.

In terms of asymmetry in participant structure, we have seen a range of tutoring roles. Through the kinds of questions posed the tutor in Examples 1-5 constrained responses and maintained control of the topic. Equally, as a form of modelling, this could be seen as having a pedagogic function of cueing, or correcting student contributions, as Ende, Pomerantz and Erickson found in their 1995 study. Other examples of learning management strategies seen in the data include categorization (Examples 1 and 2), knowledge display and knowledge testing (Example 2), and developing student expertise in case presentation (Examples 6 and 9). Tutors made use of devices such as interruptions, questions, inferences, repetition, upshots and reformulation. They give feedback and support through back channeling and offering learning tips such as mnemonics. We have also seen how tutors may withhold information (Glenn, Koschmann and Conlee, 2000) within the pedagogic frame despite their status as experts and possessors of clinical knowledge. The data also show tutors telling students what is required in examinations, as in Tutorial 1 Case 2 when the Tutor told Fay what would be acceptable or not in an examination situation:

the: presentation of a long case / I think first of all you have to delineate focus yourself whether it's a diagnostic problem or management problem OK / .... normally we don't give the: you know the diagnosis right at the beginning you know (.) you paint the picture and then you know try to leave the (.) tests at the end OK so we lost all the joy of making a diagnosis and you can't arouse the interest of the examiner”.

Particularly noticeable, though less common in these data, is how, in a problem-based interaction setting, tutors may establish clinical frames by taking up roles as

information seekers and aligning themselves with the students, especially when they lack knowledge of, for example, the patient's history. In addition, it appears that a clinical frame may be established more easily when tutors take up such a role and in addition hand over the management of the tutorial to students. However, there is likely to be shifting between the activity specific roles within the tutors' role-set as they take up pedagogic roles to control content and manage the tutorial process.

In terms of the display and negotiation of expertise and the management of uncertainty, question and answer sequences help to diminish student uncertainty and may also help to develop reasoning skills.

## **Chapter 9: Conclusion**

### **9.1 Introduction**

The purpose of this study was to investigate how students approaching the end of their medical studies negotiated the display of expertise and, its corollary, uncertainty in their problem-based learning tutorials. The motivation for the study arose from my work as a communication skills instructor attached to the Faculty of Medicine, where I taught first and second year students. One specific task within the medical curriculum had been to prepare students for their participation in PBL tutorials. Although the course content was developed based on observations and discourse analysis of PBL tutorials in the first year, I was interested in exploring how students in the final years of the medical curriculum dealt with the communicative challenges of PBL, and how the PBL setting might or might not have allowed students to perform as future professionals, able to display expertise through their communicative practices.

The Bedside PBL tutorials during the fourth and fifth years of study in Clinical Medicine are a key part of the PBL curriculum, constitutive of an apprenticeship model of education. The cases clinical students discuss in the tutorials – the database for this study – are those of patients they have interviewed in the ward, so the patient may be seen as co-present and a resource who is available for further interview and examination if necessary. Because the tutorial is a hybrid activity type (Sarangi, 2000) in which students may take up both educational and clinical roles, it is very much an activity in which they wish to make a positive self-presentation as good students and competent physicians of tomorrow. One would expect that the quality of students’



abilities in self-presentation and projection of expertise is facilitated through the taking up of roles from the role-set available to them within the tutorial activity, leading to the simultaneous acquisition of communicative expertise and procedural, substantive and experiential clinical knowledge.

In this final chapter, I discuss how students and tutors displayed and negotiated expertise and uncertainty in the Bedside PBL tutorials, and how the participation structures afforded the enactment of the role-sets available through the adoption of specific communication strategies. In Section 9.2, I discuss my findings in relation to each of my previously stated research questions (Section 1.8), with the explicit aim of drawing some definitive conclusions. I discuss how the structural and interactional mapping of the data lead to insights into participation structures and how these relate to expertise and uncertainty. In Section 9.3, I reflect on my methodological approach and my position as a researcher (mainly in the form of non-participant observer) and the limitations this might have imposed on the interaction. This is followed, in Section 9.4, by a discussion of the contribution of the study to activity analysis research in the clinical/educational setting and its practical relevance to PBL curriculum development. Finally, in Section 9.5, I discuss the possible implications for future research in clinical education contexts.

## **9.2 Summary of findings**

The research questions (RQs) that this study attempted to answer were distributed over the four analytic chapters as follows:

1. How is the PBL tutorial activity structured in terms of participation and role-positioning? (Chapter 5)

2. How is case presenting affected by being situated within the context of the Bedside PBL tutorial activity type? (Chapter 6)
3. How, in a problem-based interaction setting, do students shift between the activity specific roles vis-à-vis question and answer sequences to reach agreement or get consensus about a diagnosis, and how does their management of uncertainty in clinical reasoning (as evidenced in their questions) relate to the negotiation and distribution of expertise? (Chapter 7)
4. How, in a problem-based interaction setting, do tutors shift between the activity-specific roles vis-à-vis question-answer sequences, and how do these role-shifts affect the display and negotiation of expertise and the management of uncertainty? (Chapter 8)

I shall address findings and conclusions in sequence.

***RQ1: How is the PBL tutorial activity structured in terms of participation and role-positioning?***

My findings suggest that the tutorials afforded participants the opportunity to take up a number of activity roles within a given role-set (e.g., medical student, novice physician, tutorial chair, case presenter, and discussant), accompanied by identifiable discourse roles (such as questioner, answerer, and reporter). Asymmetry was clearly an integral constituent of the activity role (such as professor of medicine or case presenter) and was implicitly or explicitly referenced in the discourse. This finding confirmed the view expressed by Thomas (1983) and Sarangi (2000) that roles are influenced by asymmetry between participants in terms of status, experience and knowledge. As Berger and Luckmann suggested, every role has knowledge within it, requiring a degree of expertise in the deployment of resources to manage the demands

of the role. However, the discursual patterns of turn-taking and the adoption of discourse strategies such as reporting structures varied according to the degree of asymmetry, the relationship between the participants and the framing of the interaction. When the educational or clinical framing of the interaction positioned the participants as student or novice physician, the participants had to rely on differing resources, for example, for displaying knowledge to the tutor, or making contributions to the co-construction of knowledge and the diminishing of uncertainty. The notions of role distancing and role embracement (Goffman, 1961) were useful in revealing the extent of affiliation with participants' activity role and their attempts to distance themselves from that affiliation. Thus a case presenter who is uncertain of the facts would use reporting structures when reconstructing the patient's history, and convey metaphorically a distance from the role in which he was expected to display more certainty – good examples being Trudy in Tutorial 8 and Harry in Tutorial 4.

As explained in Chapter 5, the tutorials were structured around the case history presentation (with the exception of one tutorial which consisted of a series of presentations on blood components). The findings attest that the structure of the clinical tutorials was largely recursive: student presenters described the patient's symptoms, and this was followed by a diagnostic reasoning sequence through questions and answers, which led in turn to another phase of descriptions of symptoms, followed by a phase of diagnostic reasoning and so on. The interactional mapping shows that, in terms of participation, the presenters took the greatest number of turns in the activity, while the tutor also played a significant role. The remaining students participated to varying degrees in the question-answer sequences both during the history presentation phases and the diagnostic reasoning phases. The examples of structural, interactional and thematic mapping in Chapter 5 show how case presenting

and diagnostic/clinical reasoning are vehicles for the negotiation and display of expertise afforded by the opportunity to present the foundational genre of the case history in an expert way, as Ron did in Chapter 5, and through the diagnostic reasoning phase, as Jan showed in Chapter 7. The role of the tutor as expert emerged as a third area for examination. My findings suggest that when a student presenter displays expertise in controlling the different phases of the tutorial, the tutor's pedagogic role is de-emphasised or backgrounded and student participants find they are afforded greater opportunities to ask questions, display expertise and manage or modulate their uncertainty by sharing their knowledge and uncertainty with each other.

The structural and interactional mapping revealed very clearly the dominant focal and analytic themes. The main focal themes were case history presenting and diagnostic reasoning, while the dominant analytic theme was questioning. The shifts in focal themes were made apparent through the participation structures, where the case presenter was clearly the dominant force in presenting sequences, while the participation was more widely distributed among students in the diagnostic reasoning sequences. The participation structures were characterised by a student taking the role of case history presenter and presenting the history to the other participants, most of whom had no previous knowledge of the case – and this at times included the tutor. In the diagnostic reasoning sequences, the tutor asked most questions while the student presenters and other student participants responded.

To gain a fuller picture of the tutorial, thematic mapping enabled a detailed picture to be drawn of what was happening in the course of the tutorial participation. The thematic mapping revealed how case presenting was enacted in the PBL setting. It

provided indications of how the typical case presentation structure, as practised in the clerkship and precepting settings (described in Chapters 3 and 6), could be adapted in the PBL tutorial setting by a skilled presenter in response to the demands of the PBL activity. The thematic mapping also identified less skilful presentations and these presentations were characterised by increased levels of questioning by tutors as well as marked levels of uncertainty among presenters.

Two broad themes – expertise and uncertainty – emerged from the structural and interactional mapping of the data. The structural mapping in Chapter 5 indicated the main phases of the tutorial session and their recursive nature, at the same time differentiating them from the clerkship component of the curriculum and pointing to similarities in that both were concerned with case presenting. The structural mapping also showed that there were contrasts between how case presenting proceeded in one instance compared to another. There was evidence that the failure to follow similar recursive cycles of presenting and reasoning was due to problematic or inadequate history taking. But this only emerged later.

The themes of expertise and uncertainty were integral to the hybrid nature of the tutorial, as PBL is built around the objective of reducing uncertainties in knowledge, and the pedagogic and clinical orientations both allowing for displays of expertise. Student participants were able to display their clinical and procedural knowledge and offer evaluations of evidence with the concomitant assessments of probability. Warrants of uncertainty were seen as display of expertise; however, we have seen how tutors employed a much wider range of discursive devices to achieve this than students. Students' developing expertise was displayed as a function of role and

context as student participants took up roles such as chair, presenter or discussant, or were placed in roles that would allow them to display their knowledge.

In Chapter 3, I defined the PBL tutorial as a hybrid activity type. Following Sarangi's (2000) notion of interactional hybridity where participants in the activity respond to shifting frames, I identified the participation framework through mapping the tutorial activity. In the data, participants framed their participation within two main frames: the clinical and the pedagogic. The frames and shifts between the frames indicated whether the participant was displaying clinical or educational expertise, or a combination of both. An important finding of this study is that student participants oriented more to the educational frame when responding to questions from the tutor, and oriented more towards the clinical frame when responding to questions from a student chair or other student participants. This suggests that the clinical frame in which the tutor takes a non-directive position affords greater opportunities for students to display clinical expertise. For example, when a tutor framed a question as a true question as opposed to a "known answer" question calling for a display of knowledge, the frame was responded to as clinical rather than pedagogic, showing how tutors and student participants shifted between their activity roles.

Within each frame the interactional activity is bounded by what is allowable for the participants, suggesting that participant roles and role-sets are strongly associated with frames. Frames and roles were seen to shift when the tutor, addressing the case presenter, asked questions to which he did not know the answer and in doing so, became another discussant, while the case presenter became the expert with knowledge of the patient's history.

***RQ2: How is case presenting affected by being situated within the context of the Bedside PBL tutorial activity type?***

Case presenting appears to be affected by the context of the activity type in different ways, but how it evolves is clearly dependent on the perceived and actual expertise of the presenter. What became clear from the mapping exercise in Chapters 5 and 6 was that presentations of Bedside PBL sessions were not necessarily expected to follow the typical pattern practised in other contexts, such as the clerkship (Lingard, Schryer et al., 2003). While it appeared that case presenters were not required to follow the typical pattern of case history presentations, they were expected to set the scene in the classic fashion, beginning with the patient's personal information (name, age, gender), and followed by the chief complaint or problem that the patient presented with on admission to hospital. They were also expected not to step prematurely into elements such as physical examination, as evidenced in the tutors' reminders to remain focused on the history taken from the patient.

Ron's presentation, featured in Chapters 5 and 6, showed that the expertise of the presenter in re-structuring the presentation of the case can help participants to build and discard hypotheses as they gather more information to support or complicate the clinical picture given by the case presenter. This echoes Erickson's (1999) view that the ability to switch between "registers" of case presentation is a marker of growing expertise. For example, Ron appeared to withhold details from the case until they could be introduced at a point where they would complicate the diagnostic picture. Unlike the precepting setting in Pomerantz et al.'s (1997) study, competent student presenters could "orchestrate" the case presentation to suit the demands of the PBL activity.

The recursive pattern of diagnostic reasoning alternating with symptoms might be indicative of the extent to which student presenters had differential diagnoses in mind. It is possible that this influenced the weight they accorded to certain symptoms and not others. This was seen in both Ron's and Harry's presentations, but more explicitly in the latter, where Harry's own diagnostic preference for a physical cause of Madam Wu's complaint appeared to lead him to downplay her symptoms of depression. This resulted in intensive questioning by the discussants, and Harry's avoidance of this factor in his patient interview became apparent in his presentation through the questioning by the other participants including the tutor.

The tutor's intervention in the case presentation phase was often indicative of inadequacy in the presentation, as in Trudy's presentation in Chapter 6. We also saw how tutors expected student presenters to withhold the diagnosis if they had read the diagnosis in the notes, as Fay's premature revelation of the diagnosis in Chapter 6 showed, an incident marking the contrast with what was expected in the Bedside PBL context. Unlike presentations in the clerkship or precepting context, the main focus of the Bedside PBL presentations was on symptoms. In several tutorials there was little discussion of the physical examination and even less of the results of test investigations.

Based on the analytic findings, it can be claimed that in the Bedside PBL setting, the presentation of the case history is a crucial trigger for diagnostic reasoning and the presenter of the case history plays a key role in shaping the discussion and moving it forward. How the presenter develops the presentation and negotiates the question-answer sequences is an indication of the ability to respond to the demands of the activity and of professional expertise. It was noticeable that in the question-answer



sequences between presenters and discussants (Chapter 6), the participants appeared to share inferential schemata (Gumperz, 1982), making more elaborative accounts unnecessary, and the questions were not seen as unexpected by the presenters. The presentations of Harry and Trudy indicated that greater expertise appears to lie partly in knowing when and how to provide more detailed elaborations, or justifications for uncertainty or perceived ignorance.

What also emerges is the significance of the ways in which the student presenter develops the presentation and negotiates the question-answer sequences in response to interventions from the tutor and the student discussants, so displaying communicative expertise which is inseparable from professional expertise. Like Atkinson (1995) and Anspach (1988), I found that presenters made use of discoursal mechanisms associated with professional clinical discourse such as the use of the passive voice, the use of account markers to indicate temporality, agency, and the distancing of the clinical role through cited figures and reported speech. I have argued that the student presenters displayed an awareness of the particular goals of the activity in the strategies they adopted such as withholding information (as in Ron's presentation), but that they failed to convey a "positive self-presentation" in their roles as presenters when unable to account adequately for missing or unknown information (as in Harry's presentation).

***RQ3: How do students shift between the activity-specific roles vis-à-vis question and answer sequences to reach agreement or get consensus about a diagnosis, and how does their management of uncertainty (as evidenced in their questions) in clinical reasoning relate to the negotiation and distribution of expertise?***

The activity-specific roles taken up by participants clearly affect the management of uncertainty and the participants' "zones of expertise", as we have seen with regard to

case history presenters. Student presenters had opportunities to display greater certainty in their roles as presenters and information providers, although, as we also saw in Chapter 6, this depended on the thoroughness of the patient interview that preceded the case presentation. The student participants took up roles in the question-answer sequences as discussants and information seekers, asking questions of the presenter and proposing and responding to diagnostic hypotheses. Shifting between clinical and pedagogic frames, we saw how in tutor-led sequences in the pedagogic frame, discussants tended to give short, less elaborated answers and played the role expected of students, responding to tutor questions in IRE (initiation-response-evaluation) sequences. In the clinical frame, where the chair led the discussion, answers were also at times abbreviated as students did not need to display their knowledge and shared a common understanding. This understanding also seemed to be operative at points of consensus and closure when the consensus on differential diagnoses was at times implicit as in the case of the young man who appeared to have suffered a stroke whose case history Ron reported (Chapters 5 and 6).

The shift in activity-specific roles clearly reflects students' awareness of both clinical and pedagogic frames as constitutive of the PBL session and their orientation toward how to manage uncertainty in each scenario. Student discussants were able to deploy discursive resources to indicate uncertainty as an assessment of opinion (Atkinson, 1995). Where there was collegial discussion, uncertainty was at times a marker of evidentiality and reasoning. As the student participants moved towards a professional rhetoric of expertise, they embedded a "rhetoric of uncertainty" (Lingard, Garwood et al., 2003) in the clinical frame. Within this frame, the markers of uncertainty conveyed an ability to deploy an interpretive and hypothesising discourse in contrast to a factual declarative mode and, in terms of the students' professional socialisation,

this discursive versatility gave credibility to their contributions to the diagnostic reasoning sequences.

The citing of evidence in the discussion sequences can be interpreted as references to a notion of normalcy (Sarangi, 2002). This might be seen as a type of experiential reasoning, though not necessarily based on clinical experience. It may be argued that students were still apprentices and experiential knowledge was not yet available to them as a resource. Occasionally, however, they referred to previous clinical experience, suggesting a developing stock of experiential knowledge. Notions of normalcy were also implied through discursive devices used in the diagnostic reasoning sequences, where there were many examples of the ‘if-then’ conditional structure, implying knowledge of an underlying relationship or rule against which the present case could be measured. Notions of normalcy were explicitly and repeatedly referred to when the findings of the physical examination were presented where interpretation and evaluation of data were facilitated by rules derived from statistical evidence. This is unsurprising as these findings following physical examination (for example, on muscle tone, heart sounds, vision or gait) focus on measurement and aim to distinguish any departures from what is considered “within normal range”.

In the pedagogic frame, students’ displays of uncertainty were more likely to indicate a lack of knowledge due to ignorance, not so much of clinical knowledge but a failure to ask appropriate questions of the patient during the history-taking process, as in Harry’s and Trudy’s presentations. Where students reached an impasse in their reasoning through lack of knowledge, there was potential for a new learning issue. So uncertainty, when an indicator of ignorance, can be seen as a learning opportunity in the specific context of Bedside PBL tutorials.

In summary, in the clinical frame in which students took the role of discussants, uncertainty appeared to be more an indicator of *evaluative* talk, with the use of evidentiality markers implying a developing expertise and repertoire of knowledge. In the pedagogic frame, student roles were marked by displays of knowledge afforded by the tutor-led IRE sequences, but also by displays of uncertainty in reasoning and knowledge. At the same time, when students and tutors became aware of these gaps they could generate new learning issues. When they were able to reach consensus, they moved on to a new problem or a new case history.

***RQ4: How, in a problem-based interaction setting, do tutors shift between the activity-specific roles vis-à-vis question-answer sequences, and how do these role-shifts affect the display and negotiation of expertise and the management of uncertainty?***

The tutor's role as manager of the students' case presentation and of the follow-up discussion showed a clear focus on the PBL tutorial agenda and goals, but also reflected an asymmetry in the participation framework. The kinds of questions posed by the tutor – in particular the closed questions seen in Chapter 8 – constrained student responses and served to maintain tutor control of the topic. Equally, as a form of modelling, as pointed out by Ende, Pomerantz and Erickson (1995), this type of questioning could be seen as having a pedagogic function of cueing or correcting student contributions. Other learning management strategies used by the tutors included asking for categorisations of symptoms, the use of both open and closed questioning to bring about knowledge display on the part of the discussants when testing their knowledge, as well as advising students on expertise in case presentations and other medical education contexts, i.e., how to perform in examinations, how to carry out physical examinations and what kind of questions to ask in the history

taking process. In their pedagogic role, tutors made use of discourse devices such as questions, revoicing, upshots and reformulation. They gave feedback and support through backchannelling and offered learning tips such as mnemonics and “little tricks” such as the phrase “moans, bones, groans and stones”. Tutors acted as models of clinical expertise, for example, by couching evidence for the likelihood of a disorder or symptom in terms of probability rather than certainty. They also referred to “tried and tested routines” (Atkinson, 1995) and shared their experiential knowledge with students.

The structural and interactional mapping of Chapter 5 showed that the tutor took approximately half the turns and the greater proportion of these turns were in the form of questions. In Chapter 8, on more detailed examination of the tutor’s role with regard to question-answer sequences in these clinical tutorials, the findings confirm that the primary role of the tutor is to support student learning. In so doing the tutors framed the encounter pedagogically, modelling the clinical reasoning process through leading questions and their own displays of clinical reasoning. The tutors tended to shift between managing activity roles and managing curricular content, although these often overlapped, as when student presenters were instructed to give more information from the case history rather than move on to another topic such as findings from physical examination.

Weighing against the impression of asymmetry, the tutors also took up roles as genuine information seekers, by underscoring that they were also in a position of not knowing the answers, and thus aligning themselves with the student participants and establishing a clinical frame. This was more likely to occur when the tutors passed the management of the tutorial to students and appointed a chair. Even so, as in Example

9 in Chapter 8, the tutors tended to shift between such clinical and pedagogic frames taking up the pedagogic role to control content and manage the tutorial process. What emerges clearly from the analysis in this study is that both student and tutor participants play key management roles in sustaining a clinical PBL environment.

### **9.3 Methodological reflections**

Several methodological issues arose during this study. These centred on the presence of the researcher during the tutorials, the practical constraints which led to difficulties in grounding the study through participant interviews, and the presence of “silent” participants.

The influence of the presence of the researcher on tutorial participation, especially when visibly managing the recording equipment, is difficult to assess. Positioning the camera and tripod discreetly in these sessions was not always possible due to the cramped tutorial rooms. At times, there was nowhere within the circle of participants for the observer to sit and my position in the room differed according to the circumstances. This might have introduced a bias into the performance of participants, the so-called “observer’s paradox” (Labov, 1972) in which the observer becomes the observed and indeed there was some evidence that, at least initially, the tutor and a few participants were conscious of the researcher’s presence and of the video camera, as they occasionally glanced at the camera. However, these incidents were few and occurred at the beginning of the session.

As an observer, I made efforts to minimise disruption and to position myself and the recording equipment as discreetly as possible. Initially, to try to reduce any impact my presence might have had I did not use a table microphone but did so when the sound quality was poor. I also believed that as I was familiar to many of the students having

taught them in their first and second years, they would not find me a complete stranger, and would be able to ignore my presence. I knew that students were accustomed to being video recorded in their pre-clinical PBL tutorials in their first and second years, as each tutorial room had been equipped with cameras to record the progress of what was still a relatively recent curricular innovation. Students were also accustomed to having visitors or auditors observing their classes, with a number of visiting students attending some of the tutorials that I observed. Just as Sarangi (2010a) observed with regard to the clinic setting, it seemed that “given the high stakes involved [in a clinic setting] participants are very likely to overcome the presence of a recorder or observer and continue to perform naturally” (2010b: 399). Overall, I felt that the students were fully engaged with the activity and were more impervious to my presence than were the tutors. In order to diminish any potential negative effect on participation, when I had become more confident in transcribing the data, I felt audio recording would be sufficient for my purposes. What was lost in terms of the paralinguistic and kinesic aspects of participation by restricting the data to an audio-recorded format did not materially impact on the essential areas of focus in this study.

One aspect that might have been related to my presence was the fact that several participants in every tutorial were silent. When pressed by the tutor, some of these silent participants were forthcoming: they participated, as Cathy responded with her single tentative utterance in Tutorial 2 (see Chapter 7.5). Their silence did not necessarily preclude engagement in the discussion but this was impossible to check. Post-tutorial interviews with these students might have shed light on this phenomenon but, due to the logistical difficulties described in Chapter 4, these were not carried out, and the question of the silent participant remained outside the scope of this study.

The practical constraints of my working schedule and the schedule of the students meant that the post-tutorial discussions I had hoped to hold did not take place: students left the tutorial room immediately for their next scheduled activity. Interviews with both tutors and students would have added another dimension to understanding the nature of the tutorial discussion.

#### **9.4 Contribution of the study and relevance**

From a micro-level discourse analytic perspective, this study has contributed to our understanding of clinical problem-based learning, especially in terms of role/participation structure and simultaneous management of clinical and pedagogical frames within this hybrid activity type. At a broader level, this kind of role- and activity-centred study is increasingly being adopted in counselling and social work interaction (e.g. Sarangi & Clarke, 2002; Hall, Slembrouck & Sarangi, 2006), with the aim of informing professional practice. I would claim that the activity analysis approach taken in this dissertation, along with the emphasis on the roles available to participants, does contribute significantly to our understanding of clinical interaction generally, as Sarangi has shown (2010a, 2011), and, in the present case, our understanding of the interactional dynamics of problem-based clinical tutorials. The identification of a number of key themes in this study has also allowed for a richer interpretation of the role/participation- and activity-related forces at work. We now have an enhanced means of understanding the display of expertise and uncertainty in this setting, and how different kinds of knowledge may contribute to the projection of developing expertise. Even when the pedagogic frame acted as a constraint on student participation, the tutorial remained a rich learning environment.



I have demonstrated how the activity analysis approach to mapping the tutorials and analysing extended sequences of interaction helps to reveal that pedagogic and clinical concerns are the foundation of the tutorial activity, and that shifts in the framing of the activity as clinical or pedagogic change the nature of the interaction. The study is also distinctive in unpacking complex notions such as expertise and uncertainty, including their inter-relationship, in the PBL context from a discourse analytic perspective, by highlighting role-taking and participation structure within the given activity type. Expertise and uncertainty became key underlying themes in my analysis, their relevance emerging (see Table 7) from my study of the key focal themes of case presenting and diagnostic reasoning, and their resonance with both pedagogic and clinical frames.

This study also makes a contribution to the study of clinical case presentation in a PBL curriculum. I show how PBL tutorial case presenting differs from that of the typical clerkship presentation, not only in its more flexible structure (as outlined in Chapter 6), but in how it can be adapted by presenters to serve PBL activity goals, in particular diagnostic discussion. What also emerged, was how tutor feedback tended to reflect an emphasis on a traditional presentation sequence, as a measure of expertise in the genre. The balance between adapting the genre and showing that one had expertise in it was a delicate one that students needed to negotiate in combination with appropriate discursive devices. Given the clear diversity of tutors' approaches in the tutorials I studied, a fruitful avenue of future research will be to consider how far professional, curricular or institutional influences play a role in determining the dynamics of PBL tutorial interaction.

While it has been said that PBL makes clinical reasoning “visible” by talking through that reasoning (Hmelo-Silver, 2006), we have seen that when the students discussed diagnostic hypotheses together, the degree of shared knowledge at this stage of their studies meant that they generally did not do this and thus elaborative explanations of reasoning tended to be less common. The students in the present study tended to use inferential contextualisation cues such as backchannelling. The findings vividly echo Atkinson’s (1995, 1999) broader and more positive view of uncertainty in medical education that it can be a resource for the framing of propositions and the evaluation of evidence.

### **9.5 Implications of the study for PBL theory and practice**

The study has implications for the actual conduct of clinical PBL. If curricular goals are indeed to include communicative expertise, course developers will need to encourage tutors to take up a more facilitative than directive role, so that students are encouraged to manage the tutorial, take on the role of questioning and have greater opportunities to participate. The analytic findings of this study point to what can be considered facilitative strategies, which can contribute to a reduction in asymmetry (Thomas, 1996).

However, the specialised knowledge that the tutors bring to the tutorial is valued by students. So it would be pertinent to examine student understandings of the part played by PBL within their curriculum. Tutors appreciate that, at this clinical stage of the medical curriculum, student knowledge, whether procedural or substantive, needs to be consolidated through the testing of their expertise but they need to reflect on what expertise means in the context of Bedside PBL. The findings of this thesis offer

a platform for this reflection to happen, which can be addressed further in courses which aim to prepare students for the demands of PBL.

The close relationship between activity roles, frames and participation in the Bedside PBL setting revealed in this study point to a need for the PBL curriculum to make more explicit connections between these phenomena. Both tutors and students might benefit from greater metadiscursive awareness of how the roles they take up in such tutorials influence the trajectories of the resulting interaction.

## **9.6 Further research**

This exploratory study has looked microscopically into the PBL activity in a specific institutional context. The findings are necessarily restrictive, as they are drawn from a small pool of tutorials. However, they do indicate avenues along which further research might be carried out to support or challenge these findings.

The first such avenue would be to build on the methodology and include interviews and discussion of analytic interpretations with participants. Involvement of the participants in the research process through interviews and sharing of interpretations would provide a more grounded approach to understanding Bedside PBL at this level. Secondly, the issue of participants who do not appear to participate could be investigated to discover why this should be so. In this study, it was noticeable that of the seven or eight students who were normally present, several barely participated or were silent throughout. The reasons for this are worthy of investigation; since this is a setting where their participation is assessed, it is important to examine the reasons for a lack of participation.

A third area which would merit further study is the question-answer sequence, a key analytic theme in this study. Question-answer sequences may be investigated to see if certain questions are more conducive to elaborated reasoning in clinically framed discussion amongst peers, and whether certain questions are used more when a participant takes up different roles. While open questions are thought to be more conducive to elaborated answers, this study showed that the role taken up by the questioner appeared to be more significant than the type of question, and that if participants felt that knowledge was shared, elaborated answers were minimised. For example, in this study, in the clinical frame, students' questions and tutors' genuine questions were often abbreviated closed questions. While the assumption in PBL research has been that elaborated answers are preferable, this study showed that shared understandings might make full explication unnecessary. The involvement of tutors and students in this endeavour would help to increase awareness of the role of questions and the roles of questioners in the activity as this study has shown that the Bedside PBL activity type is marked by question-answer sequences.

A fourth area for study, as proposed above in 9.4, is the broader one of the context in which the PBL curriculum operates. The medical education literature is rich in research into professional, curricular and institutional constraints the PBL educational ethos has had to confront (see also Chapters 2 & 3). The planning or reshaping of a curriculum requires the coming together of interested stakeholders and the negotiation of desirable professional outcomes based on current and future needs. Studies such as the current one may inform a debate regarding what kind of professional expertise is desirable in young medical practitioners and what constitutes that expertise as part of professional 're-socialisation'.



## Bibliography

- Anspach, R. R. (1988). Notes on the Sociology of Medical Discourse: The Language of Case Presentation. *Sociology of Medical Education*, 29(4), 357-375.
- Antaki, C. (1998). *Analysing everyday explanation*. London: Sage Publications.
- Arluke, A. (1980). Roundsmanship: Inherent control on a medical teaching ward. *Social Science and Medicine*, 14(4), 297-302.
- Atkinson, J. M. & Heritage, J. (Eds.). (1984). *Structures of Social Action: Studies in Conversation Analysis*. Cambridge, UK: Cambridge University Press.
- Atkinson, P. (1984). Training for certainty. *Social Science and Medicine*, 19(9), 949-956.
- Atkinson, P. (1995). *Medical Talk and Medical Work*. London: Sage Publications.
- Atkinson, P. (1999). Medical discourse, evidentiality and the construction of professional responsibility. In S. Sarangi & C. Roberts (Eds.), *Talk, Work and Institutional Order: discourse in medical, mediation, and management settings*. Berlin, New York: Mouton de Gruyter.
- Atkinson, P. (2004). The discursive construction of competence and responsibility in medical collegial talk. *Communication and Medicine* 1(1), 13-23.
- Barrows, H. S. (1980). *Problem-Based Learning*. New York: Springer Publishing Company.
- Barrows, H. S. (1985). *How to Design a Problem-Based Curriculum for the Preclinical Years*. New York: Springer Publishing Company.
- Barrows, H. S. (1994). *Practice-based learning: Problem-based learning applied to medical education*. Springfield, IL: Southern Illinois University School of Medicine.
- Barrows, H. S., & Tamblyn, R.M. (1980). *Problem-based learning: an approach to medical education*. New York: Springer Publishing Company Inc.
- Bateson, G. (1972). *Steps to an Ecology of Mind*. New York: Ballantine Books.
- Becker, H. S., Geer, B., Hughes, E.C., & Strauss, A.L. (1961). *Boys in White: Student culture in medical school*. Toronto: University of Toronto Press.
- Bereiter, C., & Scardamalia, M. (2004). Commentary: Process and Product in Problem-Based Learning (PBL) Research. In C. E. Hmelo & D. H. Evensen (Eds.), *Problem-Based Learning: a research perspective on learning interactions*. Mahwah, NJ: Lawrence

Erlbaum Associates, Inc.

- Berger, P. & Luckmann, T. (1966). *The Social Construction of Reality: A Treatise in the Sociology of Knowledge*. London: Penguin.
- Boud, D. & Felletti, G. (1997). *The challenge of problem-based learning* (2nd. ed.). London: Kogan Page.
- Boyd, E. & Heritage, J. (2006). Taking the history: questioning during comprehensive history-taking. In J. Heritage & D. W. Maynard (Eds.), *Communication in medical care*. Cambridge: Cambridge University Press.
- Butler, C. W., Potter, J., Danby, S., Emmison, M. & Hepburn, A. (2010). Advice-Implicative Interrogatives: Building "Client-centered" Support in a Children's Helpline. *Social Psychology Quarterly*, 73(3), 265-287.
- Candlin, C. N. (1987). Explaining moments of conflict in discourse. . In S. R. T. Threadgold (Ed.), *Language topics: Essays in honour of Michael Halliday*. Amsterdam: Benjamins.
- Candlin, C. N. & Candlin. S. (2002). Discourse, Expertise, and the Management of Risk in Health Care Settings. *Research on Language and Social Interaction*, 35(2), 115-137.
- Cazden, C. B. (2001). *Classroom discourse: the language of teaching and learning*. (2nd ed.). Portsmouth, NH: Heinemann.
- Chafe, W. (1986). Introduction. In W. Chafe & J. Nicholson (Eds.) *Evidentiality: The Linguistic Coding of Epistemology*. Norwood, NJ: Ablex.
- Chan, L.K., Ip, M.S.M., Patil, N.G., & Prosser, M. (2011). Learning needs in a medical curriculum in Hong Kong. *Hong Kong Medical Journal* 17, 202-207.
- Cicourel, A. V. (1992). The interpenetration of communicative contexts: examples from medical encounters. In A. Duranti & C. Goodwin (Eds.), *Rethinking context: Language as an interactive phenomenon*. Cambridge, UK: Cambridge University Press.
- Colliver, J.A. (2000). Effect of Problem-based Learning Curricula: Research and Theory. *Academic Medicine*, 75(3), 259-266.
- Craig R. T. & Sanusi, A. L. (2003). "So, What Do You Guys *Think?*" Think Talk and Process in Student-Led Classroom Discussions. In P. J. Glenn, C. D. LeBaron, & J. Mandelbaum, (Eds.), *Studies in Language and Social Interaction*. Mahwah: NJ: Lawrence Erlbaum Associates, Inc.
- de Fina, A., Schiffrin D. & Bamberg, M. (Eds.). (2006). *Discourse and Identity*. Cambridge: Cambridge University Press.
- De Virgilio, G. (2011). One Day-One Problem Problem-based Learning (ODOP-PBL) for Continuing Education of Health Professionals. *Education for Health*, 24(2), 1-5.
- Diemers A.D., Dolmans D.H.J.M., van Santen M., van Luijk S.J., Janssen-Noordman

- A.M.B., & Scherpbier A.J.J.A. (2007). Students' perceptions of early patient encounters in a PBL curriculum: A first evaluation of the Maastricht experience. *Medical Teacher*, 29, 2-3, 135-142.
- Dillon, J. T. (1990). *The Practice of Questioning*. London: Routledge.
- Duchan, J.F. & Kovarsky, D. (Eds.). (2005). *Diagnosis as Cultural Practice*. Berlin: Mouton de Gruyter.
- Duck, J.E. (2000). Whose Group Is It, Anyway? Equity of Student Discourse in Problem-Based Learning (PBL). In C. E. Hmelo & D.H. Evensen (Eds.), *Problem-Based Learning: A research perspective on learning interactions*. Mahwah, NJ: Lawrence Erlbaum Associates.
- Duranti, A. & Goodwin, C. (Eds.) (1992). *Rethinking context: language as an interactive phenomenon*. Cambridge: Cambridge University Press.
- Education Commission. (2000). *Reform proposals for the education system in Hong Kong*. Hong Kong: Government Printer.
- Edwards, D. & Mercer, N. (1987). *Common knowledge: The development of understanding in the classroom*. New York, NY: Methuen.
- Ehrlich, S. & Freed, A. F. (2010). The Function of Questions in Institutional Discourse: An Introduction. In A. F. Freed & S. Ehrlich (Eds.), *"Why Do You Ask?" The Function of Questions in Institutional Discourse*. New York: Oxford University Press.
- Ende, J., Pomerantz, A., & Erickson, F. (1995). Preceptors' strategies for correcting residents in an ambulatory care medicine setting: A qualitative analysis. *Academic Medicine*, 70(3), 224-229.
- Engel, C. (1997). Not just a method but a way of learning. In D. Boud & G. Felletti, (Eds.), *The Challenge of Problem-Based Learning*. London: Kogan Page.
- Erickson, F. (1999). Appropriation of voice and presentation of self as a fellow physician: Aspects of a discourse of apprenticeship in medicine. In S. Sarangi & C. Roberts (Eds.), *Talk, Work and Institutional Order: discourse in medical, mediation, and management settings*. Berlin, New York: Mouton de Gruyter.
- Faidley, J., Evensen, D. H., & Salisbury-Glennon, J. (2000). How Are We Doing? Methods of Assessing Group Processing in a Problem-Based Learning Context. In C. E. Hmelo & D.H. Evensen (Eds.), *Problem-Based Learning: A research perspective on learning interactions*. Mahwah, NJ: Lawrence Erlbaum Associates.
- Fox, R. C. (1957). Training for Uncertainty. In R. K. Merton, Reader, G., & Kendall, P.L. (Eds.), *The Student-Physician*. Cambridge, Mass: Harvard University Press.
- Fox, R. C. (1980). The Evolution of Medical Uncertainty. *The Milbank Memorial Fund Quarterly, Health and Society*, 58(1), 1-49.
- Fox, R. C. (1998 [1959]). *Experiment Perilous: Physicians and Patients Facing the Unknown*. New Brunswick, NJ: Transaction Publishers.



- Frederiksen, C.H. (1999). Learning to Reason Through Discourse in a Problem-Based Learning Group. *Discourse Processes*, 27(2), 13-160.
- Gilkison, A. (2004). Problem-based learning tutor expertise: the need for different questions. *Medical Education*, 38, 921-926.
- Gilstad, H. (2011). *Obstetric ultrasound expertise as manifest in encounters between midwives and pregnant women: a case study from Kwa-Zulu-Natal in South Africa*. Unpublished doctoral dissertation, Norwegian University of Science and Technology, Trondheim, Norway.
- Glenn, P.J., Koschmann, T. & Conlee, M. (1999). Theory Presentation and Assessment in a Problem-Based Learning Group. *Discourse Processes*, 27(2), 119-133.
- Glenn, P.J., Koschmann, T. & Conlee, M. (2000). When is a Problem-Based Tutorial Not a Tutorial? Analyzing the Tutor's Role in the Emergence of a Learning Issue. In C. E. Hmelo & D.H. Evensen (Eds.), *Problem-Based Learning: A research perspective on learning interactions*. Mahwah, NJ: Lawrence Erlbaum Associates.
- Glenn, P.J., & Koschmann, T. (2005). Learning to diagnose: Production of diagnostic hypotheses in problem-based learning tutorials. In J.F. Duchan & D. Kovarsky (Eds.), *Diagnosis as Cultural Practice*. Berlin: Mouton de Gruyter.
- Goffman, E. (1961). *Encounters: Two Studies in the Sociology of Interaction*. Indianapolis: Bobbs-Merrill.
- Goffman, E. (1969[1959]). *The Presentation of Self in Everyday Life*. London: Allen Lane The Penguin Press.
- Goffman, E. (1981). *Forms of Talk*. Oxford: Basil Blackwell.
- Goffman, E. (1983). The interaction order. *American Sociological Review*, 48(1), 1-17.
- Goffman, E. (1986[1974]). *Frame Analysis*. Lebanon, NH: Northeastern University Press.
- Goodwin, C. (1994). Professional Vision. *American Anthropologist*, 96(3), 606-633.
- Goodwin, C. & Duranti, A. (1992). Rethinking context: an introduction. In A. Duranti & C. Goodwin (Eds.), *Rethinking context: language as an interactive phenomenon*. Cambridge: Cambridge University Press.
- Goodwin, C. & Goodwin, M.J. (1992). Assessments and the Construction of Context. In A. Duranti & C. Goodwin (Eds.), *Rethinking context: language as an interactive phenomenon*. Cambridge: Cambridge University Press.
- Goodwin, C. & Goodwin, M.J. (2004). Participation. In A. Duranti (Ed.), *A Companion to Linguistic Anthropology*. Blackwell Publishing Limited.
- Grove, M., Rego, P. & O'Rourke, P. (2005). Tutoring in problem-based learning medical curricula: the influence of tutor background and style on effectiveness. *BMC Medical Education*, 2005(5), 1-7.

- Gumperz, J. (1982). *Discourse Strategies*. New York, NY: Press Syndicate of the University of Cambridge.
- Hall, C., Slembrouck, S. & Sarangi, S. (2006). *Language Practices in Social Work: Categorisation and accountability in child welfare*. London: Routledge.
- Heritage, J. (2010). Questioning in Medicine. In A. F. Freed & S. Ehrlich (Eds.), *'Why Do You Ask?': The Function of Questions in Institutional Discourse*. New York: Oxford University Press.
- Heritage, J. & Maynard, D. W. (Eds.). (2006). *Communication in Medical Care*. Cambridge: Cambridge University Press.
- Hmelo-Silver, C. E. (2004). Problem-Based Learning: What and How Do Students Learn? *Educational Psychology Review*, 16(3), 235-266.
- Hobbs, P. (2003). The Use of Evidentiality in Physicians' Progress Notes. *Discourse Processes*, 5(4), 451-478.
- Hunter, K. M. (1991). *Doctors' stories: The narrative structure of medical knowledge*. Princeton: NJ: Princeton University Press.
- Hyland, K. (1998). *Hedging in scientific research articles*. Philadelphia, PA: John Benjamins Publishing.
- Jefferson, G. (1979). A technique for transcribing laughter and its subsequent acceptance/declination. In G. Psathas (Ed.) *Everyday Language: Studies in Ethnomethodology*. NY: Irvington Publishers.
- Kelson, A.C.M. & Distlehorst, L.H. (2000). Groups in Problem-Based Learning (PBL): Essential Elements in Theory and Practice. In C. E. Hmelo & D.H. Evensen (Eds.), *Problem-Based Learning: A research perspective on learning interactions*. Mahwah, NJ: Lawrence Erlbaum Associates.
- Kember, D., Ha, T.S., Lam, B.H., Lee, A., Ng, S., Yan, L. & Yum, J.C.K. (1997). *Action learning Project. Final Evaluation Report*. Hong Kong: Action Learning Project Management Committee.
- Khoo, H. E. (2003). Implementation of problem-based learning in Asian medical schools and students' perceptions of their experience. *Medical Education*, 37(5), 401-409.
- Kinkade, S. (2005). A Snapshot of the Status of Problem-Based Learning in U.S. Medical Schools, 2003-04. *Academic Medicine*, 80, 300-301.
- Knight, L. V. & Mattick, K. (2006). 'When I first came here, I thought medicine was black and white': Making sense of medical students' ways of knowing. *Social Science and Medicine*, 63, 1084-1096.
- Koschmann, T. & Evensen, D. H. (2000). Five Readings of a Single Text: Transcript of a Videoanalysis Session. In C. E. Hmelo & D.H. Evensen (Eds.), *Problem-Based Learning: A research perspective on learning interactions*. Mahwah, NJ: Lawrence Erlbaum Associates.

- Koschmann, T., Glenn, P.J. & Conlee, M. (2000). When Is a Problem-Based Tutorial Not a Tutorial? Analyzing the Tutor's Role in the Emergence of a Learning Issue. In C. E. Hmelo & D.H. Evensen (Eds.), *Problem-Based Learning: A research perspective on learning interactions*. Mahwah, NJ: Lawrence Erlbaum Associates.
- Koshik, I. (2005). Alternative questions used in conversational repair. *Discourse Studies*, 7(2), 193-211.
- Kwan, C.Y., Chan, C.L., Nichols, J.M., Sheng, H.P., & Wong, T.M. (1997). Problem-based learning (PBL) in teaching physiology and pathology. In D. Kember, B-h Lam, L. Yan, J.C.K. Yum, & S.B. Liu (Eds.), *Case studies of improving teaching and learning from the Action Learning Project*. Hong Kong: Action Learning Project.
- Labov, W. & Fanshel, D. (1977). *Therapeutic discourse: Psychotherapy as conversation*. New York: Academic Press.
- Lave, J. & Wenger, E. (1991). *Situated Learning: Legitimate Peripheral Participation*. Cambridge, UK: Cambridge University Press.
- Legg, M. (2007). From question to answer: The genre of the problem-based learning tutorial at the University of Hong Kong. *English for Specific Purposes*, 26(3), 344-367.
- Levinson, S. (1988). Putting Linguistics on a Proper Footing: Explorations in Goffman's Concepts of Participation. In P. Drew & A. Wootton (Eds.), *Erving Goffman: exploring the interaction order*. Cambridge, UK: Polity Press, in association with Basil Blackwell Ltd.
- Levinson, S. (1992 [1979]). Activity types and language. In P. Drew & A. Wootton (Eds.), *Talk at Work: Interaction in Institutional Settings* (pp. 66–100). Cambridge: Cambridge University Press.
- Light, D. Jr. (1979). Uncertainty and Control in Professional Training. *Journal of Health and Social Behavior*, 20(4), 310-322.
- Linell, P. (1998). Discourse across boundaries: On recontextualizations and the blending of voices in professional discourse. *Text*, 18, 143-158.
- Lingard, L., Garwood, K., Schryer, C. F., & Spafford, M. M. (2003). A certain art of uncertainty: case presentation and the development of professional identity. *Social Science and Medicine*, 56, 603-616.
- Lingard, L., Schryer, C., Garwood, K., & Spafford, M. (2003). Talking the talk: school and workplace genre tension in clerkship case presentations. *Medical Education*, 37(3), 612-620.
- Loyens, S. M. M., Rikers, R.M.J.P. & Schmidt, H.G. (2006). Students' Conceptions of Constructivist Learning: A Comparison between a Traditional and a Problem-based Learning Curriculum. *Advances in Health Sciences Education* 11, 365-379.
- Mackinnon, M. M. (1999). Conversion to Problem-Based Learning: a comparison of three approaches to curriculum reform. *HERDSA International Annual Conference Melbourne*.

- Maudsley, G. (1999) Roles and responsibilities of the problem based learning tutor in the undergraduate medical curriculum. *BMJ*, 318, 657-661.
- Mehan, H. (1979). *Learning lessons: Social organization in the classroom*. Cambridge, Mass.: Harvard University Press.
- Mehan, H. (1983). The Role of Language and the Language of Role in Institutional Decision Making. *Language in Society*, 12(2), 187-211.
- Mercer, N. (1995). *The Guided Construction of Knowledge: Multilingual Matters*.
- Mercer, N. (2004). Sociocultural discourse analysis: a social mode of thinking. *Journal of Applied Linguistics*, 1(2), 137-168.
- Merton, R.K. (2002[1968]). On Sociological Theories of the Middle Range [1949]. In C. Calhoun (Ed.) *Classic Sociological Theory*. Malden Mass: Blackwell Publishers.
- Mishler, E. (1984). *The Discourse of Medicine: Dialectics of Medical Interviews*. Norwood, NJ: Ablex Publishing Corporation.
- Mishler, E. (2006). Narrative and Identity: The Double Arrow of Time. In A. de Fina, D. Schiffrin & M. Bamberg, (Eds.), *Discourse and Identity*. Cambridge: Cambridge University Press.
- Nandi, P. L., Chan, J.N.F., Chan, C.P.K., & Chan, L.P.K. (2000). Undergraduate medical education: comparison of problem-based learning and conventional teaching *Hong Kong Medical Journal* 6(3), 301-306.
- Norman, G.R. & Schmidt, H.G. (2000). Effectiveness of problem-based learning curricula: theory, practice and paper darts. *Medical Education*, 34(9), 721-728.
- O'Grady, G. & Alwis, W. A. M. (2002). *One Day, One Problem: PBL at the Republic Polytechnic* Paper presented at the 4th Asia Pacific Conference in Problem-Based Learning. Hatyai, Thailand.
- O'Neill, P., Duplock, A. & Willis, S. (2006). Using Clinical Experience in Discussion within Problem-Based Learning Groups. *Advances in Health Sciences Education*, 11:469-463.
- Palinscar, A. S. (1999). Applying a sociocultural lens to the work of a transition community. *Discourse Processes*, 27(2), 161-171.
- Parsons, T.C. (1951). *The Social System*. Glencoe, ILL: The Free Press.
- Phillips, N. & Duke, M. (2001). The questioning skills of clinical teachers and preceptors: a comparative study. *Journal of Advanced Nursing*, 33(4), 523-529.
- Pomerantz, A. (1984). Agreeing and disagreeing with assessments: some features of preferred/ dispreferred turn shapes. In J. Maynard & H. Atkinson, J. (Eds.), *Structures of Social Action* (pp. 57-101). Cambridge: Cambridge University Press.
- Pomerantz, A. (2003). Modeling as a Teaching Strategy in Clinical Training: When Does It

- Work. In P. J. Glenn, C. D. LeBaron, & J. Mandelbaum, (Eds.), *Studies in Language and Social Interaction* (pp. 381-391). Mahwah, NJ: Lawrence Erlbaum Associates, Inc.
- Pomerantz, A., Ende, J. & Erickson, F. (1995). Precepting conversations in a General Medicine Clinic. In G.H. Morris & R.J. Chenail (Eds.), *The Talk of the Clinic: Explorations in the Analysis of Medical and Therapeutic Discourse*. Hillsdale, NJ: Lawrence Erlbaum Associates.
- Pomerantz, A., Fehr, B.J., & Ende, J. (1997). When Supervising Physicians See Patients: Strategies Used in Difficult Situations. *Human Communication Research*, 23(4), 589-615.
- Raymond, G. (2003). Grammar and Social Organization: Yes/No Interrogatives and the Structure of Response. *American Sociological Review*, 68(6), 939-967.
- Roberts, C. & Sarangi, S. (2002). Mapping and assessing medical students' interactional involvement styles with patients. In K. & P. T. Spellman-Miller (Eds.), *Unity and Diversity in Language Use*. London: Continuum.
- Roberts, C. & Sarangi, S. (2005). Theme-Oriented Discourse Analysis of Medical Encounters. *Medical Education*, 39, 632-640.
- Roter, D. & Hall, J. (1989). Studies of Doctor-Patient Interaction. *Annual Review of Public Health*, 10, 163-180.
- Sacks, H. & Jefferson, G. (1992). *Lectures on conversation*. Oxford, UK: Blackwell.
- Sacks, H., Schegloff, E.A. & Jefferson, G. (1978). A Simplest Systematics for the Organization of Turn Taking for Conversation. In J. Schenkein (Ed.), *Studies in the Organization of Conversational Interaction* (pp. 7-56). New York: Academic Press.
- Sarangi, S. (2000). Activity types, discourse types and interactional hybridity: the case of genetic counselling. In S. Sarangi & M. Coulthard, (Eds.), *Discourse and Social Life*. Harlow, UK: Pearson Education Limited.
- Sarangi, S. (2002). The Language of Likelihood in Genetic Counseling Discourse. *Journal of Language and Social Psychology* 21, 7-31.
- Sarangi, S. (2004). Editorial: Towards a communicative mentality in medical and healthcare practice. *Communication and Medicine*, 1(1), 1-11.
- Sarangi, S. (2005). Social interaction, social theory and work-related activities. *Calidoscopio* 3(3), 160-169.
- Sarangi, S. (2008). The Spatial and Temporal Dimensions of Reflective Questions in Genetic Counseling. In A. F. Freed & S. Ehrlich (Eds.), *"Why Do You Ask?" The Function of Questions in Institutional Discourse*. New York: Oxford University Press.
- Sarangi, S. (2010a). Healthcare interaction as an expert communicative system: an activity analysis perspective. In J. Strueck (Ed.), *New Adventures in Language and Interaction*. Amsterdam: John Benjamins Publishing Company.

- Sarangi, S. (2010b). Practising Discourse Analysis in Healthcare Settings. In I. Bourgeault, R. DeVries & R. Dingwall (Eds.), *The SAGE Handbook of Qualitative Methods in Health Research*. London: Sage.
- Sarangi, S. (2010c). Reconfiguring Self/Identity/Status/Role: The case of professional role performance in healthcare encounters. In G. Garzone & J. Archibald (Eds.), *Discourse, identities and roles in specialized communication*. Bern; New York: Peter Lang.
- Sarangi, S. (2011). Role hybridity in professional practice. In S. Sarangi, V. Polese & G. Caliendo, G. (Eds.), *Genre(s) on the Move: Hybridisation and Discourse Change in Specialised Communication* (pp. 1-26). Napoli: Edizioni Scientifiche Italiane (ESI).
- Sarangi, S. & Candlin, C. N. (2011). Applied Linguistics and professional Practice: Mapping a Future Agenda. *Journal of Applied Linguistics and Professional Practice* 7(1), 1-9.
- Sarangi, S. & Candlin, C. N. (2011). Professional and organisational practice: A discourse/communication perspective. In S. Sarangi and C. N. Candlin (Eds.), *Handbook of Communication in Organisations and Professions*. Berlin: De Gruyter Mouton
- Sarangi, S., & Clarke, A. (2002). Zones of Expertise and the Management of Uncertainty in Genetics Risk Communication. *Research on Language and Social Interaction*, 35(2), 139-171.
- Sarangi, S., & Roberts, C. (Eds.). (1999). *Talk, Work and Institutional Order: discourse in medical, mediation and management settings*. Berlin; New York: De Gruyter Mouton.
- Sarangi, S., & Roberts, C. (1999). Introduction: Discursive hybridity in medical work. In S. Sarangi & C. Roberts, (Eds.), *Talk, Work and Institutional Order*. Berlin: Mouton de Gruyter.
- Savery, J.R. (2006). Overview of Problem-Based Learning: Definitions and Distinctions. *The Interdisciplinary Journal of Problem-Based Learning*, 1(1), 9-20.
- Savery, J. R. & Duffy, T. M. (2001). Problem-Based Learning: An instructional model and its constructivist framework. *CRLT Technical Report No. 16-01*. Bloomington, Indiana: Indiana University.
- Savin-Baden, M. & Howell, C. (2004). *Foundations of Problem Based Learning*. Berkshire, UK: McGraw-Hill Education.
- Schegloff, E. A. (1980). Preliminaries to Preliminaries: 'Can I Ask You a Question?' *Sociological Inquiry*, 50, 104-152.
- Schegloff, E. A. (2007). *Sequence organization in interaction: A primer in conversation analysis*. Cambridge, UK: Cambridge University Press.
- Schiffrin, D. (2003). Narrative as Self-Portrait: Sociolinguistic Constructions of Identity. *Language in Society*, 24(2), 167-203.
- Schmidt, H. G. & Moust, J.H.C. (2000). Factors Affecting Small-Group Tutorial Learning: A

- Review of Research. In C. E. Hmelo & D.H. Evensen (Eds.), *Problem-Based Learning: A research perspective on learning interactions*. Mahwah, NJ: Lawrence Erlbaum Associates.
- Schmidt, H. G., Vermeulen, L. & van der Molen, H.T. (2006). Long-term effects of problem-based learning: a comparison of competencies acquired by graduates of a problem-based and a conventional medical school. *Medical Education*, 40, 562-567.
- Schutz, A. (1962). *Collected Papers: The problem of social reality*. The Hague: Martinus Nijhoff Publishers.
- Scott, M.B. & Lyman, S.M. (1968). Accounts. *American Sociological Review*, 33(1), 46-62.
- Sellappah, S., Hussey, T., & McMurray, A. (2001). The use of questioning strategies by clinical teachers. *Journal of Advanced Nursing*, 28(1), 142-148.
- Sham, M.H. & Dixon, A.S. (2000). *Summer Broadening Course, Case 1: Sammy Chu*. The University of Hong Kong.
- Shi, L., Corcos, R., & Storey, A. M. (2001). Using Student Performance Data to develop an English course for clinical training. *Journal of English for Specific Purposes*, 20, 267-291.
- Sinclair, J. McH. & Coulthard, R.M. (1975). *Towards an analysis of discourse: The English used by teachers and pupils*. London: Oxford University Press.
- Skelton, J. (1997). The representation of truth in medical academic writing. *Applied Linguistics*, 18(2), 121-140.
- Slimani, A. (1992). Evaluation of classroom interaction. In J. C. Alderson & A. Beretta, (Eds.), *Evaluating second language education*.
- Smith, B. L. & Macgregor, J. T. (1992). What Is Collaborative Learning? . In A. S. Goodsell, M. R. Maher, V. Tinto, B. L. Smith, & J. T. MacGregor (Eds.), *Collaborative learning: A sourcebook for higher education*. University Park, PA: National Center on Postsecondary Teaching, Learning and Assessment.
- Smith, D.E. (1989). Feminist Reflections on Political Economy. *Studies in Political Economy*, 30/3, 37-59.
- Stivers, T. & Enfield, N.J. (2010). A coding scheme for question-response sequences in conversation. *Journal of Pragmatics*, 42, 2620-2626.
- Storey, A.M. (2006). Analysing student discourse in problem-based learning (PBL) tutorials: Discrepancies between expectations and practice. *Health and Discourse Seminars (HEADS)*, Health Communication Research Centre, Cardiff University, Wales.
- Storey, A. M. & Tse, L. K. (2005). Insights into Conceptualisations of Problem-based Learning in Clinical Education Through Communicative Pedagogy. *Third International Interdisciplinary Conference on Communication, Medicine and Ethics and the 8th Annual Seminar of the Centre of Values, Ethics and Law in Medicine*

- (COMET-VELIM) Macquarie University and The University of Sydney, Australia.
- Storey, A.M., Tse, L.K., Lam, L.O.N. & Legg, M. (2004). Communicative challenges for students in PBL in medicine. *Second Interdisciplinary Conference on Communication, Medicine and Ethics (COMET)*, Linköping University, Sweden.
- Storey, A.M., Tse, L.K., Chan, L.K. & Yip, A. (2011). Researching disciplinary discourses: perspectives from applied linguistics and medical education in a second language context. *1<sup>st</sup> International Conference on Applied Linguistics in Professional Practice*, Cardiff University, Wales.
- Strobel, J. & van Barneveld, A. (2009). When is PBL More Effective? A Meta-synthesis of Meta-analyses Comparing PBL to Conventional Classrooms. *Interdisciplinary Journal of Problem-based Learning*, 3(1), 44-58.
- Svinicki, M.D. (2007). Moving beyond “It worked”: The Ongoing Evolution of Research on Problem-Based Learning in Medical Education. *Educational Psychology Review* 19, 49-61.
- Tannen, D. (Ed.) (1993). *Framing in Discourse*. New York: Oxford University Press.
- Tannen, D. & Wallat, C. (1993). Interactive Frames and Knowledge Schemas in Interaction: Examples from a Medical Examination/Interview. In D. Tannen, (Ed.), *Framing in Discourse*. New York: Oxford University Press.
- Taylor, C.C.W. (Ed.). (2006). *Nicomachean Ethics* Books II-IV Nicomachean Ethics Books II-IV.
- Thomas, J. (1983). Cross-cultural Pragmatic Failure. *Applied Linguistics* 4(2), 91-112.
- Thomas, J. (1995). *Meaning in Interaction: An Introduction to Pragmatics*. London: Longman.
- Thomas, J. (1996). *The Dynamics of Discourse: A Pragmatic Analysis of Confrontational Discourse*. Unpublished doctoral dissertation: Lancaster University.
- Timmermans, S. & Angell, A. (2001). Evidence-Based Medicine, Clinical Uncertainty and Learning to Doctor. *Journal of Health and Social Behavior*, 42(4), 342-359.
- Tipton, S. (2005). Improving international medical graduates’ performance of case presentations. *Journal of Applied Linguistics*, 2(3), 395-406.
- Toulmin, S., E. (1979). *An Introduction to Reasoning*. London: Macmillan.
- Vygotsky, L.S. (1962). *Thought and Language*. Cambridge, Mass: The M.I.T. Press.
- Vygotsky, L.S. (1978). *Mind in society: the development of higher psychological process*. Cambridge, Mass: Harvard University Press.
- Watkins, D. A. & Biggs, J. B. (2001). The Paradox of the Chinese Learner and Beyond. In D. A. Watkins & J. B. Biggs, (Eds.), *Teaching the Chinese Learner: Psychological and Pedagogical Perspectives*. Hong Kong: Comparative Education and Research Centre,



University of Hong Kong.

Wood, D. (2003). Problem based learning. *BMJ*, 326, 328-330.

Zemel, A. & Koschmann, T. (2011). Pursuing a question: Reinitiating IRE sequences as a method of instruction. *Journal of Pragmatics*, 43, 475-488.