UNIVERSITY OF SOUTHAMPTON

FACULTY OF BUSINESS & LAW

School of Management

The impact of sensemaking on knowledge transfer: A qualitative analysis of junior doctors' clinical handover

by

Melinda Anne Taylor

Thesis for the degree of Doctor of Philosophy

December 2010

ABSTRACT

This study investigates the impact of sensemaking upon domain-specific knowledge transfer amongst professionals. The research context is the late afternoon clinical handover between junior doctors finishing their day duty shift and those coming on duty. Those taking part in this handover are all within their first year of clinical practice with no senior medical staff or other health professionals present. A qualitative methodology is employed involving semi-structured interviews, observation and recording of handovers, and observation of those taking over from their day shift colleagues as they go about their work during the evenings. Two groups of junior doctors are observed, each group developing its own individual handover style. One group creates a narratively oriented forum at which knowledge is shared, while the other takes a more instructive approach, in which information or explicit knowledge is transferred. The way in which the junior doctors make sense of the role and purpose of the handover at that time of day is seen to guide the development of handover style. This in turn impacts upon the knowledge that is transferred or shared between them, and also upon how those coming on duty conduct their work during the evening. Identity construction, the central theme in social-constructionist sensemaking theory, is seen to play a significant role in the development of group cohesion, which influences the junior doctors' understanding of the handover in terms of both purpose and content. Identity is also influential in the processes involved when sensemaking reaches an inadequate conclusion but is maintained, regardless of additional conflicting data. The research contributes to current knowledge of these processes. The sensemaking activities involved in intentional, deliberate efforts by individuals to understand what is happening were identified at group level, suggesting that the analytical structure used might be applied more widely in the investigation of group situations, rather than individual sensemaking events. The junior doctors work together for six months before separating to go to different posts; they do not continue as a team. The research therefore has applicability to team and project work, especially in which there is no continuity of group membership.

DEDICATION

Dedicated to my mother, Joan Rosa Taylor, who would have been happy and proud to see this completed work.

Contents

List of figures

List of tables

DECLARATION OF AUTHORSHIP

I, Melinda Taylor

declare that the thesis entitled

The impact of sensemaking on knowledge transfer: A qualitative analysis of junior doctors' clinical handover

and the work presented in the thesis are both my own, and have been generated by me as the result of my own original research. I confirm that:

- this work was done wholly or mainly while in candidature for a research degree at this University;
- where any part of this thesis has previously been submitted for a degree or any other qualification at this University or any other institution, this has been clearly stated;
- where I have consulted the published work of others, this is always clearly attributed;
- where I have quoted from the work of others, the source is always given. With the exception of such quotations, this thesis is entirely my own work;
- I have acknowledged all main sources of help;
- where the thesis is based on work done by myself jointly with others, I have made clear exactly what was done by others and what I have contributed myself;
- none of this work has been published before submission,

Signed: ……

Date:……

Acknowledgements

I would like to express my sincere thanks to my supervisors, Professor Con Connell and Dr Jonathan Klein for their encouragement and support during this research project.

Dr Chris Bunch is thanked for his interest in my work and supporting the project. I also thank the managers, clinical staff and administration staff at the organization hosting the research, and the participants.

Dr Tim Vellacott is thanked for his pragmatic advice, and for involving me in the choral music that has very pleasantly distracted me from my research from time to time.

I thank all my fellow PhD students for the fascinating discussions we have enjoyed on research and many other issues, but especially Elen, now Dr Elen Hall, to whom I am very grateful for her unfailing support and friendship, and Dr Noor Maya Salleh who, despite returning to Brunei, has maintained conversations and laughter on an almost daily basis. Elen's husband, Charlie, deserves special thanks for being the audience to many practice runs of my presentations.

Dr Sula Ellis and her husband Tony are thanked for their constant and enthusiastic interest in this research and my progress. I also thank Sue Gruzelier.

I thank my family for their understanding during the course of this project and most of all my husband, Dr Glyn Jones, for listening while I talked endlessly about my work, for his confidence in me, and for his support throughout the research.

Chapter 1 Introduction

1.1 Focus of the research

This study stems from the researcher's curiosity about how we each make sense of things. It is widely acknowledged that descriptions of an event, a traffic accident, a wedding scene, or the circumstances preceding a new product launch for example, vary from person to person. Each witness or participant will notice something different in the detail, interpreting the situation uniquely from his or her own individual perspective, drawing upon knowledge, experiences, values and beliefs to make sense of the situation. This may be helpful in serving to enrich what we know, and we can often take time to evaluate and either accept or reject these contributions, again, according to how we make sense of them. But what happens when time is limited and the situation is critical, where the outcome of an incorrect interpretation can be disastrous? A number of organizations operate under such conditions almost continuously. Flight operations on aircraft carriers, nuclear power installations, fire fighting units, air traffic control centres and healthcare are examples of what are termed High Reliability Organizations (HROs). They demand reliable, error-free performance, sustained over long periods of time, with a workload that is subject to time pressure and extreme variability, and any errors can result in a lethal outcome (Weick & Roberts 1993). The research lies within an HRO setting, specifically, within the context of the late afternoon shift change handover between junior doctors, house officers (HOs) in their first year of clinical practice. Its significance is in allowing reflection upon the theoretical aspects of sensemaking and knowledge transfer and how they might influence this critical context, which is receiving increasing attention by professional bodies and the media, alerted to the devastating outcomes of poor handovers. This leads to a number of theoretical and practical contributions.

Medical handovers, and particularly those involving junior doctors, are receiving increasing attention from researchers. As will be seen in the literature review (Chapter 2), little has been documented concerning the activities that doctors engage in prior to handovers, during, and after handovers (Raduma-Tomas, Flin & Williams, 2011). This research will help to address this gap in knowledge by investigating these activities from a knowledge transfer and a sensemaking perspective. Further, a study of English hospitals by the Dr Foster Unit at Imperial College London (Jen *et. al.* 2009) found a small but significant increase in the number of deaths occurring in patients admitted on the first Wednesday in August, the day that new junior doctors begin clinical practice, compared with those admitted on the previous Wednesday. This was higher for patients with a medical primary diagnosis and therefore admitted onto wards within

departments of Medicine. Further studies will be conducted to identify the reasons for this and handovers involving junior doctors will be assessed as one of the possible factors. The research that is the subject of this thesis is conducted within the speciality of Medicine, examining the handovers made between junior doctors within their first year of clinical practice, precisely the group of interest to the Dr Foster Unit. This research is therefore current in nature and may make a complementary contribution to the larger study. It is also novel in focussing upon the late afternoon clinical handover between these junior doctors, which involves no other medical staff.

The study is set in a busy, acute medicine department of a large, university teaching hospital. A team of six or more house officers (HOs) going off duty make a report on the patients in their care to just two HOs coming on duty. The report does not include every patient, it is restricted to the patients and tasks that those going off duty consider will need particular attention during the following shift. If one of the HOs going off duty fails to report that a particular clinical procedure must be carried out at a certain time or does not anticipate that a patient's condition is deteriorating, then patient care is compromised. Those going off duty must make sense of what has happened during their shift and pass on relevant knowledge and information to the next shift. The HOs coming on duty need to be able to assimilate the reports from all those going off duty, making sense of what has been passed on so that they can correctly identify the order of priorities to deliver appropriate and timely care, rescheduling as the shift progresses to take account of emergencies and new admissions. To operate effectively and ensure good and safe patient care, this selective style of handover is reliant upon the sensemaking of the HOs going off duty and the sensemaking of those coming on duty, mediated by an appropriate knowledge transfer mechanism. It must also accommodate the individual subjectivity that colours our sensemaking. From this intriguing perspective, the researcher will investigate the impact of sensemaking on knowledge transfer, within an HRO context.

1.2 Thesis outline

Chapter 2, The Literature Review, begins with a description of the professional literature relating to medical shift change handovers. While there is a wealth of literature concerning medical handovers, this largely concerns handovers that involve doctors of varying levels of seniority, sometimes with other healthcare professionals included, and in which a report is made on all the patients currently in that team's care. The researcher could find no research literature specifically relating to the handover of concern to this study, namely, between HOs of the same level of seniority,

with no other healthcare professionals present, in which those going off duty would only hand over selected patients that they considered should be brought to the attention of their colleagues taking over from them. In this respect, the research is novel. Guidance provided by the British Medical Association has been included as it has relevance to good practice in all medical handovers, and is therefore of interest.

This is followed by an investigation into knowledge transfer, which necessitates reaching an understanding of the concept of knowledge. The characteristics of knowledge from the objectivist and practice-based perspectives are compared and it becomes clear that the knowledge transfer process, and its very existence, differs significantly between the two perspectives: the objectivist treatment of knowledge as a disembodied entity that with varying amounts of effort may be transferred from a source to a recipient, as are many other commodities, with little, if anything, lost in transmission; and the multidimensional, culturally embedded and socially constructed idea of knowledge that from a practice-based perspective cannot be transferred, but proliferates by sharing or being appreciated in a way that enables the generation of new knowledge, shaped according to individual beliefs, values and needs, and therefore, unique.

The review follows the development of thinking that draws together elements of both perspectives; cognitive processing according to individual interpretation, based upon personal and social models. These authors are setting the scene for future debate on socio-cognitive approaches to knowledge outcomes and proliferation, which will surely necessitate increasing discussion with colleagues in the sensemaking arena.

Narrative is presented as a natural link between knowledge and sensemaking. Its role as arguably the most widely used medium for transferring or sharing knowledge is discussed and the significance of sensemaking as a narrative process is evident throughout the remainder of the literature review.

To gain an understanding of sensemaking, its characteristics according to probably the most widely recognized author in the field, Karl E. Weick, are described. The importance of the concept is illustrated by providing examples of sensemaking in many varied contexts, but with a tendency towards those in HROs. Identity construction is seen to be a central theme, informing our perception and what we notice about an event, and our interpretation of what is happening. A differentiation is made between the ongoing sensemaking that continues through our daily lives and by which we understand our worlds, and the intentional sensemaking that is initiated when we make a deliberate effort to make sense of a situation that is outside of our

expectations. This latter form of sensemaking is highly relevant to situations in which achieving the correct understanding of a situation is paramount, for example in a military or medical context. It has been studied extensively by Gary Klein and his team of researchers, who propose a theory of sensemaking activities to explain the various possible outcomes of our sensemaking efforts. These sensemaking activities are considered by the researchers to be universally applicable to all intentional sensemaking contexts. Leading on from this work, Klein opens up a discussion on anticipatory thinking as a form of sensemaking concerning future events, and provides suggestions as to how it might be characterized.

This research identifies a number of similarities between knowledge transfer and sensemaking processes, and discussion of these contributes towards our understanding of these concepts and how they might be associated. After reflecting upon the literature, Chapter 2 concludes with the position the author has reached on the concept of knowledge, how it might be transferred or shared, and its association with sensemaking. This leads to the establishment of the research questions.

Chapter 3 describes how the methodology used in the research was determined and the exacting process of achieving ethical approval to proceed with the study. It also demonstrates some of the challenges encountered when conducting research in a real world rather than a laboratory setting and the efforts required to manage them. From this experience, the author suggests a number of practical recommendations to assist other researchers approaching the ethical review process, which are given as an appendix (see Appendix D). The justification for applying a qualitative rather than quantitative approach is made.

In Chapters 4 and 5 the research findings are presented and analyzed. It is seen that the two groups of participants developed different handover styles and the structural characteristics of each are examined. Examples of the raw data are provided as a means of illustrating to the reader the analytical methodology employed and how the findings were reached.

Reflecting upon the literature review, Chapter 6 explores the possible determinants of the different handover styles and an adaptation to a section of the data/frame theory of sensemaking activities is proposed, providing an additional dimension to our understanding of why we may sometimes persistently maintain an incorrect explanation of things, even when there is clear evidence that we have reached an inadequate conclusion. The influential role of identity construction is identified.

Chapter 7 draws together the similarities identified in the literature review between sensemaking and knowledge processes and relates them to the research findings. The contributions of the research, both theoretical and practical, are presented. The chapter concludes with a number of suggestions for future studies in this fascinating field of research.

Chapter 2 The Literature Review

2.1 The professional literature

This section of the review addresses the professional literature specifically concerning the clinical shift change handover between medical staff.

2.1.1 British Medical Association guidelines

In 2004, the British Medical Association (BMA) published guidelines for clinicians and managers on how clinical handovers should be conducted (Safe handover: safe patients, BMA). In his foreword to the document, Professor Sir John Lilleyman, Medical Director to the National Patient Safety Agency, stated that: 'Handover of care is one of the most perilous procedures in medicine, and when carried out improperly can be a major contributory factor to subsequent error and harm to patients' (BMA 2004, p. 2).

While this has always been so, the aim of the guidelines was to reinforce that message in response to its enhanced relevance resulting from the national restructuring of hospital doctors' working patterns. The change in working patterns was driven by the New Deal initiative for doctors in training and the European Working Time Directive.

The New Deal was agreed in 1991 between the medical profession, NHS management and the Government, and consisted of various measures designed to improve junior doctors' working conditions. A key element was to place limits on the number of hours worked, dependent upon the shift pattern being worked in any one week, with an implementation target date of August 2003.

The European Working Time Directive (1993) was intended to protect workers from the potentially detrimental effects of excessive working hours and to ensure adequate rest. The Directive was extended to include junior doctors in August 2004, with a phased implementation to decrease the number of hours worked by August 2009.

These two instruments have led to a change from the traditional on-call system of working, to working shift rotas. In patient care terms, this means that doctors are moving away from the position of being personally responsible for continuity of patient care and is in keeping with nurses and other health professionals who have adopted new patterns of working. '... the concept of personal continuity is outdated in the modern NHS where multiple health professionals and teams will contribute to the care of a single patient' (BMA p. 7).

The resulting shift patterns, with junior doctors on duty for shorter hours and the increase in the number of people caring for each patient, emphasizes the importance of communicating patient information effectively and the necessity for robust clinical handover processes.

'Safe handover: safe patients' is a guidance document, not a legislative requirement. The document recognizes that there will be different specific handover needs for various clinical areas and at different times of the day and does not specifically address the late afternoon handover between HOs, the focus of this research, but makes recommendations considered by the contributors to be essential to best practice in all handovers and encourages the development of initiatives to standardize handover processes. A summary of the recommendations is given in Appendix A.

While acknowledging this guidance document, it should be noted this research does not set out to compare the observed handovers with the recommendations. The handovers provided an opportunity to observe sensemaking and it is the sensemaking that is of interest and not the doctors' procedural compliance with recommended practice, even though the findings may complement the guidance.

2.1.2 Professional articles

The British Medical Journal (BMJ) has published a number of articles in which medical professionals comment upon the manner in which handovers are conducted and express their views on related research. At the time that this research data was being collected there were four current articles concerning handovers on BMJ.com and one on studentbmj.com. The articles published prior to the beginning of the data collection included one that featured on both websites, highlighting the benefits of good handover practice and suggestions on how handovers should be conducted. The recommendations are similar to those made by the BMA, above. The articles concerned handovers at which doctors of various levels of seniority were present rather than the late afternoon handover between HOs. Again, this research is not concerned with judging performance against the opinions of the medical professionals authoring these articles, but they are mentioned here to demonstrate that such literature exists and is readily available to inform the practise of all medical professionals, including students.

2.1.3 The academic literature on medical handovers

The academic literature concerning medical handovers largely arises from the United Kingdom, Australia, New Zealand, USA and Canada. While this review has not sought to identify any national differences, studies from each of these countries and a small

number of others identified, appear to generally complement one another and tend to fall into three main categories:

- characterization of the handover process and content
- handover as a source of medical error
- improvement measures

A common finding within the literature is that the processes for conducting medical handovers are often determined by individual doctors' preferences (Laxmisan, Hakimzada & Sayan, 2007). There is often no time or place designated for handovers (Vidyarthi, Arora & Schnipper, 2006) and handovers are frequently carried out out wherever the doctor going off duty and the doctor coming on duty happen to meet and at whatever time that takes place (Tokode, Barthelmes and O'Riordan, 2008). In a study of emergency departments, consultants and registrars were in agreement that as a minimum requirement, handovers should include the patient's medical problem, how this was being managed, any investigations that had been carried out, the outlook for the patient and the action plan (Ye, Taylor & Knott, 2007). This is supported by observational findings from studies in Intensive Care Units identifying the most frequent content categories as diagnosis, current medical data, interventions, expectations and goals (Miller, Scheinkestel, Limpus, Joseph, Karnik & Venkatesh, 2009).

The Joint Commission on National Patient Safety Solutions (2009) noted that communication problems are frequently cited as the cause for inadequate information transfer during handovers, and consequent medical errors. Key communication problems identified are failure to include relevant handover content, failure to provide an adequate explanation of the circumstances surrounding a decision, and lack of discussion concerning anticipated problems (Arora, Johnson & Lovinger, 2005). The absence of face-to-face communication was identified as a significant factor in a number of serious medical incidents (Flanagan, Patterson & Frankel, 2009; Philibert, 2009), while discussions carried out during handovers enable doctors to establish that relevant tasks have been completed (Wilson, Galliers & Fone, 2007) and provide an opportunity to identify potential patient safety threats, thereby supporting the organization's resilience (Jeffcott, Ibrahim & Cameron, 2009; Wears, Perry & McFauks, 2007). Failure to designate times and places for handovers can result in interruptions, which again have an adverse impact upon communication (Tokode, Barthelmes and O'Riordan, 2008).

In attempting to improve handovers, a number of authors advocate formal handover training for junior doctors (BMA, 2004; Royal College of Physicians, 2002; Iglehart,

2008; Cleland, Ross & Miller, 2009). However, the essence of their improvement measures appears to be the structuring and standardization of handovers (Arora & Johnson 2006), the presentation of what are considered to be ideal handovers (Beasley *et al.* 2006), and the consequent development of protocols or checklists. A number of these have taken the form of mnemonics, such as SBAR (situation, background, assessment, recommendation) (Haig, Sutton & Whittington, 2006), JUMP (jobs outstanding, unseen patients, medical contacts and patients to be aware of) (McCann, McHardy & Child, 2007) and SIGNOUT (sick, identify data, general hospital course, new events, overall health status, upcoming possibilities with plan, tasks to complete, any questions), which was received favourably during training, but poorly taken up in practice (Horowitz, Moin & Green, 2007). None of the mnemonic systems has been thoroughly tested in a healthcare setting, as is the case for checklists and the use of scenarios as a training tool, both of which would require much further investigation to examine their effectiveness within this context (Raduma-Tomas, Flin, Yule & Williams, 2011). Further improvement measures have been sought within information technology solutions (Flanagan, Patterson & Frankel, 2009; Wilson, Galliers & Fone, 2007), which have largely taken the form of an electronic version of a handover checklist. Some electronic systems have the potential to incorporate up to date information such as laboratory results. However, interview evidence has shown that a number of doctors believe that electronic solutions may be employed for the sake of acquiring new technology rather than providing a proven communication improvement tool (Sharit, Mccane & Thevenin, 2008).

These efforts to standardize handovers are intended to facilitate reliable, efficient communication of information. However, there is a danger that they may also have a number of unintentional disadvantages. A structured checklist process can effectively accommodate information of the type that might be described as ‘low-hanging fruit’ (Perry, Wears & Patterson, 2008); that which is readily identified and captured, but can less easily incorporate a situation such as ‘If the patient’s temperature remains high within the next hour he will need a CT scan and a lumbar puncture, and the parents are very concerned and have so far not given consent’. Also, the checklist can become a template for communication process, particularly when there is a heavy workload, with the person handing over focusing upon the ‘low-hanging fruit’, the aim of the process being to complete the checklist form rather than to provide a good quality handover, and reorienting the event from an interaction between doctors to a transaction from one to another, without the need to meet. Clinical handovers can be far more than simply events at which there is a transfer of information. By providing an opprortunity for clinicians to interact, handovers have the potential to support

macrocognitive functions such as problem recognition, analysis, planning and sensemaking (Woods & Hollnagel, 2006).

The majority of the medical handover literature reviewed concerns handovers between doctors of varying grades of seniority, between multidisciplinary teams, and between clinical staff in one department handing over to another. This research will add to the body of literature by focusing upon handovers between junior doctors of the same level of experience, without the influence of doctors of different levels of seniority. The literature is heavily weighted towards characterizing and structuring the content and process in an effort to achieve efficiency, with little investigation of the activities that doctors engage in before, during and after handovers (Raduma-Tomas, Flin, Yule & Williams, 2011). This research will address this gap in the literature by examining how these junior doctors prepare prior to handovers, what happens during the handovers and their activities after the handover, from both a knowledge transfer and a sensemaking perspective.

2.2 Knowledge transfer

2.2.1 Introducing knowledge transfer

The context of this research is a workplace handover between members of one shift going off duty and another shift coming on duty. The concept of a shift handover implies that, essentially, something of certain situations occurring during a shift may need to be known by those coming on duty in order to continue the work process. It may be knowledge, it may be information, perhaps both; these concepts will be discussed within this section. Whatever it is will be communicated by those going off duty to those coming on duty. The meaning and nature of knowledge, and how knowledge may be transferred or shared, will be discussed from various perspectives within the literature.

The terms knowledge transfer and knowledge sharing are frequently used interchangeably, although certain authors have firm views on their use. King (2006), for example, differentiates between knowledge transfer as a focused, unidirectional process from giver to receiver, and knowledge sharing as being multidirectional. Knowledge sharing may have a specific aim, but also often occurs unintentionally. Fernie *et al.* (2003) share King's view, as do Lanzara and Patriotta (2001), who are critical of functionalist approaches, particularly within the project management and

general management disciplines, which are inclined towards a view of knowledge as objective and transferable. Narrative, or storytelling, will be introduced, as it is one of the most naturally used methods by which people share knowledge. The research data will later show storytelling to be influential in the handover.

An applied approach will be taken and the literature review will generally incline towards person-to-person knowledge transfer or sharing, and knowledge within groups, in keeping with the context of the research, although a wider, organizational view will be taken where appropriate.

2.2.2 What is knowledge?

The debate on what constitutes knowledge has continued for centuries, resulting in an array of arguments from a range of disciplines (Randall 2001). Knowledge is often described by drawing the reader's attention to what it is not (Weick 1995; Fernie *et al*. 2003; Hislop 2005), and the common differentiation made is that between data, information and knowledge. However, there is no widely agreed definition of these terms and certain literature confusingly uses the terms *information* and *knowledge* as synonyms for one another. Wilson (2002) graphically illustrates this by replacing every occurrence of the word *knowledge* with *information* in several documents without affecting their meaning. Indeed, this author has witnessed the reverse process, where the term *information* in a particular document was replaced with *knowledge* in order to produce an organization's Knowledge Management Policy. Wilson defines knowledge as that which is known, involving mental processes such as comprehension '... that go on in the mind and only the mind, however much they involve interaction with the world outside the mind, and interaction with others' (Wilson 2002, p. 2). Data consists of simple facts and information is data '... embedded in a context of relevance to the recipient' (Wilson 2002, p. 2), both being external to the mind and open to manipulation.

The three elements are often referred to as a hierarchy with knowledge uppermost, evolving from information, which is derived from data. Bhatt (2001) suggests that the level of structure is the key differentiating factor, with knowledge being more highly structured or organized than information, which is in turn more structured than data.

Tuomi (1999) proposes that a reversal in the hierarchy from data to knowledge, i.e., knowledge, information then data, occurs before the data-information-knowledge hierarchy develops. This is based upon the assumption that information results from articulated knowledge, which is then broken down into categories and again into data, from which the original data-information-knowledge hierarchy begins.

There is a similarity here to the sensemaking notion of punctuation and bracketing (Weick 1995) in which, essentially, strings of data are divided into portions to aid understanding. The reversal of the knowledge hierarchy provides a further similarity to sensemaking in that environmental data are selected and organized to make sense of a situation and the sense that is made is used to initiate the search for additional data and its interpretation. These sensemaking concepts will be discussed in Section 2.3.3.1.3.

Jonathan Klein (personal email, 14th May 2009) suggests that each knowledge hierarchy has a different status, one dynamic and one structural. The complexity of knowledge is necessary for the assimilation of data and information, but data and information may then become structured into knowledge.

Sveiby offers the simple definition that 'Knowledge is a capacity to act' (Sveiby 1997, p. 38). Polanyi (1967) emphasizes the dynamic nature of knowledge, describing it as an activity that might be better described by the term *process-of-knowing*. Nonaka and Takeuchi (1995) propose a view of knowledge based upon belief, commitment and action. It is personally held and cannot be separated from its context, unlike information, which is considered to be organized data and nothing more.

Davenport, De Long and Beers (1998a) expand this action-oriented view by proposing that knowledge is the outcome of information combining with reflection on previous experiences and actions, individual interpretation and the situational context. Smith (1998) and Alavi and Leidner (1999) both suggest that it is when information is processed in a way which enables action that it becomes knowledge, but the information must be drawn from interpreted data which can be authenticated or considered believable: what is key to the concept of knowledge here is individual interpretation and meaning. The implication of this is that a person's existing knowledge shapes the type of information collected and the way in which it is analyzed. Therefore, people with different knowledge can give different accounts of the same situations (Hislop 2005). There is a sensemaking argument that parallels this process to explain differing descriptions of the same event. Action and interpretation also exert a significant influence upon sensemaking processes, as will be discussed in Section 2.3. The way that people have understood past events, their existing frameworks, are used to make sense of present events by influencing the environmental data collected and the way it is interpreted. In this way, from a sensemaking perspective, people may understand situations differently and give varying accounts of the same event.

What is emerging from the literature is that rather than being linked in a simple, structural relationship, data, information and knowledge relate interactively and dynamically, and our understanding of them may be influenced by individual, socially derived, cognitive processes.

2.2.3 Tacit and explicit knowledge

In order to investigate knowledge, many classifications have been developed, such as individual and group knowledge and, perhaps most widely known, the distinction between explicit and tacit knowledge. The prevailing epistemology in Western culture, grounded in the work of Descartes, favours individual and explicit knowledge above group and tacit knowledge. For Cartesians, the thinking self is the one certainty; everything else we perceive in our world is influenced by our subjective interpretation, and rational, analytical methods, thought to minimize these uncertainties, are considered the best means of acquiring knowledge. The precedence afforded to explicit knowledge is demonstrated in the treatment of tacit knowledge '... as an informal, inchoate, or obscure kind of knowledge, whose very nature calls for it to be made explicit in order to be truly understood or useful in practice' (Cook & Brown 1999, p. 384).

The debate concerning the explicit and tacit forms of knowledge has reached no consensus and there are varied beliefs on the relationship between and implications of each. The main difference of opinion seems to be between those who view explicit and tacit knowledge as completely distinct forms and those who regard them as two extremes of a continuum.

Explicit knowledge is characterized as specific, formalized, readily stored in a tangible form and easily communicated, for example in documents, instruction manuals and procedures. It is impersonal, is not context dependent and is therefore considered to be objectified (Zack 1999). Tacit knowledge is said to be owned by and inseparable from people, being developed from their individual backgrounds, experiences, values and beliefs, and is extremely difficult to articulate and communicate (Hislop 2005). Polanyi (1967) proposes that the major part of any person's body of knowledge is that which cannot be articulated and from this arises his widely known proposition that we know more than we are able to tell. There are two very different perspectives on the relationship between explicit and tacit knowledge, which have a significant impact on how the transfer and sharing of knowledge is viewed. Hislop (2005) terms these the objectivist and practice-based perspectives. The characteristics of each are shown in Table 1.

Objectivist	**Practice-based**
Knowledge derived from intellectual process	Knowledge embedded in practice Knowing/doing inseparable
Knowledge is a disembodied entity/object	Knowledge is embodied in people Knowledge is socially constructed
Knowledge is objective 'facts'	Knowledge is culturally embedded Knowledge is contestable Knowledge is socially constructed
Explicit knowledge (objective) privileged over tacit knowledge (subjective)	Tacit and explicit knowledge inseparable and mutually constituted
Distinct knowledge categories	Knowledge is multidimensional

Table 1: Characteristics of knowledge from the objectivist and the practice-based perspectives. (From: Hislop 2005, p. 27)

2.2.3.1 The objectivist perspective

The objectivist perspective suggests that explicit and tacit knowledge are two distinctly separate types of knowledge with differing characteristics. The characteristics of explicit knowledge enable it to be codified, stored and be readily accessed or transmitted. It is considered that the knowledge is complete with nothing lost in transmission; it has precisely the same meaning for the sender and the receiver, and the receiver is able to comprehend and use the knowledge without any further communication from the sender. This form of knowledge lends itself quite readily to management and particularly to communication via information technologies (Jasimuddin, Klein & Connell, 2005). Within this perspective, tacit knowledge is managed by converting it to explicit knowledge, after which it is then rendered codifiable and communicable. It is assumed that people are able to articulate all they know about a process, '... making explicit all the assumptions, behaviours, and actions they utilize in accomplishing the task being examined' (Hislop 2005, p. 23). This is then codified, structured in a way to make it accessible to others, stored centrally and thus exists within various forms of texts.

The treatment of knowledge as an object, formed independently of individual subjectivity, that has meaning independent of consciousness (Alavi & Leidner, 2001), implies that knowledge is, in fact, objectified truth (Ambrosini & Ambrosini, 2001). It also assumes that there is a direct relationship between language and meaning; that words mean precisely that which they denote, and that any communication problems that do occur are considered to arise from a lack of absorptive capacity on the part of the receiver (Ringberg & Reihlen, 2008). However, in this author's view, this disregards the complexity of linguistics and the inherent ambiguity of language. While the receiver would certainly need to have some minimum level of absorptive capacity in order to comprehend what is being communicated, its existence does not necessarily mean that the two parties rely upon similar interpretive frameworks or that it will lead to a shared understanding.

Tacit knowledge to the objectivist is highly subjective and defined by the beliefs, assumptions and cultural values of those who possess it. It is essentially a cognitive entity, but certain researchers consider that it may be rendered codifiable (Hislop 1995). Wilson (2002) argued against such a possibility (see Section 2.2.5). The work of Nonaka (1994) and Nonaka and Takeuchi (1995) falls within this perspective, whose well known knowledge creation model (Figure 1) proposed four modes by which knowledge might be converted, leading to the creation of new knowledge.

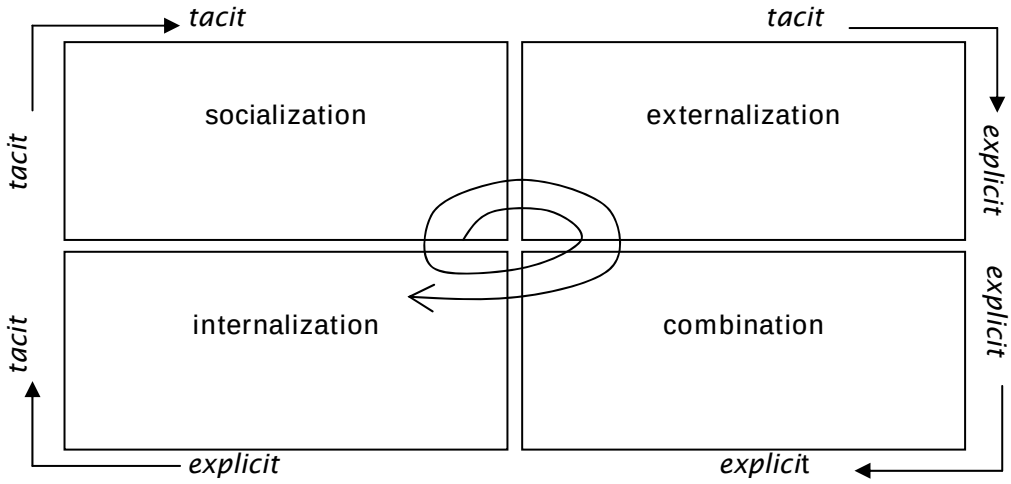

Figure 1: Nonaka's four modes of knowledge creation.
(From: Glisby & Holden 2003, p. 30)

Socialization is the term used by Nonaka (1994) for the first mode, that of sharing tacit knowledge. Individuals interact with each other to share mental models such as beliefs, paradigms and viewpoints, and create tacit knowledge through shared experience. There must be a willingness to share and exchange. The second mode, externalization, describes the conversion of tacit knowledge to explicit knowledge. Nonaka (1994) emphasized the importance of group commitment in this mode, enabling what Glisby and Holden term 'the diffuse and inductive processes that the externalization of tacit knowledge inevitably requires' (Glisby & Holden 2003, p. 32). Combination involves the use of 'exchange mechanisms' (Nonaka 1994, p. 19), meetings or databases, for example, to manipulate explicit knowledge, resulting from the previous mode, into categories and other explicit representations. The fourth mode, internalization, is the conversion of explicit to tacit knowledge, a type of embodiment, which Nonaka (1994) likened to the process of learning.

Interaction between individuals and their commitment to the knowledge creation process is critical to the model. As new ideas and concepts are shared with an increasing number of individuals they are examined, developed and shaped, and those that are considered beneficial are adopted. This continuous process of knowledge conversion, sharing and reflection is known as the knowledge creation spiral.

This model of knowledge creation is demonstrated in Nonaka and Takeuchi's (1995) example of a company developing a bread-making machine, which centred on what the authors considered to be the conversion of tacit to explicit knowledge. An effective machine would have to be capable of kneading dough properly; tacit knowledge held

in the heads of master bakers. A member of the development team became apprenticed to a master baker and, according to the authors, after observing and imitating the master baker, was able to convert the tacit knowledge of proper kneading into explicit knowledge, largely using the term *twisting stretch* to describe the process. Once the tacit knowledge had been made explicit, it was transferred to the engineers who, after some trial and error, were able to develop the machine. To Nonaka and Takeuchi (1995) this demonstrated a group involved in knowledge creation. Although the model presents knowledge as being dynamic in the ways in which it is converted and so created, it is considered ultimately to be an entity possessed by individuals, and within groups, it remains possessed by the individuals forming that group.

An alternative view to this is that while much knowledge does exist at the individual level, it can also be held by a social group as a single entity (Spender 1996). Table 2 illustrates the concept.

	Individual	**Social**
Explicit	Conscious	Objectified
Tacit	Automatic	Collective

Table 2: Knowledge types
(From: Hislop 2005, p. 20)

Table 2 shows a representation of the four generic knowledge types developed by Spender (1996b). At the social or group level, objectified knowledge is explicit knowledge and could be, for example, a club membership rule book or operating procedures for a particular work process. Collective knowledge is not codified, it is tacit and to do with shared understandings, values and cultural norms which are embedded within collective contexts ranging from a local village society, through to communities of practice, organizations and entire nations. The knowledge developed within these communities is unique and the members develop distinct cognitive repertoires that determine their interpretations of their environment (Brown & Duguid, 1991).

2.2.3.2 The practice-based perspective

In opposition to the objectivist perspective of tacit and explicit knowledge, the practice-based perspective suggests that there is no strict separation, that all explicit knowledge has tacit elements, they are mutually constituted and cannot be separated (Polanyi 1967; Tsoukas 1996; Werr & Stjernberg, 2003). Polanyi (1967) proposes that explicit knowledge is founded within relevant tacit knowledge: without the appropriate tacit knowledge, explicit knowledge is meaningless. From this position, without a tacit dimension, fully explicit knowledge cannot exist. Hislop (2005) illustrates this with the example of text, which from the objectivist perspective is a form of codified knowledge in which the words have literal meaning, but which also has tacit elements, for example an understanding of the language it is written in and perhaps cultural nuances enabling a reader to make sense of it. Maps, formulae and spoken words are also meaningless without tacit coefficients (Polanyi 1967).

Rather than a purely cognitive process, knowledge here develops on an on-going basis through activities as people gain experience, so that thinking and doing become part of knowledgeable activity, leading to the use of embodied knowledge for specific tasks (Gherardi 2000; McKinlay 1996). The consequence of this is that while some knowledge may be articulated, there will always be elements which have to become known by doing, hence, the master and apprentice relationship, requiring interaction and working together, usually for a length of time (Hislop 2005).

The practice-based perspective proposes the active engagement of people in constructing meaning, so that they can effectively share knowledge. This view directly opposes that of the objectivist position in which there is a simple transferral of a fixed notion of knowledge from giver to receiver. Taking a critical view of the practice-based position, Ringberg and Reihlen (2008) assert that there is a parallel between this and the objectivist perspective, in that while each regards knowledge production and transfer very differently. '... the end result is that knowledge in both positions exists as codified and objectified in entities that are separate from the cognizing mind' (Ringberg & Reihlen 2008, p. 917), that is, either in texts, or within practice, '... practice now constitutes the black box within which knowledge is embedded, stored and transferred' (Ringberg & Reihlen 2008, p. 916). The authors support their argument referring to the work of authors including Brown and Duguid (2001), Gherardi (2001) and Orlikowski (2002) concerning the constitution and transfer of knowledge through social interactions and organizational practices, routines and systems, and also Tsoukas (2005) and Blackler (1993) whose interests lie within activity rather than the individual in analyzing knowledge work. However, by focusing their argument upon knowledge as embedded in practice, Ringberg and Reihlen (2008)

fail to recognize that within this perspective knowledge is also considered to be embodied and inseparable from people, which is the position proposed above by Polanyi (1967), Tsoukas (1996) and Werr and Stjernberg (2003). These two aspects of knowledge are closely knitted together within the practice-based perspective (Hislop 2005).

It is essential to the practice-based perspective that people develop some appreciation of the values and assumptions that the knowledge of others is based upon, which requires extensive social interaction and communication. An important element of this is a process referred to by Boland and Tenkasi (1995) as perspective making and perspective taking. It enables the person sharing or transmitting knowledge to do so in a way that it will be most effectively received, and helps to provide meaning for the person receiving or perceiving it. The argument that Boland and Tenkasi (1995) make is that communication helps to strengthen knowledge and within that communication process, perspective making and perspective taking are achieved through narrating experiences and reflecting upon them. 'These processes are like playing games with language as well as like transmitting messages through a conduit, and they involve heightened levels of reflexivity' (Boland & Tenkasi 1995, p. 351). In perspective making the individual or group develops and strengthens its unique knowledge and practices, using language and actions to refine its vocabulary, values, and practices, becoming more complex and finely tuned towards the specific individual or group needs and goals. Perspective taking requires the ability to reflect upon what is communicated and develop a new narrative to explain the familiar, so that new insights and understandings are formed. Narrative communication is crucial to both concepts. The importance of narratives to knowledge transfer or sharing and to sensemaking will be seen throughout the literature review.

The development of knowledge through socialization means that it will always be influenced by personal, cultural and social values and judgements and is therefore, subjective and biased (Hislop 2005). It will be influenced by the values and judgements of the person who produced it and also by the values and judgements of the person interpreting it, so that two people may have different interpretations of the same entity or situation. The wholly subjective nature of knowledge viewed from the practice-based perspective opens it up to questions of validity, and can result in conflict when individuals or groups hold competing interpretations. Consequently, issues of conflict, power and organizational politics are of more concern here than from the objectivist perspective. In formal organizations, the influence of these issues on the employment relationship can determine the willingness of employees to engage in knowledge sharing or to develop or use their existing knowledge (Scarborough 1999). There may

also be tensions relating to the ownership of knowledge and intellectual property rights.

Lanzara and Patriotta (2001) acknowledge and support the subjective nature of socialization as a knowledge sharing mechanism and develop the theme to argue that new knowledge results from controversy involved in social processes such as debate and collective enquiry.

2.2.4 Social influences on knowledge transfer or sharing

Social links between those involved in social networks are an important influencing factor as they form the routes for knowledge sharing (Granovetter 1973). The strength of each link is significant. Strong links, characterized by established, close, trusting relationships are considered to facilitate sharing complex, tacit knowledge, while weaker links have a more limiting influence (Granovetter 1985). Looking at social networks more closely, Zhuge (2002), proposes that knowledge transfers more effectively between peers than between non-peers as they have similar knowledge structures, share common work interests, and working on similar tasks provides experiences which are valued when shared.

This is supported by Broekhuis and Veldkamp (2007) whose findings showed that doctors placed a high value on clinical dialogue with others of the same hierarchical level, particularly with regard to sharing experiences. These findings have significant implications in a training environment such as that in which junior doctors find themselves when commencing clinical practise. They will individually only be confronted by a limited number of situations on their own wards (medical conditions, procedures, caring for a patient under police custody, for example), but sharing experiences with peers can help to increase their body of knowledge. While hearing about an event does not have the same impact as experiencing it, it will be seen that narratives can provide perhaps the next best thing (see Section 2.2.8).

The impact of social support upon knowledge sharing is also demonstrated by data provided by Cabrera, Collins and Saldago (2006), suggesting that those who perceive their co-workers to value knowledge sharing are more inclined to engage in knowledge sharing themselves. Bhatt (2001) proposes that knowledge is interpreted according to its environment, thereby adding the characteristic of context-dependency. For example, the way that a nurse in an operating theatre interprets the wink of an eye from a surgeon is based upon a shared knowledge structure that the two have developed. The same gesture in an alternative setting may be interpreted very differently. This theme is developed by Quigley *et al.* (2007), who suggest that the

social context produced through the interactions between the knowledge source and the recipient might be an essential component in reinforcing knowledge sharing incentives.

Self-efficacy, the belief in one's own capability to organize and prepare for future events (Bandura 1997), is an important motivational factor influencing individual decisions on sharing knowledge (Compeau & Higgins 1995a; Bock & Kim 2002; Hsu *et al.* 2007). It is a type of self-evaluation, influencing the decisions a person makes about behaviours to engage in, the amount of effort and perseverance to exert when encountering a problem, and achieving mastery of the behaviour. This is supported by the work of Kankanhalli, Tan and Wei (2005), whose findings show a positive relationship between higher levels of reported self-efficacy and greater contribution to knowledge repositories.

Outcome expectations related to reward systems are also significant factors in the decision to share knowledge (Bartol & Srivastava, 2002). Extrinsic benefits including monetary rewards, promotion and educational benefits are considered to facilitate the development of a positive attitude towards knowledge sharing (Bock & Kim, 2002; Kankanhalli, Tan & Wei, 2005). Similarly, the intrinsic benefits of self-satisfaction, social recognition and social status are thought to be inducements for knowledge sharing (Kankanhalli, Tan & Wei, 2005). This may go some way towards explaining the popularity and proliferation of Internet social networking sites, which largely offer no extrinsic inducement but attract millions of participants to share knowledge on a voluntary basis.

Ambiguity concerning any aspect of knowledge or its purpose will have a detrimental effect upon its transfer and use, as will difficulties arising from the source of knowledge, the recipient, and the context of the transfer (Szulanski 1996).

The source of knowledge may be unwilling to share if knowledge is perceived as a source of power or position, or if the reward offered for sharing is considered inadequate. The source may also be unwilling to allocate the necessary time and other resources for knowledge sharing. The perceived status and trustworthiness of the source is an important factor in engaging the recipient. A lack of trust creates uncertainty and the perception of risk that one of the parties may either not benefit or may be compromised by sharing knowledge. On the other hand, a trusting relationship helps to create an environment in which people are more willing to share and there is an expectation of reciprocal or mutual benefit (Hislop 1995). A study of scientists' attitudes to knowledge sharing (Andrews & Delahaye, 2000) showed that trust and

confidence was the most important factor influencing their willingness to cooperate with one another. The level of trust a recipient bestows upon a source has been shown to influence the recipient's perception of the transfer costs: the lower the trust, the higher the perception of costs, and vice versa (Zaheer *et al.* 1998), which in turn influences the decision on whether or not it is worthwhile to engage.

The recipient may be unwilling to accommodate any new knowledge from outside the immediate domain and Szulanski lists '...foot dragging, passivity, feigned acceptance, hidden sabotage, or outright rejection ...' (Szulanski 1996, p. 31) as possible outcomes of lack of motivation. The recipient's pre-existing knowledge and absorptive capacity will influence the acquisition of new knowledge, and the ability to retain the new knowledge is essential if the recipient is to apply it successfully.

The level of preparedness of the new context for the knowledge plays an important role in determining how difficult the transfer will be and includes elements such as procedures, coordination, and skills and attitudes of the people involved.

2.2.5 Implicit knowledge

The literature review will now return briefly to Nonaka (1994) and Nonaka and Takeuchi (1995), whose knowledge creation model has received criticism on two counts. Firstly, Glisby and Holden (2003) methodically investigated the knowledge creation model and revealed cultural influences and values, specific to Japan, which were inherent in each of the four modes. An in-depth discussion of cross-cultural influences on knowledge transfer or sharing, while potentially very interesting, is outside the scope of this thesis, but it should be noted that the model was found to be so strongly a product of Japanese culture that the claims of universality were considered doubtful.

That is not to say that the model has no validity: Glisby and Holden (2003) proposed that rather than attempting to replicate the model, non-Japanese organizations might use it as a means to reflect upon their own knowledge management practices: 'In this sense the model can enhance the understanding of our own organizational culture by forcing us to see it from a different vantage point' (Glisby & Holden 2003, p. 36).

Secondly, Nonaka and Takeuchi (1995) based the model on the concept of tacit knowledge proposed by Polanyi (1958; 1967) and while this work is often used as justification for the tacit/explicit division, other authors disagree with this interpretation, arguing that Polanyi has more in common with what has been described previously as a practice-based perspective (Brown & Duguid 2001; Wilson 2002).

Brown and Duguid (2001) pointed to Polanyi's (1967) conclusion that knowledge always has an inarticulate component and that his argument was not that tacit and explicit described two *types* of knowledge, but two *dimensions* of knowledge. Wilson (2002) argued that the interpretation of tacit knowledge made by Nonaka and Takeuchi (1995) was incorrect and that when Polanyi (1958) referred to *tacit* the meaning was precise: '... tacit means 'hidden', tacit knowledge is hidden knowledge, hidden from even the consciousness of the knower. This is why Polanyi used the phrase "We know more than we can tell"' (Wilson 2002, p. 14). The argument made was that by locating tacit knowledge within the process of individual comprehension, it cannot be expressed and cannot be captured, either for conversion or any other purpose.

Tsoukas (2003) also disagreed with the notion of converting knowledge from tacit to explicit, suggesting that tacit knowledge was acquired by a knowledgeable person directing one's attention towards specific stimuli. D'Eredita and Barreto (2006) concurred with this view, but were of the opinion that it did not fully explain the mechanism by which tacit knowledge proliferated. This, the authors suggested, was achieved through sensemaking processes. These authors identified an association with the episode-based nature of sensemaking, the punctuation and bracketing of stimuli into episodes of sensemaking, previously mentioned in Section 2.2.2, and proposed this as an expansion of Tsoukas' ideas on attention-drawing. Attention is directed towards particular stimuli, which are understood according to their context at that particular time and become personalized, characterizing that particular experience. Experience is the result of relating episodes; by reflecting upon previous episodes, sense can be made of new situations. When two or more people collaborate and collectively focus their attention, they collectively construct and relate episodes. The authors' proposals on this as the means for knowledge proliferation will be considered further in Section 2.3.3.1.3, where the episodic nature of sensemaking is discussed in more detail.

Wilson (2002) proposed that by the inclusion of mental models within tacit knowledge and suggesting that these became expressible in the conversion or creation of knowledge, Nonaka and Takeuchi (1995) were not talking about tacit knowledge, which in his view is inexpressible, but implicit knowledge: knowledge that with some thoughtful application may be made expressible. The implication of this is that the knowledge creation model then becomes concerned with conversions between explicit and implicit knowledge, rather than explicit and tacit. Yet this will still be insufficient to achieve its goal as: 'Real know-how is embedded in tacit knowledge, and such knowledge, if not already possessed, must be developed by the individual himself or herself' (Klein 2008, p. 42). From the practice-based perspective, this is achieved by

action, by practice and gaining experience, and differentiates knowledge from knowing.

2.2.6 Moving towards a socio-cognitive perspective

The review has so far indicated a number of points at which there are associations between the processes or concepts in the knowledge literature and the sensemaking literature. The model of knowledge suggested by Cook and Brown (1999) provides further links in its social and action orientation, as will be discussed in Section 2.3. The importance of genres, or classifications having specific meaning for particular groups, and of narrative within the spheres of knowledge and sensemaking, play a significant role within Cook and Brown's model and will also be shown to be influential in the research data collected. For these reasons, the model will be examined in some detail.

Cook and Brown (1999) propose a model in which characteristics of both the practice-based and objectivist perspectives are synthesized, the distinction between knowledge and knowing is emphasized and as a result of the interplay between the two, knowledge transfer gives way to a process of knowledge creation. Introducing the process of reflection upon environmental feedback into their argument might be interpreted as moving towards a socio-cognitive position.

The explicit/tacit and individual/group classifications are acknowledged and these are the focus of what the authors term the epistemology of possession, referring to that which is known, or knowledge which people possess. For example, stating that 'Dr A knows about kidneys' indicates that Dr A possesses knowledge of kidneys. That which people know how to do cannot be accounted for by possession of knowledge alone, and the authors therefore include in their model what they term '... the epistemic work done by human action itself...' (Cook & Brown 1999, p. 382), or that which is done in practice. The statement 'Dr A treats patients who have kidney disease' takes into account both the knowledge Dr A possesses about kidneys and the actions Dr A carries out.

The authors consider that what is possessed is *knowledge* and what is involved in action is *knowing*. In these terms, while individuals and groups use explicit and tacit knowledge in their actions, not all of the things they know how to do can be accounted for by knowledge, and the authors therefore propose an epistemology of practice, for which knowing is the focus. In the proposed model, '... bridging the two epistemologies...' (Cook & Brown 1999, p. 383), the authors assert that the interplay between knowledge and knowing is mutually enabling and provides the basis for generating new knowledge.

2.2.6.1 The epistemology of possession

Cook and Brown (1999) assert that the four categories of knowledge resulting from the explicit, tacit, individual and group distinctions are unique and irreducible, each performing specialized functions or epistemic work that cannot be carried out by the other. Each form has equal status to the other and neither can be converted from one to another. This view differs significantly from the Cartesian perspective of privileging explicit and individual knowledge.

Basing their deliberations on Polanyi's (1983) differentiation between explicit and tacit knowledge, Cook and Brown (1999) develop their argument using the example of learning to ride a bicycle. The activity requires both tacit knowledge to enable the rider to stay upright and explicit knowledge of knowing which way to turn the bicycle to prevent falling, either to the left or the right. The most detailed explanation of how to ride a bicycle only equips the novice with explicit knowledge. Even if the instructor imagines the experience of falling from the bicycle and tells the novice to turn this way or that to stay upright, the novice can only acquire the tacit knowledge necessary to ride by spending time on the bicycle; there is no amount of explicit knowledge which can achieve this as explicit knowledge cannot enable the required epistemic work.

If a novice is told how to turn to avoid falling, then that explicit knowledge can be used to help the novice while learning how to stay upright. Similarly, someone who knows how to ride might use tacit knowledge to ride in a way which would help identify which way to turn to avoid falling. In this way, the authors assert that the forms of knowledge can be used as an aid to acquiring the other but cannot be used alone to acquire the other; the novice must get onto the bicycle.

Cook and Brown (1999) further argue that explicit and tacit knowledge cannot be converted into one another. In the previous example, the rider using tacit knowledge to acquire the explicit knowledge of which way to turn to avoid falling does not convert the tacit knowledge, it is still there as before, being used to stay upright. The explicit knowledge is generated within the context of riding, aided by what was tacitly known. Similarly, the novice who is told which way to turn to prevent a right or left fall but who cannot ride, cannot do anything with that explicit knowledge that will change it into the tacit knowledge required for riding. Each form of knowledge does not lie hidden within the other; they are separate entities performing separate work.
Cook and Brown (1999) propose a similar argument for individual and group knowledge, that each carries out epistemic work that the other cannot do, and both have equal status. The anaesthetist will know the feeling of the right amount of cricoid

pressure to exert during intubation, it is epistemic work carried out by the individual anaesthetist that cannot be carried out by a group, as groups do not have hands. But knowledge of, for example, what is considered acceptable and unacceptable practice, and details of processes regarding election to the anaesthetists' professional regulatory body, is possessed by anaesthetists as a group. No single anaesthetist possesses all of this knowledge, they each possess some of it, but the body of knowledge is held by the group. The work carried out by the group is epistemically different to that carried out by the individual and neither can do the work of the other.

2.2.6.2 The epistemology of practice

Much of the practice-oriented thinking on knowledge and knowing is drawn from the philosophical school of pragmatism, which focuses upon action rather than abstract concepts and considers practical consequences and real effects to be vital components of meaning and truth. Beliefs are identified with the actions of the believer. The truth of beliefs relates to the success of those actions in achieving the believer's goals. As will be seen in Section 2.3, the action-orientation of sensemaking and Weick's (1995) ideas on belief-driven sensemaking, are very much in keeping with this thinking.

In the example of learning to ride a bicycle, the authors argued that possessing tacit and explicit knowledge would not enable the novice to ride; he or she would have to get onto the bicycle. Stepping aside briefly from the main discussion, Cook and Brown (1999) describe the novice's possession of tacit knowledge as having been told, for example, which way to lean and turn the handlebars in order to remain upright. Persuaded by Wilson (2002), this author considers that what Cook and Brown (1999) are referring to is more properly *implicit* knowledge, as the rider would have found a way to express his or her actions when riding (see Section 2.2.5). Returning to the discussion, the epistemic work of riding the bicycle, knowing rather than knowledge, is based in practice rather than possession. The term practice is used in the sense of carrying out work, and is defined by the authors as 'The coordinated activities of individuals and groups in doing their "real work" as it is informed by a particular organizational or group context' (Cook & Brown 1999, p. 386-7). It is understood in the phrase *to practise medicine*, rather than to repeat an exercise to gain competency, such as violin practice. Knowing is not something which is used in action or enables action, it is part of action, the epistemic work carried out as part of actually riding a bicycle or carrying out one's work as a medical practitioner.

As a consequence of this argument, knowledge, rather than being an entity that enables action through its possession, becomes a tool that is used by knowing. To develop their argument, the authors employ the concept of productive inquiry,

proposed by the pragmatist John Dewey, as one of the most significant processes in which knowing utilizes knowledge. 'Productive inquiry is that aspect of any activity where we are deliberately (though not always consciously) seeking what we need, in order to do what we want to do' (Cook & Brown, 1999, p. 388). The term inquiry is used, as the motivation for action is some kind of query; a situation that is not understood, a problem or a question. It is productive as the aim is to achieve an understanding, resolution or an answer. This is similar to the process of intentional sensemaking, discussed in Section 2.3.4.

The search for the answer is not conducted randomly, but is organized by the use of concepts, theories, ideas and so on, which for Dewey represent knowledge. As knowledge is used by knowing, so knowing is tempered by knowledge and the constraints that it might place upon actions. Dewey also proposed that engagement in the dynamic activity of productive inquiry could result in the generation of knowledge, which could then be used as a tool for further knowing. The interaction between knowledge and knowing and the potential for generation of new knowledge from this interaction as part of productive inquiry, parallels the interactive process of matching environmental data with an existing mental framework in order to make sense of a situation, which Klein *et al*. (2007) also describe as deliberate though not necessarily conscious. As will be discussed in section 2.3.4, environmental data guides the selection of the frame, and the frame that is brought into play influences the recognition and selection of environmental data. If the data do not fit with the frame, the resulting sensemaking effort might be to modify the frame or replace it with a more appropriate one. Alternatively, the frame might be used to search for new data or to reclassify the existing data, which can then lead to the development of a more appropriate frame, so that there is a new understanding, a new sensemaking of a situation.

Cook and Brown (1999) view knowing as a social concept. We act within a physical and social world, which is shaped and changed by our interaction with it. As knowing, being part of action, is derived from that social interaction rather than simply what we possess in our heads, it is a social concept.

To advance their argument for the importance of action, Cook and Brown (1999) draw upon the work of Ortega (1961a) who, in keeping with pragmatist thinking, situated his ideas from the position of the self within a given context, proposing that what we can know and do are the result of real, ongoing interaction between the self, as an individual or group, and the physical and social features of the circumstances we are in at a specific time. As will be seen in Section 2.3, this particular mode of interaction

between the self and the environment is central to the ideas on sensemaking proposed by Weick (1995).

Ortega (1961a) suggests that as we interact with the world we come to know certain qualities that relate solely to the interaction, and that can only be known by being part of that interaction. Cook and Brown (1999) use the example of the tensile strength of clay; it is a property of the world, but we can only know it when we interact with clay, making a pot or other object. Cook and Brown (1999) associate this idea with the concept of affordances, as proposed by Gibson (1966, 1979), concerning the action and behaviour of a person, or indeed an animal, within a particular environmental context. Affordances are possibilities for action, the combination of environmental properties in relation to a person or animal's ability to perceive those properties. Stemming from his work on visual perception, Gibson (1979) focused his argument on physical objects, but proposed that affordances were not limited to objects, but also pertained to wider entities and situations, 'Not only objects but also substances, places, events, other animals, and artefacts have affordances' (Gibson 1966, p. 285). However, the concept is more readily described in relation to the physical world.

When perceiving an object, a person or animal will first note properties such as shape, colour, position in relation to self and other objects, texture, and so forth. After this follows perception of the affordances, the ways in which the person or animal can interact with the object and what can be done with it, dependent upon the observer's abilities to recognize them. This is particularly noticeable in objects produced by human design. A set of steps for example, will afford the action of stair climbing to an ambulant adult, but not to an infant only able to crawl. The design of a doorknob may either facilitate ease of use or a clumsy action. A flat doorplate with no raised handle would be impossible to pull, but readily invites being pushed. While affordances do not determine behaviour, they increase the probability that particular behaviour will occur. The term *effectivities* relates to the abilities of people to recognize and use affordances. Perception and action are thus co-determined by a person's effectivities and environmental affordances, working together (Gibson 1979).

An interesting difference of opinion, although outside of the scope of this thesis to pursue, lies within the relationship between affordances and mental models. While Gibson (1997) implies that affordances may be directly perceived rather than cognitively mediated and are therefore superior to constructs such as schemata and mental models, Glenberg and Robertson (1999) suggest that affordances are the building blocks from which mental models are constructed.

Gaver (1991) developed Gibson's idea of affordances with less focus upon how they are perceived and more emphasis upon the relationship between environmental features and peoples' needs, for example the relationship between architecture and the need for accessibility. Norman (1999) redefined affordances as physical suggestions as to how to interact with objects, with the focus being upon usability; a small ball, for example, being of a size, shape and texture that it fits into a hand, and a teapot being unusable if designed so that the spout and handle are on the same side, with later work directed towards the fields of human factors and human-computer interface issues. From these latter areas the term *social affordance* has gained currency, relating to affordances within the technological environment that invite interaction, for example within computer-supported collaborative learning environments (Kreijns & Kirschner 2001) and within an email context (Wellman *et al.* 2003).

Informed by Ortega (1961a), Gibson (1979) and Gaver (1991, 1996), Cook and Brown (1999) present the concept of dynamic affordance. According to the authors '... there is a sense of affordance that lies beyond these inherently static senses, which deserves to be understood in its own right. We call this additional sense "dynamic affordance" and mean by it the forms of affordance that emerge as part of the (dynamic) interaction with the world' (Cook & Brown 1999, p. 390). It is suggested that dynamic affordance has both an intuitive sense and a conceptual sense and, in the context of the authors' previous example of learning to ride a bicycle, lies within the '...real and subtle interaction between the rider and the bike in motion' (Cook & Brown 1999, p. 390). Tightly associated with Cook and Brown's (1999) concept of knowing, dynamic affordance is essential to learning and without it, there can be no enactment of what has been learned.

Knowledge as a tool helps us to interact with the environment both socially, in acknowledging and accepting (or rejecting) individual and group characteristics, values and norms, and physically, in how materials and tools discipline our interactions with them. In this way, a hammer constrains how we interact with a nail, and we discover the inherent capability of a material, what it can and cannot do and the bounds beyond which it will fail. 'Within the relational and interactive character of knowing, the world shapes our actions by requiring that we honor it, just as we shape the world by interacting with it in a disciplined way. Knowing is to interact with and honor the world using knowledge as a tool' (Cook & Brown 1999, p. 389).

2.2.6.3 Bridging epistemologies

The forms of knowledge according to Cook and Brown's (1999) epistemology of possession are shown in Figure 2. The concepts in the upper left cell are those things

that individuals can know, learn and express explicitly, such as 'how to' rules and formulae. The contents of the upper right cell are also expressed explicitly but are used or transferred within groups. This includes, for example, organizational stories and metaphors, which have particular meaning within a specific group. Later in this chapter the importance of stories or narratives as a means of transferring knowledge within groups will be discussed, and their significance within this research will be shown in the analysis of data. The skills shown in the lower left cell represent the tacit knowledge used to employ the concepts in the upper left cell, such as skilled use of a tool or the 'feel' for riding a bicycle.

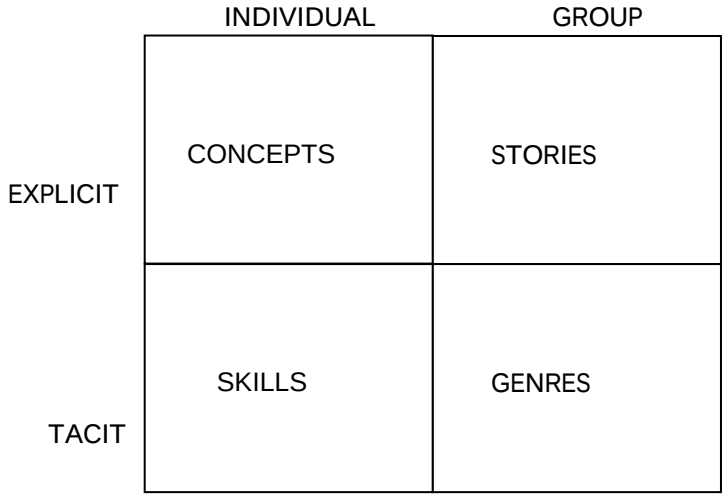

Figure 2: The four forms of knowledge
(From: Cook & Brown 1999, p. 391)

An understanding of the genres shown in the lower right cell is considered by the authors to be important to the distinction between knowledge and knowing. Within a literary context, the term *genre* is used as a means of classifying texts and also provides a structure enabling us to understand and interpret what we are reading, to differentiate the important distinction between, for example, a work of fiction and an autobiography. It is the meaning given to the term *autobiography* or *novel* that establishes the genre, not the actual text. The text only acquires that meaning once it has been classified as, for example, *science fiction*. The meaning of the text can also change as readers, publishers and authors review and re-evaluate works.

The influence of a genre can be so great that we are not aware of it. Most people across all cultures know instinctively where to look in a newspaper to find the editor's main story, and the investor considering acquiring a company will automatically turn to the appropriate section of the company accounts to view the figures of key importance to his or her business model. Within organizations the genre selected to convey a

message can be critical to how the message is interpreted. Groups and organizations have their own conventions concerning the significance attributed to various message formats, such as email, memo, post-it note and formal letter, and the genre may be more influential than the actual written words.

Cook and Brown (1999) expand the term *genre* so that it includes, in addition to the meanings denoted by groups to textual artefacts, the physical and social artefacts related to a group's activities. These may be technologies, products, activities such as work processes, or ways in which certain types of meetings are conducted and their meanings '...emerge and undergo constant confirmation and/or modification through a kind of "negotiation in practice" as they are used in the context of the group's ongoing "real work"' (Cook & Brown 1999, p. 392). The authors suggest that the meaning of a particular genre is established in past use and it is then revisited or evoked each time it is used in subsequent work. It therefore only has useful meaning within a particular group's practices and is unique to that group.

Two organizations, for example, might each hold events called *senior managers lunches*, which would appear to an observer to be two groups of managers meeting to eat sandwiches and chat. But the senior managers lunch in one organization might be the place for political networking, for talking to and being seen to be talking to, certain people. In the other organization the event might have a much more informal, sociable orientation. Both events have the same name and appear to be the same, but the genres are different. The meaning of *senior managers lunch* is group knowledge, known to the members of each group, and may be used by those members without any explicit statement. Cook and Brown (1999) therefore consider this to be group/tacit knowledge and as such, genres carry out epistemologically distinct work, work carried out by the group in its group practice and meetings, rather than by individuals. This concept is significant to the research findings and is discussed in Chapter 6.

In bridging epistemologies, knowing, the epistemology of practice, interacts with knowledge, the epistemology of possession. The relationship between the two is dynamic, using productive inquiry, as knowing is part of our interaction with the world. In bridging epistemologies the four forms of knowledge might be used in a single activity. The authors describe this with the example of a dance troupe. Individual knowledge is used by each dancer in practice of a particular skill and group knowledge is used by the troupe trying out a routine and learning it: the choreographer demonstrates and the dancers follow the movements. Tacit knowledge is acquired by the group in practice through interacting with the choreographer's instructions. Within this interaction the troupe generates new knowledge in the form of genres and new

forms of knowing as they perform the dance. In proposing this model the authors are moving the focus from the use of existing knowledge as the basis for performance or actions, to a process of creating something new.

2.2.6.4 Implications of Cook and Brown's model

The implication of this for individuals, groups and organizations is that in terms of processes such as learning, innovation, skill development, performance and production, it is not only the knowledge that they possess which is important, but also how they practice, and the generative interplay between the two, between knowledge and knowing.

This has a significant impact upon our understanding of knowledge transfer and knowledge sharing. Looking back to Nonaka and Takeuchi's (1995) model of knowledge creation and the example of the bread making machine (see Section 2.2.3.1), Cook and Brown (1999) have a different interpretation of the process, which Nonaka and Takeuchi (1995) described as essentially conversion, transfer and creation of knowledge. Cook and Brown take an opposing view to Nonaka and Takeuchi's concept of new knowledge being produced through a continual interaction between tacit and explicit knowledge, in favour of their assertion that new knowledge is created through the use of existing knowledge as tools in an interactive process of productive inquiry. According to Cook and Brown (1999), the team developing the machine used existing tacit and explicit knowledge as tools in an interaction which generated new knowledge and knowing.

The distinct epistemological forms of knowledge were brought into play at an individual and organizational level and, according to their model, these forms cannot be converted from one to another. Each member of the engineering team possessed explicit technical knowledge. The master baker possessed tacit knowledge and the apprentice developed tacit knowledge. In the authors' view, explicit stories or metaphors would be present, '...since such are all but universally found in groups' (Cook & Brown 1999, p. 394). Group tacit knowledge existed in the form of a genre, the useful meaning conveyed by the *twisting stretch* applied to the dough.

The apprentice did not *receive* the master baker's converted and transferred knowledge; the master's knowledge was used and that of the apprentice was generated. The individual tacit knowledge of the apprentice and the explicit group knowledge of the engineering team, were used as tools by the team as a whole, as a productive inquiry process (the trial and error development process), enabling them to build a machine that would knead dough in a particular way.

Knowing was present as the epistemic work involved in the team's interaction with dough, the machine kneading mechanism and each other, using various knowledge as tools. The epistemologies were bridged as the group practices, or ways of knowing, enabled it to use different forms of knowledge possessed by different people. The interactions using tacit and explicit knowledge resulted in the generation of new knowledge and new ways of knowing, not the transfer of knowledge.

While Cook and Brown (1999) disagree with Nonaka and Takeuchi (1995) on matters of the conversion and transfer of knowledge, their assertions on the development of new knowledge and innovation as a socially generated process, support and perhaps strengthen the social themes central to Nonaka and Takeuchi's (1995) proposals.

By including reflective consideration of feedback gained through interaction with the environment into their argument, Cook and Brown (1999) contribute to explanations of individual and group differences in knowledge outcomes.

2.2.7 A socio-cognitive approach to knowledge transfer

Ringberg and Reihlen (2008) propose a theoretical model that states an overtly socio-cognitive approach to knowledge transfer. The concern of the authors is that people with similar training and backgrounds and engaged in the same practices can still produce different conceptualizations of a particular event or activity. According to the authors, their model focuses upon the role that cultural and private mental models play within this process and how, by applying them either categorically or reflectively to socio-cultural feedback mechanisms, different meanings and knowledge transfer outcomes are produced. Ringberg and Reihlen (2008) were criticised by this author in Section 2.2.3.2 for their somewhat narrow interpretation of the social-constructionist view of knowledge transfer. However, their theory suggests sensemaking considerations and is therefore of interest to this research.

The work of authors whose view of knowledge combines action with cognitive processes was noted in this review as being a significant feature in investigating the nature of knowledge, and was also associated by this researcher with various sensemaking concepts. Ringberg and Reihlen (2008) acknowledge that other researchers, including Garud and Rappa (1994) and Ginsberg (1994), have suggested an integration of the cognitive and the social interaction literature in order to reach a more comprehensive theoretical model of knowledge. However, Ringberg and Reihlen (2008) consider that these are proposals for further research rather than expressions of a theoretical position (Ringberg & Reihlen 2008, p. 913).

The work of Boland and Tenkasi (1995) on perspective making and perspective taking, described previously in Section 2.2.3.2, is absent from the argument proposed by Ringberg and Reihlen (2008). This may be due to the differing positions of the two pairs of authors. Within the social, narratively focused process of perspective making and perspective taking, Boland and Tenkasi (1995) propose a model concerned with strengthening, developing and 'producing knowledge' (Boland and Tenkasi 1995, p. 350), a position that this researcher interprets as being aligned to previously discussed theories of knowledge being *created* as a result of social interaction, rather than *transferred* from a source of knowledge to a recipient (Tsoukas 2003; Lanzara & Patriotta 2001; Cook & Brown 1999). Ringberg and Reihlen (2008) on the other hand, while critical of the objectification of meaning in favour of unique understanding resulting from individually mediated cognition, still refer to '...the decoding of information into meaningful knowledge...' (Ringberg & Reihlen 2008, p. 912) and persist with the term *transfer*, implying an objective perception of knowledge.

The authors do not refer to the work of Cook and Brown (1999), but just as Cook and Brown (1999) drew inspiration from the pragmatists, in particular Dewey, in developing their theory, so too do Ringberg and Reihlen (2008). The two sets of authors each emphasize the importance of reflectivity and environmental feedback as a component of practice, noting that, 'The inclusion of the latter (reflectivity) has largely been overlooked in later work' (Ringberg & Reihlen 2008, p. 916).

2.2.7.1 Cultural and private models

Ringberg and Reihlen (2008) describe cultural models as highly organized, memorable interpretations, which are resistant to change and provide certain assumptions and outlooks upon the world. The authors assert that cultural models become internalized through the cognitive processes that take place while involved in everyday experiences, such as observations, instructions, communication, practices and so forth, that lead to the development of shared meaning and understanding (Ringberg & Reihlen 2008, p. 921). Once internalized and part of a person's cognitive resources, cultural models then influence that person's aims, worldview, and how they interpret and interact with things, people and situations within their environment.

Cognition is also influenced by private mental models, which '...originate from a person's creative (and even unintended) combination of existing cultural models as well as unique cognitive dispositions (self-reflection, critical thinking, acumen, memory, etc)' (Ringberg & Reihlen 2008, p. 921). The two types of model are therefore closely associated, rather than being clearly distinct. According to the authors, cultural

and private models help to structure and organize events so that cognitive resources can be applied to dealing with less familiar situations.

2.2.7.2 Categorical and reflective processing

Categorical processing produces meaning by automatically integrating perceived stimuli according to existing cultural and private mental models, with consistent and predictable outcomes (Ringberg & Reihlen 2008, p. 922). From a neurocognitive perspective, categorical processing becomes fixed in neurological pathways, becoming resistant to updating. The authors suggest that categorical processing largely emerges from reflective processing, which then becomes automatic or categorical once mastered, enabling greater cognitive capacity to be devoted to unusual or discrepant events.

Categorical processing is an efficient way of processing 'normal' interactions and events, and it is also applied to everyday routines. People also use it when demands are being made upon cognitive capacity, for example, when under pressure to make a decision, or when distracted or facing multiple novel stimuli, so that action can be taken. However, reliance upon categorical processing may result in environmental stimuli being '...forced into existing mental models' (Ringberg & Reihlen 2008, p. 922), so that the person does not consider or assimilate novel stimuli. Presumably, this would also result in an inability to fully participate in or learn from new situations.

The authors describe reflective processing as a person's ability '...to sustain a high level of cognitive responsiveness and combine/extend internalized cultural and private models in thoughtful (creative, reasoned) ways to improve their sense making' (Ringberg & Reihlen 2008, p. 922). The proportion of categorical versus reflective processing varies according to context, experience and individual acumen. Rather than the automatic application of cultural and private models that characterizes categorical processing, reflective processing is a purposeful activity in which the person deliberately attempts to engage with stimuli that cannot be made sense of categorically. Whether it is employed or not is dependent upon the person's need to make sense, their goals and their cognitive ability. When faced with information that cannot be managed categorically, some people may feel anxious and avoid updating, while others may be curious and engage in questioning and reflection to update their categorical processing.

Reflective processing resulting in a successful outcome leads to the adaptation of existing mental models, which the authors suggest then become incorporated as a new

model for categorical sensemaking for similar future events (Ringberg & Reihlen 2008, p. 923).

2.2.7.3 Knowledge transfer outcomes

Ringberg and Reihlen (2008) propose that the interaction between reflective/ categorical thinking and environmental feedback, for example, from social interaction, practise or media, produces four different knowledge transfer outcome scenarios: negotiated knowledge, collective knowledge, unique knowledge and stereotypical knowledge. These are shown in Figure 3.

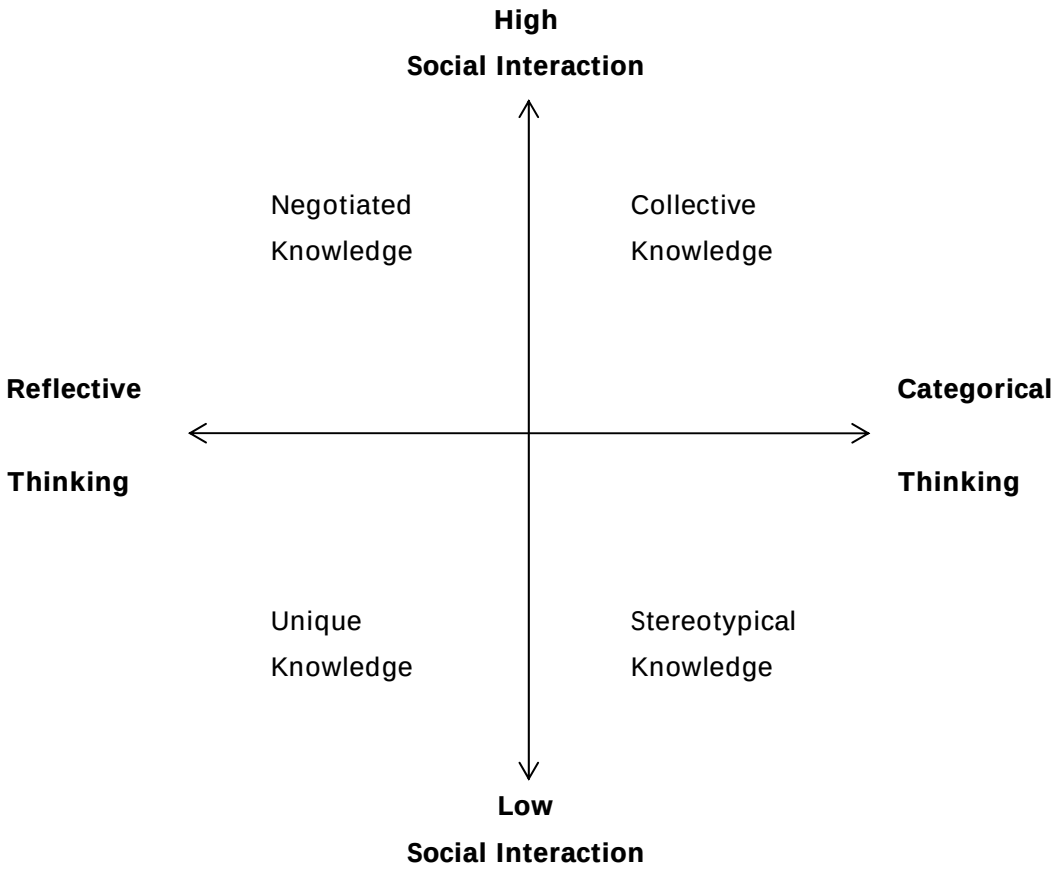

Figure 3: Knowledge transfer outcome scenarios
(From: Ringberg & Reihlen (2008) p. 924)

2.2.7.3.1 Negotiated knowledge

Knowledge transfer arising from negotiated knowledge occurs as a result of participants with divergent mental models being aware of their conceptual discrepancies and making efforts to resolve them. Both parties must share authority and control over the negotiated knowledge outcome: the process cannot work if one party assumes superiority over the other.

2.2.7.3.2 Collective knowledge

A collective knowledge outcome arises when those involved depend upon shared cultural models, developed from shared experience, education and training. There is a high degree of social interaction with reliance upon more automated, categorical thinking, developed from procedural, repeated routines. The authors use the example of an anaesthetist and a surgeon who develop a set of shared cultural models that enable them to understand each other's actions and communicate significant meaning using a limited range of gestures and exchanges of words (Ringberg & Reihlen 2008, p. 925).

This type of knowledge transfer is found in organizations heavily reliant upon predictable task performance. Ringberg and Reihlen (2008) suggest that members of such teams share similar cultural models so that in particular situations, they each know what to expect from others, when and why. Communication and knowledge transfer within the collective boundary takes place with ease, but can be very difficult with people outside of the group who do not share the customs, meanings and shared behaviours. Collective knowledge can also hinder processing for novel events and situations that the group would not usually encounter.

2.2.7.3.3 Unique knowledge

Unique knowledge is developed through a high level of reflective thinking and limited social interaction. It would be unusual for someone to be situated at the far extreme of this scenario, but those with a general disposition within this area might be valued as a creative source within an organisation. It is in this manner, in the generation of ideas, that knowledge transfer to others is most likely to occur, and its appreciation would require reflective thinking.

2.2.7.3.4 Stereotypical knowledge

Here, people rely on categorical thinking automatically, without reflection. The contexts are usually formalized and routine-based, in which rules guide specific behaviours in response to particular events. Private models and reflective processing are not required or encouraged (Ringberg & Reihlen 2008, p. 926). In certain bureaucratic organizations, this can be useful in ensuring that consistent routines are implemented with little supervision. However, it can also mean that situations requiring alternative management processes are dealt with incorrectly. Also, as there is little updating, due to the low level of interaction and the highly structured environment, individuals or managers may repeatedly apply cultural models that have become outdated, or may continue to apply categorical thinking to situations that have

evolved into multidimensional entities, requiring a very different approach. Both behaviours will impede progress and performance.

2.2.7.3.5 Implications of the socio-cognitive approach

Ringberg and Reihlen (2008) suggest that all four of the knowledge transfer outcome scenarios may co-exist to various degrees, and that this may occur at varying levels of an organization. The authors also suggest that a person may engage in more than one scenario, depending upon their organizational role and the task to be carried out (Ringberg & Reihlen 2008, p. 928).

They consider that the theory makes a practical contribution in encouraging managers to identify the interpretive frameworks of their staff, clients and customers so that they can be matched to the appropriate knowledge transfer scenario, in order to better meet the organization's aims. The complex process of identifying peoples' cognitive dispositions and required level of social interaction for various environmental conditions to achieve desired outcomes would necessitate a high level of skill. However, knowledge of the key themes could assist a more general approach. For example, organizing situations that require a great deal of social interaction and team building events is unlikely to result in an abundance of original, creative ideas from specialist research staff, but may be very helpful to a product development team.

It seems to the researcher that much of what Ringberg and Reihlen (2008) suggest to be the development of cultural and private models is essentially the construction of identity, and that the individually-oriented application of these models to data in order to generate various knowledge outcomes, parallels the influence of identity upon sensemaking in determining the identification and interpretation of environmental data.

The significant contributions that Ringberg and Reihlen (2008) make is in drawing together characteristics of cognitive and practice-based approaches to knowledge transfer, and considering the concept of sensemaking within the knowledge transfer process.

2.2.8 Narrative as a means of sharing knowledge

Narrative is of interest to this research as the participants engaged in the shift change handover do so verbally: one person going off duty speaks to a small group coming on duty, and it is within this context of narrative in a formal setting, rather than informal, opportunist narratives, that this section of the literature review will focus.

Conversation is possibly the most frequently used medium when one person is to learn something from another but according to Cook and Brown (1999), '...the activity that conversation affords is not limited to a merely additive back and forth exchange of information' (Cook & Brown 1999, p. 393), it is a generative process. Taking the example of two doctors discussing the management of a particular medical condition, Dr A might tell Dr B that he is trying a particular approach and go on to describe it. Dr B adds that knowledge to his own and also situates it within the context of his own skills, preferences, beliefs and so on, which can develop new connections, insights and meaning. The same thing happens when Dr B replies to Dr A and they can develop a shared meaning of what it means to take Dr A's approach, a new genre, which might then affect the way that the doctors practice and how they work together. For Cook and Brown (1999), the engagement in such a conversation is a practice that carries out epistemic work and is a form of knowing. Knowing uses knowledge as a tool in interacting with the world and this interaction bridges the epistemologies, enabling the generative interplay between knowledge and knowing, the source of new knowledge and innovation.

Dr A's description of his new approach might be considered to have taken the form of a narrative or organizational story and we will now turn to the role of narrative or storytelling in the transfer, sharing, or indeed, creation of knowledge.

The use of narrative in knowledge transfer or, as is more frequently used in the narrative literature, knowledge sharing, is widely acknowledged, particularly in sharing tacit knowledge (Boje 1994; Connell, Klein & Meyer, 2004; Czarniawska 1998; Denning 2000, Weick 1995) and implicit knowledge (Klein 2008). Narrative is the most appropriate and frequently used means of conveying tacit, individual social knowledge (Linde 2001). This includes knowledge about a group's identity, what it means to be a member of that group and how to practise as a member. It forms an essential part of the induction process during which newcomers learn the organizational stories that all members must know, the circumstances of why and when they are told, and how they are narrated.

Narrative plays a significant role in individual cognition: Bruner (1990) considers the ability to connect events in the context of a story to be vital to understanding and making meaning from experience, and proposes that anything that is not included in a narrative structure becomes forgotten. As will be seen in following sections, this is aligned with Weick's (1995) view that sensemaking is largely dependent upon our ability to think in narrative terms. The narratives themselves depict peoples' experience of the world and how they view themselves within that world. In addition to

representing the social world, narratives organize or structure events to bring about coherence and, as this process is influenced according to the narrator's values, beliefs and expectations, narratives are actively engaged in developing sense and meaning and in creating the social world (Boje 1994; Czarniawska 1998; Pentland 1999; Weick 1995).

While the literature generally uses the terms narrative and story, or storytelling, interchangeably, some authors do differentiate between them. In these cases the term story usually refers to the content or plot of what is being told, while narrative refers either to the process of narration, in which the plot is combined with other elements to form a particular structure, or is viewed as a literary genre, to which a story can belong (Connell, Klein & Meyer, 2004; Denzin 1998; Pentland 1999). For the purpose of this research the two terms will be used interchangeably, but any exceptions will be indicated.

Pentland (1999) suggests several features common to narrative texts:

- a time sequence – at a basic level, a narrative text must provide a sequential account of events;
- actors – who or what the story is about;
- a narrative voice – telling the story from a particular viewpoint;
- an evaluative frame of reference – cultural values and standards which the actors can be judged against;
- other content and context indicators – textual devices which aid interpretation.

These features may be present to a greater or lesser degree according to what is being told, but they form the elements from which a story can be recognized. Pentland (1999) also describes four structural levels that further aid the analysis:

- text – the actual text of a story, spoken or written (e.g. 'When I arrived at the Accident & Emergency Department…');
- story – this underlies the text and is taken from a particular viewpoint (e.g. A patient's account of what happened when he or she was admitted to the hospital);
- fabula – generic description of certain events (e.g. How a particular patient was admitted: what actions were taken by whom);
- generating mechanism – the deepest layer that shapes the fabula (e.g. the process by which patients are admitted to the hospital via the Accident & Emergency Department, admission protocols and so forth).

While the surface structure, the text of a story, is readily recognized, the knowledge held within the deeper layers may be more complex and is usually more difficult to identify. This is where the encoded environmental data is held that reveals even the most complex inter-relationships between data elements (Connell, Klein & Meyer, 2004), which may be used as a tool in organizational analysis (Weick 1995), conveying what is known of, for example, culture, values and how to deal with certain situations or emotional responses to events.

Narrative data may be examined in much deeper detail (Connell, Klein & Meyer, 2004; Pentland 1999) but the structure described above is sufficient to introduce the concept of a narrative text or story and for the level of analysis to be carried out. Pentland (1999) emphasizes that narrative qualities can be found in many kinds of data even though they may not contain all of the features described above. Examples of this may be found in an organization's annual financial reports or within parish records. This point will be returned to in the analysis of data.

In addition to the content of the story, the physical act of face-to-face storytelling can have much to convey (Boje 1991), which may only be apparent to the audience; '... such performances might be rich in tacit knowledge, only some of which will be evident from a transcript of the narrative' (Connell, Klein & Meyer, 2004). It can be a highly dynamic event and Connell, Klein and Meyer (2004) identify three key factors underlying this action potential. Firstly, the listener can engage with the narrator in ways such as interrupting, asking questions, seeking clarification, agreeing or disagreeing and displaying emotions in response to the knowledge being conveyed, all of which influence the narrator's behaviour. Secondly, these responses may lead the narrator to modify the story and its knowledge content. Thirdly, as a result, the story is less rigidly constructed.

Consequently, the storyteller can alter what is conveyed to suit the needs of the audience, but the storyteller can also make amendments according to his or her own needs, altering the content of what is communicated and thereby influencing the listener's perception or understanding.

Storytelling requires the participation of a narrator and a listener. As neither is obliged to take part, when storytelling takes place both participate willingly, often without formal, managerial incentives (Connell, Klein & Meyer, 2004). Whatever the motivation to take part may be, storytelling can be a useful medium for knowledge sharing, thus highlighting the importance of Boland and Tenkasi's (1995) concepts of perspective

making and perspective taking discussed in Section 2.2.3.2, in which individuals with differing levels of expertise or knowledge use narrative to reflect upon, recognize and appreciate each other's different ways of knowing, and thus develop new knowledge.

Taking account of one another's background and knowledge is an extremely complex process involving many individual techniques, cultural factors, judgements and biases, which do not always successfully converge. For example, ready access to and familiarity with one's own perspective can result in an overestimation of the ability and willingness of others to share that perspective. There can also be situations in which all those involved are unable to recognize and examine their differing interpretive frameworks. Dougherty (1992) provides an example of this is in a study of unsuccessful instances of new product development. It was found that the focus for failure lay within differences in how those involved interpreted issues concerning the link between the new technology and marketing the product, and were unable to reach a resolution.

Three themes were identified. Firstly, in attempting to make forecasts, the business planner was concerned about positioning against competitors, while the sales manager's priority was identifying the right customers. Secondly, in each instance, those involved did not understand the development process, ignoring the activities of others and making light of their concerns, failing to prepare overall priorities, and not appreciating the complexity of the process. Thirdly, those involved remained within their own 'thought worlds' (Dougherty 1992, p. 191), believing that they knew everything they needed to know, and working independently, even in physically different locations, rather than coming together as a team. Each of these themes has in common a lack of narrative and perspective making, with a consequent lack of reflection and perspective taking, resulting in extremely limited knowledge sharing. Dougherty (1992) drew a conclusion that has been mentioned previously in this literature review and which will be encountered again in the discussion of sensemaking, 'It is more like the tales of eye witnesses at an accident, or of individuals in a troubled relationship – each tells us a complete story, but tells a different one' (Dougherty 1992, p. 191).

Where each participant in a narrative has a deep awareness of a context, they frequently engage in terse storytelling (Boje 1991), in which the narrator leaves some of the content to the listener's imagination. From their shared understanding, the narrator instinctively knows what can be left out and it may be difficult for someone who does not share that awareness of context to fully appreciate the conveyed meaning. Conveying significant meaning via limited actions, gestures or words was

also seen to be a feature of Ringberg and Reihlen's (2008) suggestions on collective knowledge. Terse storytelling and Cook and Brown's (1999) concept of genres, discussed in Section 2.2.6.3, are closely aligned. For example, a nurse might say to another coming on duty, 'It's been a typical Wednesday morning', and the nurse coming on duty knows precisely what is meant. Other than the ward staff, who knows what happens, or doesn't happen there on a Wednesday morning? The term 'Wednesday morning' serves as a genre, and the terse 'typical Wednesday morning' each has meaning that is understood by both nurses without further explanation. Where the context is less closely shared, the narrator may misjudge the listener's perspective and the story will be misunderstood, or perhaps not completely understood. As will be seen in the data analysis, the research revealed an example of narrative containing terse storytelling in which it was clear to the researcher that each of those present shared a complete understanding of what was being conveyed, but the story was eventually being told by facial expression and gestures such as nodding to confer agreement.

Why do people participate in storytelling? Connell, Klein and Meyer (2004) propose that the motivation to use stories might be classified by examining the purpose of the story: whether its intention is entertainment, to achieve a particular effect, to enrich understanding, or to educate. The sensemaking perspective (Weick 1995) focuses on identity and people needing to locate themselves within their worlds: storytelling helps participants to do this. It is by using narratives that 'we make sense of the world, and of the relationship between ourselves and other selves ... it is through such stories that we produce identities' (Lawler 2002, p. 248).

Boje (1991) takes the view that storytelling is the preferred way that people engage in sensemaking. There is little doubt that people enjoy stories and almost everyone will be familiar with situations in which they have listened to one story and responded to it by telling one of their own. During the telling of a story, some aspect of what is heard might prompt the listener to respond with his or her own story, perhaps to elaborate the original story, or to confirm or refute it. This can lead to the creation of new knowledge in addition to sharing existing knowledge.

Klein (2008) provides a further compelling reason for storytelling; a well-told story provides the listener with virtual access to the narrator's experience, the next best thing to the experience itself, enabling the near reconstruction of events which would be far too complex to represent in, for example, procedures or models. It also brings into play the generative interaction between knowledge and knowing, the epistemic work from which new knowledge is created (Cook & Brown, 1999). These factors in

combination explain the innate capability of stories for sharing all forms of knowledge: explicit, implicit and tacit.

2.2.9 Concluding remarks on knowledge transfer

The idea of knowledge as an action-oriented concept is persuasive, and the definition of knowledge adopted will therefore be that knowledge is a justifiable personal belief that enhances an individual's capability to take effective action.

The terms data, information and knowledge have been investigated. Data may be expressed in simple terms such as *here are two stones*. It is not difficult for one person to convey to another that there are two stones. Information requires a context in order to give it meaning. The numbers 21, 37, 42 and 73 may seem to be unstructured data, but in the context of a take away menu shared by the customer and the chef, they represent a meal. Knowledge necessitates individual processing, some interaction that internalizes it and renders it known.

The literature indicates that the communication of simple, unstructured data can be achieved in a straightforward manner with nothing lost in transmission. The term 'transfer' seems wholly appropriate here as the data is stable and no further processing is required, either by the knowledge source or the recipient; that which is received is identical to that given. Moving through the increasing levels of structure within the knowledge hierarchy, and from explicit towards implicit and tacit knowledge, the communication process becomes more complex, requiring additional processing by both parties. It also becomes subject to misinterpretation as the individual characteristics of the source of knowledge and the recipient have increasing influence, therefore requiring more effort and attention. The literature in this area has been seen to look increasingly towards social processes and socio-cognitive theories that focus upon individual interpretation to explain the mechanisms involved. Indeed, accepting the definition of tacit knowledge as that which is truly inexpressible means that such knowledge cannot be *transferred* (Wilson 2002). To explain the proliferation of tacit knowledge, the term *knowledge sharing* is frequently used and seems more appropriate. The knowledgeable person presents what he or she knows using language or other social means, in complex contexts such the master-apprentice relationship, narrative structures, actions and cultural behaviour. Others interact with the knowledgeable person and what is being presented, applying cognitive processes that effectively produce new, individually generated knowledge. It seems then that the terms *knowledge transfer* and *knowledge sharing* are not properly interchangeable. Additionally, even that which is said to be transferable does not actually leave the

source to be transferred to the recipient, suggesting that a more correct term to be used for all instances in which knowledge is communicated might be *proliferation*.

Ringberg and Reihlen (2008) emphasize the influence of cultural and private mental models on individual interpretation as part of the process of making sense of things, suggesting that this may explain how new knowledge differs from one position to another, and from one person or group to another. This cognitive, reflective theme is also considered by Cook and Brown (1999), who suggest that the transition from knowledge of something to knowing it, or the creation of new, individual knowledge, is achieved through some cognitive process embedded in action. This has resonance with the notion of sensemaking as an action-oriented process (Weick 1995). Tsoukas (2003) proposes that tacit knowledge is acquired through a knowledgeable person directing a novice's attention towards salient stimuli. D'Eredita and Barreto (2006) develop this idea, proposing that the mechanism enabling this lies within sensemaking, in particular within the action-oriented process of punctuation and bracketing.

The literature reviewed thus far infers that sensemaking processes might be central to the production or generation of knowledge and thereby to its proliferation. This will now be considered more closely by examining the sensemaking literature to achieve an understanding of the concept, specifically noting any implications that sensemaking processes may have for the transfer, or perhaps more appropriately, the sharing or proliferation of knowledge. Within the previous sections the researcher identified a number of similarities and associations between concepts found in within the knowledge literature and those concerning sensemaking, and these will be developed further.

2.3 Sensemaking

2.3.1 Approaches to sensemaking theory and research

Making sense of the sensemaking literature requires a structure on which to present the findings. Two main schools of thought form the supporting framework for the development of sensemaking theory: cognitivist and social-constructionist. On closer inspection, it can be seen that many authors do not sit precisely into one or other category, but the classification is a useful means of describing in general terms the theoretical foundation that distinguishes researchers.

2.3.1.1 The cognitivist approach

The concept of categorization is central to the cognitivist approach, which explains sensemaking in terms such as mental models, frames and cognitive repertoires. These

are considered to be formed from the sensemaker's previous experience and applied to the current situation, so that he or she may understand it. Cognitivist research aims to identify these frameworks and categorization systems and the methods by which they operate. The cognitive maps described by Boland and Tenkasi (1995) provide a good example of this with diagrammatic representations including a doctor's mental map of quality of care, and that of a narrative analysis; and Hill and Levenhagen (1995) propose a model of how mental maps are developed and implemented by entrepreneurs. For the cognitivist, sense has a realist nature that is reflected in the research methods used, which include survey methods and content analytic coding or combinations of qualitative and quantitative methods, for example ethnography with empirical observational data. This sense of realism is applied not only to the individual, but also to groups, organizations and entire industries, by means of shared mental maps or schemata and thus, a shared, accepted reality (Hayes & Allison, 1998).

Hopkinson (2001) situates the author Karl Weick within cognitivist thinking, thus providing a vivid example of the nebulous nature of the sensemaking concept. As will be seen later in this chapter, Karl Weick is widely recognized as a social-constructionist and his work clearly expounds sensemaking as a socially based activity, emphasizing the importance of interactive processes such as narrative and discourse as part of the sensemaking activity, rather than the outcome of sensemaking. Yet Hopkinson (2001) views Weick as a cognitivist as he bases the sensemaking concept of enactment (see Section 2.3.3.1.3) upon punctuation and bracketing, in which particular elements are selected from an ongoing flow of events and grouped together to provide a means of understanding the world. This is unquestionably cognitivist categorization. An overt example of this can be seen in the way in which organizations conduct strategic planning by labelling events within their operational environments according to the categories in the widely used SWOT analysis: strengths, weaknesses, opportunities and threats.

The importance of narrative as a means of understanding is common to both cognitivist and social-constructionist researchers, but its treatment differs. For the cognitivist, language and meaning are related in a straightforward manner, enabling an understanding of a situation to be readily communicated. But the narrative is not viewed as an accurate and factual report of a situation or event; it is a representation of cognitive reality or a means by which the sensemaker categorizes his experience according to various cognitive schemata. The narrative or story from the cognitivist perspective provides a realistic report viewed '... through the cognitive lens of the storyteller' (Hopkinson 2001, p. 427); it is subject to the specific cognitive schema that the storyteller has brought to bear on the event in order to make sense of it. 'It is

(more) like the tales of eye witnesses at an accident, or of individuals in a troubled relationship – each tells a complete story, but tells a different one' (Dougherty 1992, p.191).

Researchers can therefore use narrative literally, directly quoted, to demonstrate viewpoints and accounts and these can be used to make comparisons, perhaps of the views of different groups towards a particular event. The textual approach developed by Gephart (1993) as a means of investigating the sensemaking processes involved in public enquiries provides a working example of this. The technique has been used to analyze the detailed official proceedings and other related documents such as newspaper articles and field notes associated with an enquiry, searching for the language rules, structures, practices and other resources which people use to make sense of their world and identifies how these are made meaningful to those involved.

Cognitivist research presents the stories of participants as understood, readily construed sense, as opposed to the social-constructionist approach in which the process of storytelling is the active construction of sense and organizational life.

2.3.1.2 The social-constructionist approach

Unlike the cognitivist idea of sense achieved through the sharing of common mental maps or schemata, the social-constructionist approach regards sensemaking as being formed through ongoing social processes of negotiation within which a sense of individual and group identity is produced, and through which groups take form and structure (Boje *et al.* 1997). Weick (1979) describes this as being achieved through a cyclical process beginning with sensemaking at the individual level, then mutual or social sensemaking takes place, moving on to understanding, followed by actions, then a new cycle begins again with individual sensemaking. It is a continuous process of creation and recreation in an attempt to make sense of the world and language is central to this process (Watson 1995).

Social-constructionism opposes the cognitivist treatment of language, and views sense and reality as being constructed within language and discourse, rather than independently of and communicated through language. The multivocality produces sense and meaning that is situated, fragile and negotiable (Hopkinson 2001). But people think narratively, and in attempting to label sense, which from this position is continuous rather than static, the use of language paradoxically makes sensemaking difficult so that meaning cannot be communicated perfectly from one person to another (Weick 1995).

Language is used to construct reality and also to establish levels of power by conferring authority to certain voices and subduing others (Fairclough 1989; Foucault 1977). This impacts upon identity construction and the possible identities that might be achieved at both individual and group levels: according to the concept of positioning, identities or concepts of self are dependent upon those they are related to or compared with. In turn, this has a significant and real influence upon action, a central theme of social-constructionist sensemaking.

Narratives are viewed as media for sensemaking and creating reality (Orbuch 1997; Weick 1995). The narrator is considered to be the creator or author of his or her reality, in being responsible for selecting the various environmental items that are brought together to form the plot. The story links the items together forming relationships and seemingly causal associations to explain events. The narrator and listener position themselves within the social order of the story and in doing so confirm their identities and knowledge of how to interact with the world. Sensemaking research concerning narratives focuses more closely upon who the narrator considers him or herself to be, how they see the world and how that sense of the world was developed.

That a researcher may substantively move his or her perspective from one classification to the other, and that other researchers may interpret their colleagues' work in quite different ways, illustrates both the evolution of sensemaking as an area of study and the dynamic nature of the sensemaking process, in which the researchers themselves are taking part.

2.3.2 The nature of sensemaking

The literature on sensemaking covers an abundance of contexts. Project management (Wright *et al.* 2000), terrorism (Snowden 2006), marketing (Hopkinson 2001), health care (Boreham, Shea & Mackway-Jones 2000) and weather forecasting (Klein, Moon & Hoffman, 2006a), represent just some of the areas that have attracted authors. It is also a subject of great interest to military forces, who acknowledge the need to understand sensemaking processes in order to operate efficiently and sensitively within an increasingly complex arena, one that has undergone enormous changes within the last decade. Military contexts have a great deal in common with medical contexts, the focus of this research, in frequently operating under time pressure, with complex information in often life-threatening situations.

Chapter 1 introduced the concept of HROs, organizations that require constant, error-free operation to prevent lethal or catastrophic outcomes. They are relied upon to

produce stable outcomes, even though their work is subject to extreme variation and pace (Roberts 2005). Such organizations are contrasted with those focusing on high levels of efficiency, where there is little variation in the level of operational intensity and their errors are unlikely to be catastrophic. Particular forms of sensemaking are thought to play a significant role in how HROs perform and are discussed in Section 2.3.3.1.4.3 (Weick & Roberts, 1993; Albolino, Cook & O'Connor, 2007).

The term 'sensemaking' has been used in mainstream psychology for decades (McDermott & Church, 1976) but is poorly defined and '... used as a metaphor for individual "understanding" and "meaning making," and describes a broad and all-encompassing, subjective, mental activity whereby individuals make sense of themselves, others and events ... what the term encompasses has not been clearly stated and is frequently used to describe something the "mind" does' (Craig-Lees 2001, p. 518).

Associated with cognitive processes such as memory, visual recognition and language, sensemaking may be considered merely a representation of various concepts accepted within psychology including creativity, comprehension, mental modelling and situation awareness (Klein, Moon & Hoffman, 2006a).

However, much of the psychological research on creativity relates to its role in problem solving (Newell & Simon 1972), or as a measurable personality trait (Ward & Saunders 2003), or its association with expertise (Weisberg 2006). None of this research can adequately explain sensemaking. While sensemaking may at times involve creativity, they are two different concepts.

Sensemaking might be closely aligned to the psychological notion of comprehension. Indeed, the Binet-Simon assessment of intelligence includes a test of comprehension in which the person tested is asked what he or she would do, or ought to do, in a given situation. However, the focus is on the understanding of individual stimuli in isolated contexts (Clark & Clark, 1977), as is a large part of the research on comprehension, which frequently centres on the meaning of words, phrases and other sections of prose, rather than the more complex array of stimuli dealt with in sensemaking, during the progress of an event for example, as a situation unfolds (Klein, Moon & Hoffman, 2006a).

Mental modelling is a memory representation of how a person thinks that something works in the real world. It describes the relationships between the components of that world; the concepts, principles and knowledge, and the person's intuitive perception

about their own actions and their consequences (Gentner & Stevens, 1983). Mental models explain events rather than isolated stimuli and in this way are more similar to sensemaking than other psychological notions (Klein, Moon & Hoffman, 2006a). Even so, sensemaking is differentiated by being a continually updated process rather than a fixed model.

In situation awareness we see a similar distinction. Situation awareness is concerned with having a state of knowledge concerning the current data elements within the environment, and being able to draw inferences from that knowledge to predict the impact that actions might have in the future, within that context (Endsley 1995b). Sensemaking is a process rather than a state and as such may be more concerned with the processes involved in achieving and maintaining that state of knowledge, the strategies used and negotiating barriers encountered. Situation awareness is discussed in more detail in Section 2.3.5.2 in connection with the sensemaking concept of anticipatory thinking.

It seems then that creativity, comprehension, mental modelling and situation awareness can all be involved in sensemaking, but these concepts do not adequately explain sensemaking and current researchers in this field are looking at something with a quite different meaning.

Moving towards sensemaking in the management literature, the most prominent author is Karl E. Weick. For Weick, sensemaking is a social activity, with organizations being sensemaking systems in which members are continually engaged in reaffirming to one another what they individually regard as true reality, and the consequent action that is required to engage with that reality. The interactions between participants and their representations of situations and of each other are crucial to the development of individual and collective understanding. The term ‘organization’ should be interpreted loosely, as within the context of sensemaking it can apply equally to a multinational corporation, a Parish Council Committee or a group of students sharing a house with one another. From the social-constructionist’s perspective, we all interact in some way in various settings, and affirm our identities within those settings through that interaction.

As noted earlier, sensemaking is a process rather than a state. It involves the construction and grouping or bracketing of cues to be interpreted, linking them to some frame of reference drawn from past experience, such as theories, traditions or stories, and revising the interpretations made as a result of actions, interactions and their outcomes (Weick 1995, p. 8). It does not end; the outcomes again lead to

construction and grouping of cues. Consequently, what people make sense of and the way they do it is dependent upon where and how they look, their goals and their tools or capability for representing reality; it is entirely subjective. Unlike puzzle solving or code breaking, which would assume the existence of a pre-determined, *correct*, order for each situation experienced, according to Weick's sensemaking, people may apply knowledge, experience and conceptual resources repeatedly to the elements of a situation, '... never knowing whether they have discovered a unifying order' (Weick 2001, p. 9). Essentially, there is no objective truth against which a person's sensemaking can be judged.

There is a strong similarity here to the previously discussed suggestions in the knowledge literature of how a person's existing knowledge informs the type of information that is collected and the way it is interpreted (Davenport, De Long & Beers 1998a; Smith 1998; Alavi & Leidner 1999; Hislop 2005), so that people with differing knowledge understand situations differently.

Weick likens this process to cartography. The frameworks or patterns are similar to maps and in cartography there is no single, definitive map for an area, the map will change depending upon the focus of the representation and the purpose for which it is being charted. For example, the same geographic area can be charted from the perspectives of perhaps its road systems, wildlife distribution, places of worship and incidence of kitchen fires. Four very different maps will be produced, each illustrating the same place and at the same time, neither being incorrect or contradictory because there is no objective geography against which the maps can be verified. In the same way that numerous different maps can be applied to the same terrain, an infinite number of frameworks can be tested in sensemaking. But in sensemaking, the ground to be charted is itself continually changing so that holding onto one configuration to try and make sense of the reality is so much more difficult (Weick 2001).

Weick stresses that sensemaking is not just a process of interpreting the environment, it is also a constructive process; the sensemaker both creates and discovers his or her own world (Weick 1995). In contrast to Weick, Brenda Dervin's approach is that of Sense-Making Methodology (Dervin 1998), which focuses upon the development of a methodological approach to all forms of communicative practice, from intrapersonal, through to organizational and societal, in all contexts. While differing in orientation, Dervin's approach supports Weick's notion of sensemaking as a creative and theorizing activity in that it: '... explicitly privileges the ordinary person as a necessary theorist involved in the development of ideas not only for understanding personal worlds but

necessarily for understanding the collective, historical and social worlds as well' (Dervin 2003, p. 333).

The narrative nature of sensemaking is evident in much of Weick's work and many of his ideas are expressed in the format of collections of stories to explain his thinking. Weick considers stories to be essential for sensemaking; we think narratively and thus make sense narratively (Weick 1995, p. 61). Good stories connect seemingly random elements in a reasonable way, enabling people to make sense of what happens and initiating action. Narrated skilfully, stories compel others to offer their own contributions, further enhancing sensemaking. Stories are the outcome of previous sensemaking and the basis for future sensemaking. This narrative thread is apparent throughout the discussion of sensemaking.

An amount of Weick's work is centred on detailed investigations of secondary data; for example, his ideas on sensemaking during crisis situations are developed from revisiting an analysis of the Bhopal disaster by Shrivastava (1987) and Maclean's (1992) assessment of the Mann Gulch fire that killed thirteen men. His central ideas on the role of identity and his characterization of sensemaking are largely informed by a reanalysis of the research by Porac, Thomas and Baden-fuller (1989) concerning the strategic behaviour of executives in the Scottish woollen industry. Weick's consideration of these and other works has resulted in his characterization of sensemaking. His ideas have exerted such a significant influence on research in this field, that this researcher can find little recently published sensemaking research that does not refer to the identification of some or all of these characteristics in various contexts.

2.3.3 Weick's sensemaking characteristics

2.3.3.1 The seven sensemaking characteristics

Weick (1995) identifies seven properties that characterize sensemaking and differentiate it from other processes concerned with explaining situations and events. These are shown in Table 3.

Sensemaking is grounded in identity construction
Sensemaking is a retrospective process
Sensemaking is an enactive process
Sensemaking is social
Sensemaking is ongoing
Sensemaking is focused on and by extracted cues

Sensemaking is driven by plausibility rather than accuracy

Table 3: The seven sensemaking characteristics proposed by Weick (1995)

That these characteristics have come to be regarded almost as standard reference points for sensemaking is not at Weick's behest. 'These seven characteristics serve as a rough guideline for inquiry into sensemaking…' (Weick 1995, p. 18). They are, however, an important feature in reviewing sensemaking literature. Two of the characteristics, identity construction and plausibility, are considered to be the key factors differentiating sensemaking from basic cognitive psychology (Gililand & Day 2000; Mills 2003). A number of the characteristics have been referred to previously in this literature review due to their association with knowledge transfer or knowledge sharing processes. To develop a more detailed understanding of sensemaking, each characteristic will be investigated individually.

2.3.3.1.1 Sensemaking and identity construction

The notion of self is continually redefined by our actions and by how we interpret our environment. Thus, sensemaking continually reshapes our image of ourselves and we have different identities in different contexts.

Definitions of identity generally include notions of a set of core, distinctive and enduring characteristics that typify a person, often in relation to a particular occupation, and provide a means by which we recognize or understand each other (Albert & Whetten 1985; Ashforth 2001). This is characterized by the familiar terms of engagement on being introduced to somebody; names are established, frequently followed by the question 'what do you do?'. While certain characteristics are enduring, such as personality traits, likes, dislikes and preferences, the overall concept of identity is not considered to be a fixed entity; '… identity is constantly open and available to be negotiated and re-negotiated, defined and redefined' (Collinson 1992, p. 31).

Weick's views on identity have much in common with those of Ortega (1961a) (see Section 2.2.6.2). Identity is formed from the process of interaction and as people move between various interactions they experience certain characteristics or qualities relating to that interaction, and thus they move between various definitions of self (Weick 1995). This renders the sensemaker subject to continual redefinition and faced with the choice of which self to present in particular situations. The sensemaker's understanding of a situation will change according to the self that is presented to it, 'Depending on who I am, my definition of what is "out there" will also change' (Weick

1995, p. 20). Who we think we are influences how we make sense of and respond to our environment, which in turn affects other people, their images of us, and their behaviour towards us. This then either confirms or destabilizes who we think we are. There is a continual flow of influence from the self to the environment and from the environment to the self, so that the establishment of identity is the central theme of sensemaking (Weick 1995, p. 20) and a failure to confirm ones' self initiates deliberate sensemaking activities (Weick 1995, p. 23). This proposition is supported by Mills (2003) who considers that identity construction '... is at the root of sensemaking and influences how other aspects, or properties of the sensemaking process are understood' (Mills 2003, p. 55).

Narrative plays an important role in the construction of identity. It's significance in the induction of newcomers to a group or organization has been previously noted. As the newcomer learns the group's stories and the situations and manner in which they should be retold, he or she is also learning about the group's identity, through stories of the deeds of those considered to be heroes or how notable situations were successfully managed. The stories can also convey messages on what the group considers to be inappropriate. But while this part of the induction process is underway and the newcomer learns what it means to be a group member, his or her own stories of self, who one is and what one's history has been, are in turn shaped to fit the new group or organizational context.

If the image others have of us changes, the impact upon our identity enhances our receptiveness to new meanings, which again influences how others see us and act towards us. However, we do not have to accept the outcome: 'They (people) take the cue for their identity from the conduct of others, but they make an effort to influence this conduct to begin with. There is a complex mixture of proaction and reaction, and this complexity is common in sensemaking' (Weick 1995, p. 23).

The attempts to influence the responses of others stem from each individual's identity needs and these needs are reflected in their group or organizational identity. Erez and Earley (1993), suggest that the processes employed in the development and maintenance of each person's changing sense of self are driven by three core needs: the need for self-esteem, enabling a positive cognitive view of the self; self-efficacy, perceiving oneself as competent and capable; and self-consistency, a desire for coherence and continuity.

If negative images pose a threat to any of these representations of self, then the sense made of those images will be changed, even if this results in a redefinition of identity.

The disruption to expectations leads people to fundamental questions concerning their identity, such as who they are, what they are doing, what is significant and why. This is the basis of Weick's (1995) assertion that intentional sensemaking is initiated by a failure to confirm one's self. The disruption disturbs expectations and also the efficacy of established behaviour and patterns of meaning. As a result, people try to make sense of ambiguous stimuli in ways that will meet their own identity needs, drawing on their experiences to create a plausible story that will support and maintain consistent feelings of self-efficacy and self-esteem. Once a credible explanation of what is going on has been achieved, it is used by that person and others as a new arena in which to act and establish new meanings and behaviours: a new identity (Weick *et al.* 2005, p. 416).

There are occasions when identity becomes firmly fixed. Weick *et al.* (2003) re-examined evidence from the case of Bristol Royal Infirmary in which paediatric surgery was continued for many years, even though the infant mortality rate was very high. The initial inquiry concluded that hospital staff had a shared mindset, enabling them to explain the high mortality rate as misfortune. Weick *et al.* (2003) proposed that the influence of the mindset was attributable to identity construction. The surgeons had constructed an identity of people learning how to carry out highly complicated surgery on infants suffering from highly unusual conditions. They maintained this identity, but it failed them because the surgeons engaged in minimal learning. They continued their procedures without proper reflection upon their work, so that data collection was poor, they did not consult other surgeons and did not consider the work of others more skilled in this work. Eventually, formal complaints were made.

A number of authors have studied identity change at an organizational level (Porac, Thomas & Baden-fuller, 1989; Dutton & Dukerich, 1991; Gioia & Thomas, 1996). The focus of the process lies within how organizational members interpret the responses of outsiders to the image the organization projects, which influences the individual members' identities. When action is taken by the organization to alter the image it conveys, the organizational members, in a process of reflection, use the responses of outsiders to the altered image to modify their actions and achieve a revised identity. This suggests that individual identities are partly constructed and modified not only by how those individuals believe others view them personally, but also by how they believe others view the groups or organizations to which they belong. This also supports the assertion by Collinson (1992) in the opening paragraph to this section, that identity is not a fixed entity and provides evidence that by influencing sensemaking, identity can be intentionally changed (Gioia & Thomas, 1996, p. 398).

The influence of others on an individual's view of the self is demonstrated in studies by Geen (1991) on social motivation theory, concerning three effects that interpersonal interactions can have on motivational states. The first is social facilitation, by which the mere presence of others can cause a state of arousal that facilitates simple and well-learned tasks, but not those that are complex or novel.

The second is social loafing, which relates to group members who do not have any particular concerns about how they will be evaluated in relation to their current task or feel that their individual reputations are at stake. In this case, individual performance and task involvement of the loafers decreases as the group size increases. Geen (1991) demonstrates this in relation to quality of written materials, creativity and cognitive judgement, in which the increasing group size had a diluting effect on loafers' individual feelings of responsibility towards task quality and completion. Those who do have concerns about how they will be perceived, perhaps believing that the outcome of the task will impact on their professional status for example, are more inclined to take on increased levels of responsibility and a larger proportion of the work.

The third effect is social anxiety, '...created when a person is motivated to make a certain impression on any audience, either real or imagined, but doubts that this impression can be made' (Geen 1991, p. 390). Geen (1991) proposes that failure to make the impression has an adverse effect upon the self-concept, so that behaviour is inhibited, the person begins to disengage from the situation, meaningful discussion gives way to simple, sociable statements, and strategies are developed to avoid blame and to attribute failure to situational causes.

All three effects, social facilitation, social loafing and social anxiety, share motives associated with people's concerns about how they will be evaluated by others and fear of disapproval: identity is at stake.

Returning to Ringberg and Reihlen's (2008) socio-cognitive theory of knowledge transfer, we can now see the similarity between the authors' proposals and the influence of identity upon sensemaking. Ringberg and Reihlen (2008) proposed the development of cultural and private mental models through social processes and individual cognitive disposition, which this author considered to be analogous to the process of identity construction, and the individual application of these models to the environment, reflectively or categorically, to produce various knowledge outcomes (see Section 2.2.7.3.5).

From the sensemaking perspective, identity is constructed through the reflective relationship between individual needs and goals, and social processes, which together determine how each person individually interacts with and interprets environmental data, thus influencing sensemaking. It is therefore suggested that the distinct characteristics of the individual and individual interpretation, or perhaps more properly *identity*, might influence both knowledge outcomes and the sense that is made.

2.3.3.1.2 Sensemaking as a retrospective process

We continually look back to past experiences and the sense we made then, to understand what we perceive now, bringing that previous sensemaking to bear on the present situation. The retrospective nature of sensemaking is closely similar to the suggestion by Davenport, De Long and Beers (1998a) that knowledge is the outcome of processing information according to reflection on previous actions and experience, and the present context.

Sensemaking is a retrospective process because we can only know what we are doing after we have done it (Weick 1995). Once we have perceived something it is already in the past, even if fractionally so, so that everything that is perceived is memory. This assertion is founded in the work of Schutz (1967) and Hartshorne (1962), both agreeing that time exists in two distinct forms, as duration and as discrete segments. Duration is a flow of experience that has no boundaries and cannot be grasped and attended to. What we are aware of are our experiences (intentionally plural). We move out of the flow of experience and direct our attention towards discrete events, or experiences, which are in the past.

As we look back at experiences from a specific point in time, our view of those experiences is influenced by whatever is happening at the time of looking back. Rather than attaching a meaning to an experience that will then endure, meaning relates to the type of attention that is directed towards the experience, which is dependent upon what is happening and our goals and expectations at that time. In this way, one event might be understood differently by different people, as illustrated by research into public inquiry reports (Gephart 1992) and strategic analysis (Boland 1984).

It is important to note that we do not reflect upon these experiences in isolation. People are usually engaged in more than one activity, or project, at a time, with a different level of awareness of each, and each at a different stage. The experience being looked at might then seem equivocal, because it makes many different kinds of sense, some of which may be contradictory. The problem for the sensemaker is confusion resulting from too many potential meanings. Here, Weick distinguishes his

approach from those who take an information processing perspective, in which the solution to reducing equivocality and making sense lies within gathering more information. In Weick's view, resolving equivocality requires values, priorities and clarity about preferences, rather than additional information, which would only add to the confusion. The actual feeling of achieving clarity, order and rationality is a significant sensemaking goal and once this is reached, retrospective sensemaking stops. 'Clarity on values clarifies what is important in elapsed experience, which finally gives some sense of what that elapsed experience means' (Weick 1995, p. 28).

This is supported by Heuer (1999), whose research showed that intelligence analysts needed help with the evaluation and interpretation of data, not in searching for more data. Similarly, Lanir (1991) examined cases of intelligence failure, such as the Yom Kippur Day attack in 1973, and concluded that sufficient data was available to the decision makers, but the difficulty lay in its analysis.

Further evidence is provided by a study investigating psychologists' confidence in their clinical decisions. Oskamp (1965) found that the accuracy of their decisions reached a ceiling quite early in the information gathering process, after being presented with approximately eight data elements from case notes. Additional data had no further impact on decision accuracy and the psychologists appeared to have fixed their opinions at an early stage. The study also found that their confidence in their decisions progressively increased, past the ceiling point for accuracy and throughout all stages of the study, and even in those who had reached incorrect conclusions, so that they each became convinced of their understanding of the case. Additional information was not used to modify their decisions, but to confirm them: 'Furthermore, their certainty about their own decisions became entirely out of proportion to the actual correctness of those decisions' (Oskamp 1965, p. 264). The research did not investigate why the psychologists reached their decisions at an early stage, but the findings are of interest in relation to an area of the data/frame theory of sensemaking (Klein *et al.* 2007) concerned with fixating upon a decision and preserving a frame, which is discussed in Section 2.3.4.3.4 and Section 6.4.

As sensemaking involves looking back at a memory, anything that affects how we remember things will alter the view. Knowledge of an outcome has a significant impact on how events leading to that outcome are remembered (Weick 1995). When people are told that the outcome of a project is successful, they reconstruct events that took place focusing on positive elements and giving a high rating to group performance. Conversely, an outcome that is perceived to be poor invokes a reconstruction that emphasizes problems encountered and incorrect actions, even if these were not

considered influential at the time they occurred. In both cases, connections are simplified and strengthened so that the outcome appears with hindsight to have been inevitable and predictable (Starbuck & Milliken, 1988). Significantly, the history of events is reconstructed in keeping with the outcome, even when that outcome is manipulated and people are deliberately given the wrong result (Hawkins & Hastie, 1990; Staw 1975). Thus, nothing happens in precisely the way we remember it to have happened, and many of the causal sequences of events, particularly those that have hindered progress, will be lost.

In producing this bias in hindsight, retrospection can create the false impression that errors should have been anticipated and action taken to prevent them. It can also lead to an overestimation of what could realistically have been known at the time of an event (Fischoff 1975), and can severely impede the development of foresight, for example in trying to learn from the analysis of a crisis, in order to organize against the occurrence of similar future events. The Columbine Crisis of 1999, an act of extreme violence carried out by two high school students, provides a clear example. Analysis of the crisis identified many warnings of what was to unfold, but they could only be seen as such after the crisis had occurred. These warnings included the students' criminal records, medical and psychiatric records, threatening and antisocial behaviour, creation of a website concerned with violence and hatred, and murder threats, all of which had been brought to the attention of the students' parents, school, police and local community. Further red flags took the form of guns being sold to the students without warning or concern, easy access to bomb making equipment, and thirteen other high school shooting incidents that had occurred in the previous six years, each receiving high profile, international attention. In addition, a widely distributed expert profile of a high school student killer had been developed. The profile fitted both students perfectly (Nathan 2004).

When listed as above, each event becomes linked to the other with increasing strength to make the compelling case that these students should have been identified as potential killers and stopped. It is only when we look back that we can see this interactive and cumulative effect.

Studies of public inquiries and other investigations into significant events such as that described above, are of relevance to this research as those attempting to make sense of what has occurred have usually not been themselves involved, in much the same way that the HOs coming on duty have not been present during the previous shift, but need to make sense of their colleagues' accounts.

In 1993, the UK Secretary of State for Health began an inquiry into the circumstances surrounding the deaths of four children and injuries to nine others, all patients on the same ward at Grantham and Kesteven General Hospital, during a three-month period in 1991. Responsibility for the deaths and injuries was attributed to the deliberate acts of a nurse, Beverley Allitt, who was convicted on several counts of murder, attempted murder and grievous bodily harm. Brown's (2000) thorough and fascinating deconstruction of the inquiry report reveals the impact of retrospective on how sense was made of the events. The inquiry sought an explanation for the highly unusual situation of how someone who was later found to be a mass murderer had been recruited and trained within the nursing profession, without anyone identifying her as dangerous. Information and statements concerning Allitt going back to her early school days were considered. Brown (2000) argues that the treatment of this information, the way in which sense was made of it, was to construct a plausible account in which Allitt was represented as outwardly normal in all respects, so that there was nothing unusual for anyone who knew her or worked with her to notice. Her frequent tendency to wear a bandage or an arm sling at school, for example, was *normalized* with arguments that she always had a reasonable explanation for her injuries, they were not accompanied by long absences, and that other pupils were also accident-prone and enjoyed the attention they would receive when wearing a bandage. In a further example, Allitt's extensive sickness absence during nurse training was not considered unusual as a handful of others also had high absence rates. By retrospectively selecting and associating particular information and developing meaning, a plausible narrative was constructed as to why no pattern was recognized as events progressed; her behaviour was such that there was no recognizable pattern there to alert anyone. The account is meaningful to its audience because it is in keeping with how we think we make sense of things. The inquiry was thus able to absolve the administrative, medical and nursing staff from any criticism or blame, while enacting a strategy to restore public confidence in the health service establishment.

Paget (1988) takes a similar view to Weick (1995) on the retrospective nature of sensemaking, and emphasizes this in a comment relating to mistakes in medical diagnosis. An action only becomes a mistake once it has already gone wrong. While the action is being carried out it is not becoming a mistake, it is an action. It is only when it is looked at in retrospect, however small that delay in time might be, that it becomes labelled as a mistake: 'They (mistakes) identify the too-lateness of human understanding' (Paget 1988, p. 97).

2.3.3.1.3 Enactment

Our actions produce the opportunities and the constraints within our environment. This is the action-orientation of sensemaking, the construction of reality.

The enactment process arises from peoples' need to organize and structure, to create a sense of order so that they can understand situations. To achieve this, an external reality is constructed against which they can test their assumptions. Enactment is concerned with the action-orientation of sensemaking. People's actions often produce part of the environment that they face and the environment influences their actions; it is in this way that their reality is constructed (Weick 1995, p. 36). Weick provides several examples of this, including that of an air traffic controller who, on a clear day, placed five incoming aircraft in a holding pattern, and within six minutes those five aircraft were involved in ten near misses (Weick 1995, p. 31). The air traffic controller produced that environment, and the environment increasingly constrained the controller's actions, limiting the available options for achieving safe landings. As Weick emphasizes, the environment is not an entity separate from the individual, each person is part of their own environment. They create their own environments as those environments create them.

A further example of enactment illustrates this, that of iatrogenics or medically induced disease. Weick (2006) cites studies by Scheff (1965) of medical errors and his observation that in medicine, if there is doubt, the doctor should continue to suspect an illness. This is based on the assumption that undetected illness can progress and cause perhaps irreversible harm to the patient. Scheff (1965) classified the errors as 'type 1' if a doctor discharged a patient who was actually ill, and 'type 2' if a doctor admitted a patient who was not ill. The results showed a clear majority of 'type 2' errors. At a time when the patients were vulnerable and open to suggestion, the doctors, by admitting the patients to hospital, had assigned to them the label of being hospital in-patients and in response to this, the patients then proceeded to behave as ill people.

This study identifies a serious implication of making a false positive diagnosis. It also leads Weick (2006) to the proposition that those doctors with a tendency to take action, who engage with the illness process and admit patients when in doubt (make a 'type 2' error), are enacting or creating an environment that requires their medical skills (Wieck 2006, p. 181). Additionally, it demonstrates that the person is part of his or her environment, '... the physician sees himself when his diagnosis implants a 'disease' which is then presented to him for treatment' (Weick 2006, p. 182).

Weick (2006) asserts that the mechanism by which enactment operates is a form putting boundaries around, or bracketing, portions of environmental data, organizing and structuring data in order to achieve meaning. The portions are divided out and separated from a continuous flow of undifferentiated data, providing a signal that one part of the stream of data may be more important than another. This initial action produces a collection of units or raw data that are related at best in a rudimentary manner. At the second stage, more complex cognitive action takes place to punctuate or refine and connect the bracketed portions; Weick (2006, p. 187) uses the term 'parsing' for this process. This transforms the raw data into information and provides meaning. 'The person continues to do cognitive work on the collection of events until they become transformed into a network of causal sequences' (Weick 2006, pp. 185-186). In this way, a causal map of the environment is produced and is stored within the head of the sensemaker. A similarity was noted in Section 2.2.2 between this process of organizing and structuring environmental data, from random items through to making sense, and the increasing levels of structure in the knowledge hierarchy, whereby discrete data may be organized to produce information, then structured further to develop knowledge (Bhatt 2001).

The following well-known example is used by Weick (Weick 2006, p. 186-187) to clarify his ideas and illustrate characteristics of enactment. The following represents a flow of a continuous data:

adhadhadhadhadhadJameswhileJohnhadhadhadhadhadha
dhadhadhadhadhadmoreinterestfortheteacherhadhadh

Enactment brackets a portion of the flow:

JameswhileJohnhadhadhadhadhadhadhadhadh
adhadhadhadmoreinterestfortheteacher

This is then punctuated and connections are made to turn the raw data into information. This can be achieved in many ways; Weick divides it into equally spaced words:

James while John had had had had had had had
had had had had more interest for the teacher

The punctuation provides words but no meaning. He therefore tries unequal spacing:

James while John had had had had had had h
ad had had had had more interest for the teacher

Unequal spacing suggests there may be connections between the words. The connections are explored using punctuation marks in place of the unequal spaces resulting in a meaningful causal sequence:

James, while John had had “had had,” had had “had.”
“Had had” had had more interest for the teacher.

In this way, John has produced an increase in the teacher’s interest. However, the punctuation can also be changed to:

James, while John had had “had,” had had “had had.”
“Had had” had had more interest for the teacher.

The meaning is now changed so that James is the cause of the teacher’s elevated interest.

The above example shows the arbitrary nature of enactment, within which one approach to punctuation can be as plausible as another. The punctuations are also consequential: as was seen in the example, each set of punctuations produced a very different outcome. The connections formed as the raw data is transformed into information become causally linked, not due to James and John’s possession of “had had” or the teacher possessing a level of interest, but because they are extensions of the individual’s actions of bracketing and parsing.

Looking back to the similarity between this sensemaking process and the earlier discussion on the nature of data, information and knowledge, the suggestion by Klein (2009) that the data-information knowledge hierarchy and its reverse hierarchy might each have a different status presents a further similarity (see Section 2.2.2). Just as existing knowledge might be necessary for the selection and integration of data and information (Tuomi 1999), so previous sensemaking might influence the way in which the flow of environmental data is punctuated and bracketed.

Returning to Weick’s analysis of enactment, for a more tangible example, let us consider Jimi Hendrix’s interpretation of Bob Dylan’s ‘All Along the Watchtower’. Written by Dylan as a dark tale concerned with sweeping away society’s old guard, Dylan performed it as a quiet and contemplative acoustic folk song. The notable lyrics conveyed an apocalyptic warning, but the delivery was thin, thus attracting little attention. Hendrix transformed the piece with energy and urgency far more appropriate to its message, into what is widely recognized today as the definitive version, even by Dylan himself. ‘It overwhelmed me, really. He had such talent, he could find things inside a song and vigorously develop them. He found things that

other people wouldn't think of finding in there. He probably improved upon it by the spaces he was using. I took license with the song from his version, actually, and continue to do it to this day' (Dylan 1995)

Weick is convinced of the importance of enactment: 'The only possible raw materials that are available for subsequent parsing and retention, are those materials initially generated and/or bracketed by enactment processes' (Weick 2006, p. 187). Therefore, the way that an individual or organization engages in the enactment process determines the environment and what will be known. The data is structured into a story, created according to individual inclinations.

It was seen in Section 2.2.5, that D'Eredita and Barreto (2006) considered the notion of punctuation and bracketing to be an essential element in the process of tacit knowledge proliferation. Their proposal will now be described in more detail. The authors expand the work of Tsoukas (2003), who suggests that tacit knowledge proliferates by a process in which individual interpretation draws attention towards specific portions of a background consisting of 'numberless experiences', which become linked together and are then shared. For D'Eredita and Barreto (2006), this does not sufficiently explain the mechanism for the process. They suggest that tacit knowledge is constructed according to Weick's (1995) punctuation and bracketing, and that what Tsoukas (2003) refers to as numberless experiences are more correctly Weick's (1995) sensemaking episodes that are linked together. The authors describe the episodic process of tacit knowledge proliferation in terms of a driving instructor and student. The student initially focuses upon the mechanics of the car, how to put it into gear, then how to operate the clutch and accelerator together, the brake, setting new goals as experience is gained. The instructor, an experienced driver, refocuses from driving back to the mechanics of the car, reflecting upon his or her past experiences, in order to teach the student. Both construct new episodes relating to previous episodes and express tacit knowledge through action. The usefulness of past episodes to the construction of new episodes is dependent upon the similarity between past and present goals, stimuli, interpretation of those stimuli and response to the stimuli. The discrete episodes relate together to form a flow of experience dependent upon the amount of overlap between these characteristics. The student will have relatively little overlap and much of what is constructed will be new episodes, whereas the instructor will be able to draw extensively upon past episodes concerning how to teach a student to drive.

D'Eredita and Barreto (2006) suggest that in such master/apprentice situations, the presence of the master increases the likelihood that the apprentice's experiences will

lead to construction of new episodes, as a result of the master directing the apprentice's attention to the appropriate stimuli and helping to relate episodes in ways that bring previous experience into play. The master easily recognizes the relationships between intended goals and actions. In the absence of the master, the apprentice works in a trial-and-error fashion as he or she has less knowledge of these relationships, and will require more experience and perhaps an element of luck, in discovering what they are and thus developing tacit knowledge (D'Eredita & Barreto 2006, p. 1828-29).

This proposal contributes to the debate on how tacit knowledge proliferates by suggesting that sensemaking might be the central mechanism. In characterizing tacit knowledge as episodic in nature and to be the outcome of sensemaking episodes, the authors situate the singular and isolated concept of tacit knowledge within a more social paradigm, and it is this social characteristic of sensemaking that will now be discussed.

2.3.3.1.4 Sensemaking as a social process

Sense is made according to the actual, implied or imagined presence of others: we exist within networks of shared meanings.

Sensemaking does not happen in isolation from other people. It is dependent upon others, whether they are present or not as, at some point, others will interpret the actions we take as a result of our sensemaking. 'Sensemaking is never solitary because what a person does internally is contingent on others. Even monologues and one-way communications presume an audience. And the monologue changes as the audience changes' (Weick 1995, p. 40).

Weick's (1995) view of sensemaking as a social process draws on symbolic interactionism, which suggests that people act towards each other and elements within the environment on the basis of the meaning that particular people and things have for them. Those meanings are derived from social interaction and are modified through individual interpretation. When one person responds to another, the response is not made directly to that person's actions, but to the meaning attached to them (Blumer 1969). Thus, human interaction is mediated by interpretation of one another's actions, and people's actions are dependent upon how they individually define situations. Through the meanings used and created from social interactions, people construct their world and their reality.

A great deal of social interaction and sensemaking takes place through discourse or conversation and, as was seen in Section 2.2.8, narratives or stories, as part of such communication, are widely used as a means of sharing or transferring knowledge and helping people to make sense of their world. ‘Any set of events that can be sequenced and related can also be narrated: stages in the growth of a plant, the progress of a disease, the painting of a picture...’ (Scholes 1981, p. 205). From a sensemaking perspective, stories structure events and connect them in a causal sequence. The construction of a story parallels the making of sense: as people look back on events, punctuation and bracketing bring coherence to a flow of unstructured environmental data; the retrospective nature of sensemaking (see Section 2.3.3.1.2) edits and reconstructs so that the sequence of events lead to a seemingly inevitable outcome; and just as a story relates a series of events to a plausible outcome, so a plausible sense of meaning is developed from a sequence of data (to be discussed in Section 2.3.3.1.7).

In addition to connecting events initially perceived as random into a causally related sequence, stories help people to make sense by bringing together what is known of a situation with what is assumed, so that the assumptions may be cognitively tested. Also, hearing stories of others’ experiences helps people to understand what might be happening when ongoing sensemaking is interrupted, thereby reducing arousal and disruption to the current project. In this way, stories help to make unexpected events expected so that when they occur they can be managed more easily.

Weick (1995) notes that while the development of shared meaning is extremely significant to social sensemaking, it is all too frequently considered to be the only means by which social sensemaking is brought about, and is assumed to be central to the process by which people act together to pursue common goals (Weick 1995, p. 41). Weick argues that sensemaking as a social process also takes place when people take organized, coordinated action, even though they may each hold differing meanings for the experience. ‘That is, organization members may have different reasons for undertaking the action and different interpretations of the action’s potential outcomes, but they nonetheless act in an organized manner’ (Donnellon, Gray & Bougon 1986, p. 44). Blumer (1996) is in agreement with this view, suggesting that aside from sharing values or meaning, people may participate in joint actions, for example, to reach a compromise, or being pressured into taking a particular action, or seeing no alternative choice. Whatever the reasons, the actions become sensible as they help people to achieve their goals and may proceed to become established routines or procedures.

Czarniawska-Joerges (1992) supports the idea that rather than a shared meaning, it is the experience of the common action that is important to sensemaking, and the shared experience may have a different meaning for each person involved. As Blumer notes, 'In very large measure, society becomes the formation of workable relations' (Blumer 1996, p. 76), which reflects the practice based or social-constructionist view of what is considered to be knowledge as '... the outcome of particular social practices that have come to be established, and through which the world is represented' (Tsoukas & Mylonopoulos 2004, p. S3).

The notions of shared values and shared meaning imply a shared sense of reality, which underlies the idea of group mind. Group mind should not be confused with groupthink, which relates to group efforts to minimize conflict and reach consensus, and which will be discussed briefly here to clarify the differences between the two concepts.

2.3.3.1.4.1 Groupthink

The psychologist Irving Janis carried out extensive research into groupthink in a wide range of contexts; social, occupational and political, notably investigating the dynamics of groups responsible for the Bay of Pigs invasion, the intentional escalation of the Korean War and other groups whose decisions have had catastrophic outcomes. He described the concept of groupthink as '... a mode of thinking that people engage in when they are deeply involved in a cohesive in-group, when the members' strivings for unanimity override their motivation to realistically appraise alternative courses of action' (Janis 1972, p. 9), so that they continue with their present activity and preserve their original decision. The more closely aligned the education, occupation and outlook of the group members, the higher the potential for groupthink to occur. But the focal characteristic is group cohesion. Groups that are highly cohesive are thought to be more likely to engage in groupthink as they have often developed ways of working together that involve shared meanings and understandings, so that much of their communication is achieved through commonly understood actions and in-group language, such as the terse storytelling discussed in Section 2.2.8. This does not imply that groupthink is inevitable in a cohesive group, as Janis (1972) proposed certain other features that must also exist. These combine to form a five step causal model comprising groupthink antecedents, concurrence seeking, groupthink symptoms, defective decision-making and poor decision outcomes.

Janis (1972) considered that in addition to high group cohesion, certain conditions were necessary to the formation of groupthink. Termed groupthink antecedents, these conditions were defects in the group's structure, such as a lack of procedural norms,

leader bias and group isolation; and a provocative operational context that might result in stress and reduced efficiency, such as difficult decision tasks or recent failures.

In concurrence seeking, members perceive a group need and take action to support it. In this situation, the drive to align with the group position is such that a member will openly be in support, even if privately disagreeing. This may be strengthened by the presence of a charismatic leader attracting approval and admiration from the group members, and thus able to influence the group's agenda with little effort, perhaps acting quickly so that there is no time to discuss any potential problems with the chosen strategy.

The leader does not need to be overtly dominant and may in a sense be perceived to be encouraging debate, while in reality is pursuing a preconceived goal. For example, he or she may create a setting in which outsiders are invited to present alternative courses of action, then call for individual group members to each state their opinions. It is difficult for group members to openly support an alternative as it directly opposes the group consensus. As each member restates support for the original decision, it becomes increasingly difficult for those remaining to give a different view.

Leaders engaging in such manipulation are not necessarily malevolent and the actions of the group members may reinforce and encourage their behaviour. However, modern history provides many examples of a leader's singular opinion combining with this 'docility fostered by suave leadership' (Janis 1972, p. 43) to produce a crisis. As concurrence develops, the tendency towards groupthink '... can operate like a low-level noise that prevents warning signals from being heeded' (Janis 1972, p. 37), so that each members' attention is selectively drawn towards information and messages that support the group feeling and its selected action, encouraging confidence and optimism, and those that do not are disregarded. A 'we-feeling' (Janis 1972, p. 37) is created so that the members feel a sense of belonging to a group that is capable, will protect them, and in some way will enhance their joint and individual potential. This enthusiasm and confidence might be beneficial to perhaps a sports team, but as critical thinking becomes diminished, in a group making decisions on medical research or government policy, for example, it can be significantly detrimental.

Once concurrence is achieved, the group presents symptoms of groupthink including collectively rationalizing their behaviour, increased pressure to conform, an illusion of unanimity and certainty, and a conviction that the group preference is the right way forwards.The consequences of groupthink symptoms are group bias, failure to fully

consider objectives, poor information seeking, limited consideration of alternatives, and lack of contingency planning. In short, the group fails to process information effectively. The previous stages in the causal model produce defective decision-making processes, which result in poor decision outcomes.

Groups displaying groupthink do not always reach an incorrect decision. Janis (1972) acknowledges that such groups may be pursuing a decision that is actually correct, reached perhaps by chance. It is the way that the group manages information that is faulty.

A number of authors comment upon Janis's (1972) theory. Whyte (1989) suggests that additional consideration should be given to the way a group structures the decision being dealt with and its tendency for risk-taking. McCauley (1998) reinterprets the groupthink theory, proposing that poor decision-making is more probable when group cohesion is founded on the personal attractiveness of its members. From this perspective, open evaluation of information and ideas is inhibited as it necessitates criticism, which is interpreted as criticism of the individual setting out the information and ideas, and thereby posing a threat to the group. Authors including Henningsen *et al.* (2006) and Park (2000) argue that there is little evidence to support the identification of groupthink in laboratory studies. However, many of the studies referred to examine only discrete parts of the groupthink theory rather than the overall concept. Also, as will be noted in the discussion concerning the use of scenarios in research (see Section 2.3.4.1), Janis (1972) developed his theory from observations of critical decisions taken within a global political arena and however carefully staged, researchers cannot be sure that they have achieved the required level of commitment to the experiment when working with paid college student recruits. Finally, Henningsen *et al.* (2006) argue that as the groupthink theory was developed from looking back at decisions with catastrophic outcomes, the development process itself was subject to retrospective sensemaking (see Section 2.3.3.1.2), producing '... an illusory correlation among the groupthink symptoms because of retrospective sensemaking occurring when individuals have evidence (of) a poor decision' (Henningsen *et al.* 2006, p. 36).

2.3.3.1.4.2 Group mind

Returning to group mind, Weick and Roberts (1993) develop their view of this concept from three studies concerned with describing the mechanisms by which group mind operates. Firstly, Wegner, Giuliano and Hertel (1985) suggest that those engaged in close relationships enact a single transactive memory system, a structure in which the actions of individuals are connected, but each has differentiated responsibility for remembering particular portions of the joint experience. It is the locations of these

portions that are known, rather than the details of the entire common event, and those involved rely upon one another to contribute the details for which they are responsible, which then cues their own contribution. As the basic, lower order and disparate details are shared or transferred, higher order generalizations, themes and ideas are developed (Wegner, Giuliano & Hertel 1985, p. 268). In this respect, the process that these authors describe might be considered to reflect the development of the data-information-knowledge hierarchy, previously discussed, so that the effective performance of such groups might be attributed to effectively sharing tacit knowledge. But what is important to Weick and Roberts' (1993) thinking is that Wegner, Giuliano and Hertel (1985) conclude that group mind is not dependent upon shared meaning, attitudes or understanding, but is more concerned with the communication processes between group members.

The second study is derived from the view of organizations as entities that are capable of thought; networks of organized, connected activities that parallel the organization of neurons in the brain. Sandelands and Stablein (1987) suggest that organizational concepts and ideas are encoded in the connected activities, as concepts and ideas are encoded by connected neurons within the brain. This gives rise to the idea of an organizational mind and intelligent processing. The authors propose that organizational mind develops from the connections between the activities or behaviours, rather than connections between people, so that intelligence is located in behavioural patterns rather than individual knowledge.

The third study concerns the coordination of action within teams. Hutchins (1990) suggests that effective group performance depends upon members having task knowledge that overlaps with each other. This flexibility allows each member access to a number of parts of the process if there is a disturbance in its usual operation. The global structure of the group's activities then arises from the local interactions of its members.

2.3.3.1.4.3 Heedful action

Informed by these studies, Weick and Roberts (1993) develop their own proposals on the concept of group mind. The authors consider that the way in which the connections are made is more important than the strength of the connections, and also view group mind as an activity rather than an entity. They emphasize this by using the term *collective mind* rather than *group mind*. *Collective* infers individuals who interrelate their actions so that they behave as a group. The individuals contribute to the collective mind, but the collective mind is distinct from the individual mind as its

existence is within the pattern of interrelated actions of a number of individuals (Weick & Roberts 1993, p. 360).

‘‘Mind’ is not the name of a person, place or thing, but, rather, is a dispositional term that denotes a propensity to act in a certain manner or style’ (Weick and Roberts 1993, p. 361). Heedful action is recognized by characteristics such as alertness, paying attention, carefulness, consideration and vigilance. It is of importance to operations requiring error-free performance, such as the HROs described in Section 2.3.2, which are able to correctly anticipate unusual events and take action to deal with them, unlike organizations that are more tolerant of errors. Heedful action arises from the intelligently interrelated behaviours of all those involved, ‘... the outcome of training and experience that weave together thinking, feeling, and willing’ (Weick & Roberts 1993, p. 362). It is much more complex than the performance of well-rehearsed procedures and habitual, repetitive action, with each performance a replica of the last. In such situations, all is well while everything in the environment remains stable and as expected, but when an unusual event occurs performance deteriorates, as there is no procedure to deal with it. In heedful behaviour, each action is modified by the previous action so that learning continues to take place and unusual events are accommodated.

To act heedfully requires each person to have a representation that includes the actions of others and how they relate to themselves. This is achieved by envisaging the social system of the joint actions. When the representations of each person become structurally similar, their respective actions converge so that they interrelate to assist and support one another appropriately. The actions are carried out by individuals, but within the framework of a socially structured context. When interrelating begins to break down, people begin to focus on their own local situation and the presence of others in the joint representation becomes less clear. They attend to their own actions, but not with respect to how these impact upon others, so that people and activities are not attended to. Errors are dealt with more slowly and there is less understanding of how events may develop and their implications. This deterioration, heedless interrelating, creates an environment in which small errors may combine and produce a disaster.

Weick and Roberts (1993) illustrate heedful interrelating with the account of a pilot’s experience after landing on an aircraft carrier at night. The example also demonstrates the importance of this form of sensemaking to HROs. The pilot could sense from the movement of the light wands used by the taxiing director signalling him that there was some urgency. He understood this to mean that another incoming aircraft was close behind, and the deck crew needed to get him into place as quickly as possible. The

director signalled that he should follow him, and the pilot taxied the plane to the furthest point of the bow. Moving the plane into position necessitated the director guiding the pilot to turn so closely to the edge of the flight deck that the cockpit swung over the edge of the deck in an arc. The pilot could see nothing but the darkness of the water below. The pilot and taxiing director both knew what they were doing but that alone did not keep the plane from falling off the deck. What is important to heedful or mindful operation is the ability to notice any event, however small, which might indicate a problem, and the collective capability to take action to prevent that problem. 'The interrelating of their know-how keeps the plane on the deck. A command from the director that is not executed by the pilot or a pilot deviation that is not corrected by the director are equally dangerous and not controllable by either party alone' (Weick & Roberts 1993, p. 370). While the activities of taxiing and directing are heedfully interrelated, they remain error-free.

Weick (2006) suggests that collective sensemaking and heedful behaviour within groups are maintained by narratives. As a means of communicating knowledge about a group's values, beliefs and ways of operating (see Section 2.2.8), narratives play a significant role in orientating newcomers, helping them to make sense of their new environment. The activity of narrating to newcomers also refreshes and reinforces the meaning of the stories to the group members telling them. At the same time they are reminded of features that may have been forgotten, thereby increasing the number of examples of heedful action that they might reflect upon, and continuing sensemaking as a social process (Weick 2006, p. 269).

2.3.3.1.5 Sensemaking as an ongoing process

Sensemaking is a continuous process that we are always in the middle of, constantly updating ourselves.

Weick (1995) considers sensemaking to be an ongoing process, having no absolute start or end points. We are always in the middle of something that, according to the retrospective nature of sensemaking, only becomes something when we can look back at it. This happens when we put boundaries around a portion of the flow of events. These portions then flow into the past and our current sensemaking is influenced by both the actual past events and by the speed at which they become past events, and interpretations are outdated.

The things we are in the middle of are the projects referred to in the discussion on retrospection. We attempt to untangle the complexity to understand what is happening, by constantly making and revising our assumptions. This is not a

monotonous stream of action. The flow is interrupted by events, which may be as varied as routine meetings, software upgrades or the appointment of a new team member. Even if not important in themselves, the significance of the interruptions is that by triggering new sensemaking, they enable the formation of meaning and provide a focus for ongoing activity so that progress can be checked, changes in courses of action may be commenced, new stories begin to circulate and individual and organizational identities are confirmed.

The interruptions initiate activity in the autonomic nervous system causing arousal; a warning that something is happening requiring action to be taken. When the current activity is ongoing, for example in the case of well-rehearsed operating procedures, the interruption breaks the expectation of what is happening and disturbs sensemaking. The interruption is an important environmental change, initiating arousal, the fight-or-flight response, and eliciting an emotional reaction. If there are a number of perceived ways to complete the sequence of procedures, then the level of arousal will be lower than would be the case with limited options, in which case completion becomes more critical and might also make greater demands upon attention, skill, time and other resources.

From this, Weick suggests that those who are able to improvise and organizational generalists might display less extreme emotional reactions. They will have more substitute behaviours at their disposal with which to complete the activity than those who are more focused and less flexible. The longer it takes to find a solution, the higher the arousal and stronger the emotion, often resulting in anger. But if the interruption has a positive effect, people are more likely to feel pleased. This may be due to the sudden and unexpected removal of the interrupting stimulus, an annoying colleague for example, who is moved to a different office. It may also be due to an unexpected acceleration of events leading to completion of an activity before the anticipated time. Weick uses the example of submitting a manuscript to a journal that is immediately accepted for publication, without the anticipated revised drafts. The acceptance is unexpected and the interruption is received positively (Weick 1995, p. 47).

The different outcomes of interruptions will result in varied emotions and people remember events which have the same emotional feeling as those they are presently experiencing (Snyder & White 1982). For example, if someone feels angry about an interruption, previous events with similar feelings of anger will be enhanced, and when he or she looks back to past events to make sense of what is currently happening,

those associated with anger will dominate, influencing the current interpretation being made.

The conditions supporting positive emotions are not frequently found in organizations. People have limited control over the interruptions that take place. Also, as time passes people develop a larger portfolio of negative interruptions to draw upon due to life experiences such as the imposition of new work legislation, reorganization, disagreements or redundancy, and the achievement of projects is often slowed down, for example by budgetary restrictions or increased workloads, rather than accelerated.

Weick (1995) refers to two types of interruption, which are defined in the work of Mandler (1984). The first is an unexpected event that is incongruous with the current, ongoing sensemaking. The second is the non-occurrence of an event that was expected to take place. Both represent disruptive, unusual events, preventing the current activity or thought processes from being completed and triggering the autonomic nervous system, as described above (Weick 1995, p. 101). Autonomic nervous system activity draws upon the capacity for processing information, which in turn reduces the efficiency of complex thought processes. This is due to the autonomic activity signalling a threat, so that attention then becomes focused on the interruption, reducing the number of cues that can be attended to from whatever was in progress when the interruption occurred. This can assist performance by focusing attention on what is considered to be important and ignoring peripheral cues. However, if the threat is not dealt with there is continued arousal, which becomes consciously acknowledged, demanding increased attention. Cues of importance to the interrupted task or activity are then overlooked and cognitive ability is further impeded. In such circumstances, recently learned responses and sensemaking processes are discarded in favour of those previously learned and more familiar, even though outdated (Weick 2006).

The amount of autonomic activity depends upon the level of organization of the actions being carried out at the time of the interruption; interrupting a highly structured, habitual process will result in a high level of autonomic activity. It is also influenced by the severity of the interruption, for example, whether there is a high degree of external pressure to complete the activity. Consequently, interruptions initiate arousal, which draws upon attention and reduces the number of cues that can be attended to for sensemaking.

As people continue to bound ongoing events, keeping pace by continually updating actions and interpretations, and managing interruptions, then sensemaking continues.

But once a person loses the ability to do this, sense begins to break down (Weick 2006).

2.3.3.1.6 Sensemaking and cues

To make sense of a situation, an environmental cue is linked to a general idea of what might be happening. There is then an interplay between the cue and environmental conditions, or the context of the situation, in which the meaning of the cue is clarified, which in turn redefines the explanation of what is happening, and guides the identification and interpretation of further cues. In this way, we develop a larger sense of what is happening from a small point of reference.

In sensemaking, people extract cues from the environment; simple, familiar reference points from which new meaning can be developed. The cues are not the new meaning in themselves, but are constructions generated by people attempting to understand situations. They are indicators of a course of events with particular consequences. Weick (1995) uses the example of an acorn as a cue. In interacting with its environment in the form of earth, air, water and so on, the consequence of an acorn is likely to be an oak tree. The acorn specifies the type of tree but not details such as branch formation or number of leaves, as these are linked to local conditions. It is an intention leading to a course of action, which is expressed in one of numerous ways, identified through interaction with its environment.

What is extracted as a cue and how it is interpreted is context-dependent and is derived from our knowledge and expectancies (Klein *et al.* 2005). For example, the feeling of a hand on one's shoulder will have an acutely different impact and meaning when experienced at a crowded music concert than when walking alone, late at night. Starbuck and Milliken (1988) suggest that cues are selected by noticing, which involves an unconscious, creative process of filtering, classifying and comparing great amounts of data. The ongoing nature of sensemaking is influential here. It was seen in the previous section that people actively strive to diminish ambiguity in order to construct an ongoing world that is '...less unique, more typical, more repetitive, more stable, more enduring' (Weick 1995, p. 108), and in order to achieve this, cues may be unconsciously filtered out. For example, returning to Brown's (2000) analysis of inquiry sensemaking, the colleagues of Beverley Allitt did notice that she was present at each of the incidents at which a child collapsed, 'Indeed, some of them teased her as an agent of bad luck' (Brown 2000, p. 61), but none of them attached any significance to her invariable presence. It is reasonable to suggest that in most professions, colleagues do not generally arrive at work each day with an expectation that one of their number may well be intending to carry out professional mal practice, and the

healthcare staff at Grantham Hospital did not have the expectation of a staff member harming patients against which to consider each others' behaviour.

An interesting element of inquiry analysis is the selection of labels used by those involved in various incidents. The two teenagers involved in the Columbine Crisis, for example (see Section 2.3.3.1.2), were readily termed *murderers*, by official sources and public commentators. It can be seen from Brown's (2000) analysis of the Allitt inquiry shows that use of the term *murderer* was largely confined to a sector of the press and public. The reluctance of the Department of Health and Allitt's colleagues to use the term might lie within the influence of identity, in that they were averse to acknowledging that one of their number might intentionally inflict harm upon a patient.

Daft and Weick (1984) view the cue selection process in terms of scanning, implying a more structured, intentional and strategic operation. From this researcher's perspective, the co-existence of both processes would be completely acceptable, contributing to our knowledge of the mechanisms involved when moving from the ongoing flow of sensemaking by which we understand our world in a general sense, to the deliberate, intentional sensemaking that is the concern of the data/frame theory, to be described in Section 2.3.4.

The ability to exert control over the selection of cues used by others influences their sensemaking and thus confers significant power over how a group, team or organization functions. A talented leader, for example, might highlight certain cues in successfully pursuing a new strategy, or a dominant team member might draw the team's attention towards what he or she perceives as negative effects of a new software programme, so that its implementation is compromised. Boreham *et al.* (2000), in a study of clinical risk in hospital emergency departments, recount an incident in which a junior doctor acted against her initial decision to carry out further tests on a newly admitted patient and, as the patient was rapidly deteriorating, proceeded with a course of treatment suggested by the ambulance crew and the way they had handled the patient, and by particular drugs that were being prepared by the charge nurse. The suggested diagnosis was incorrect and the drugs were administered unnecessarily. This incident illustrates the influence of both cues and identity construction in sensemaking. The doctor, who had only recently joined the department and was working her first night duty shift, made sense, although incorrectly, of cues drawn from the signs and symptoms presented by the patient, the actions of the ambulance crew and charge nurse, and the particular drugs that had been prepared.

She confirmed this sense by locating herself in a junior role, deferring to the actions of people with greater experience in their own roles.

Hughes (1988) provides further similar examples, although in these instances there are favourable outcomes, in which nurses direct the attention of junior doctors, experienced doctors beginning work in a new speciality, and doctors with 'rusty' skills, using cues to influence their actions and sensemaking. Further studies by Hughes (1989) identify how emergency department reception clerks exert significant influence over patient processing by the presentation of particular cues, and how they edit and communicate what they know about a patient to other staff, while remaining within the bounds of responsibility for their role.

Expertise is influential in enabling the identification of subtle cues that may be ignored or go unnoticed by a novice or most other people. With expertise comes the ability to generate expectancies, tying events together to construct a story or causal framework of a situation. This is essential in detecting the absence of a cue that was expected to occur, perhaps an event in a process that does not take place, alerting us to a possible problem that needs to be made sense of.

The importance of expertise is confirmed in operational studies by Klein *et al.* (2005) revealing that identifying subtle cues is not simply a matter of discriminating them from a range of data, but also involves making connections by which patterns can be recognized. The authors give the example of a student nurse who noticed that a baby's skin was mottled and decided that this was due to the baby being cold. An experienced nurse also noticed the appearance of the baby's skin, linked this with various other subtle signs, asked for further investigations, and the baby was found to have a serious infection. The student had seen all of the signs noticed by the experienced nurse but had responded to them superficially, increasing the temperature in the baby's cot for example, being unable to connect the signs in a meaningful way (Klein *et al.* 2005, p. 15).

However, conducting a search for a pattern will not necessarily result in finding one, as noted in Brown's (2000) analysis of the report concerning Beverley Allitt (see Section 2.3.3.1.2). It may be that the search for a pattern has been initiated before any recognizable pattern has been developed; the search may be guided and restricted by constructs such as professional guidelines and particular interpretive routines so that elements leading to the identification of a pattern are not considered; and highly complex environments with time pressures may impede attempts to understand what is happening (Allard-Poesi 2005, p.186).

Similarly, having expertise does not guarantee that cues will be identified. The concept of inattentional blindness refers to instances in which there is a failure to see highly visible objects that are being directly looked at, while attention is directed elsewhere (Mack 2003). Examples of the impact of this concept upon sensemaking include experienced pilots engaged in training using flight simulators who, while attending to the numerous instruments on the display console, proceed with the simulated landing, even though there is a clearly visible airplane blocking the runway (Mack 2003, p. 180). Interest in the phenomenon, which occurs in visual, auditory and tactile contexts, has led some researchers to consider that what may actually be occurring is a form of inattentional amnesia, whereby an unconscious or implicit level of perception takes place outside of awareness.

Using magnetic imaging techniques, there is some evidence of similar neural processing for stimuli that are attended to and seen, and for stimuli that are not attended to and not seen, although the level of activity is much higher in the former instance (Mack *et al.* 2002; Scholte 2001; Wolfe 1999). This is an intriguing area of research, but further investigation lies within the domain of cognitive psychology and is outside the sphere of this thesis.

Within the context in which sense is being made, the cues extracted from the environment can be anything that is unusual or unexpected, but need not be large in scale to have a significant impact on sensemaking. Weick (1995, p. 53) asserts that 'faith' in the cues and upholding their use as reference points helps to link environmental elements together. Enactment, as discussed previously, then strengthens that faith; the cues give rise to action, which in turn facilitates sensemaking, which then enhances belief in the cues. This view is very similar to the pragmatist perspective that the strength of a person's belief in their actions is related to their success in achieving their goals (see Section 2.2.6.2). For Weick, this belief-driven sensemaking process gives meaning to the term *self-fulfilling prophecy*. 'Once we think we know something, we search for information that is consistent with that belief. Seek and ye shall find' (Langer 2009, p. 14). The anticipated consequence of an extracted cue is strengthened by the sensemaker acting intentionally and with belief. With ongoing sensemaking, the judgements upon which the cue was initially extracted are adjusted, impacting upon the expected outcome, which in turn impacts back on why the cue was extracted. The two elements are informed by and shaped by one another, so that the anticipated outcome and the action converge.

The consequence of this is that sensemaking is not necessarily a precise process and leads Weick to the possibility that in sensemaking, '... when you are lost, any old map will do' (Weick 1995, p. 54). He illustrates this with an often-used example of soldiers finding their way back to base camp after being stranded for three days in thick snow, using a map which was later found to be of a completely different mountain range to the one in which they had become lost. The leader's key role was to instil confidence and motivation so that the soldiers moved off in some reasonably sensible direction. This purposeful activity enabled them to notice new environmental cues so that they could update their sense of location, and their faith in the cues they acted upon led them to further action, noticing more cues, more updating, more sensemaking. This example shows the resourceful manner in which people can manage data in order to make sense, and links to the seventh and final of Weick's sensemaking characteristics, that a plausible interpretation of events is more important than one that is accurate.

2.3.3.1.7 Sensemaking and plausibility

A credible, socially acceptable account of things that enables action is often more important to sensemaking than an accurate account, which might incur delay and personal or organizational threat.

According to Weick (1995), sensemaking is not necessarily dependent upon accuracy. People look for accounts of situations that they can believe in and which fit into larger schemas that have meaning for them. Of course, there are instances when accuracy of sensemaking is a significant issue, which usually involve dealing with very specific questions. Outside of these situations, Weick proposes that the very strength of sensemaking as a perspective is that its focus is not objective perception. Rather, it is concerned with plausibility, pragmatism, creativity and invention, within a context of belief in, and ability to deal with, whatever is relevant to the current goal.

In support of Weick's argument for plausibility, Sutcliffe's (1994) study of senior executives concluded that in some instances, inaccurate perceptions could have positive outcomes. By failing to appreciate the full, objective impact of a particular goal, it might appear less daunting and persuade even those inclined to inertia into taking action. That action in itself can facilitate the enthusiasm and confidence required for success.

The dominance of plausibility over accuracy relates to the action orientation of sensemaking. Weick (1995) provides several reasons to explain this. Firstly, people need to alter and filter the cues they use for sensemaking according to the situation they are engaged with, otherwise there would be far too much incoming data for them

to deal with and act upon. Also, sensemaking involves the elaboration of cues and each cue can have many meanings and levels of significance in various situations. When faced with multiple cues with ambivalent meanings, it is important for the sensemaker to begin making sense in some plausible way, to make a start on an interpretation, rather than waiting for the *ultimate* interpretation to arise. Following Weick's argument on the retrospective nature of sensemaking, waiting for the *ultimate* interpretation is in any case futile: the experiences and frameworks that the sensemaker brings to bear on any situation are reconstructions and thus not precise representations. At best, the present situation can only be similar to an interpretation of a past event, rendering accuracy meaningless.

Speed of action is often required when faced with new situations. A great deal of organizational action is time critical and a delay incurred by making a detailed examination of a situation in search of accuracy may be extremely costly to the organization and the individual. Making an accurate interpretation may be less important than a plausible explanation that gives reasonable order and prompts action. Also, by responding quickly to circumstances, events may be shaped in a manageable way, before some other meaning has been able to develop.

Weick's final reason reflects the notion of identity construction in which people construct that which constructs them. People find meaning in the things they believe they can do something about and reject cues that they do not have the capability to deal with, so that accuracy is again compromised. However, courageous action taken by a sensemaker who is confident in his or her capabilities can shape the environment so that it needs those particular capabilities. This bold sensemaker, in Weick's words, '…comes close to perfect accuracy' (Weick 1995, p. 60).

Lundberg (2000) studied professionals within the financial sector, such as senior level stock market traders and auditors, making decisions involving large amounts of money with significant associated consequences. They do this knowing that their decisions are based on incomplete information. The author says that 'Traders and other actors in high risk/volatile environments must excel in the process of finding plausible explanations for a given set of data' (Lundberg 2000, p. 694). Healthcare staff, including the junior doctors at the focus of this research, operate within such a context and deal with uncertainty on a recurrent basis. The author's findings are therefore of interest.

Lundberg (2000) proposes that the mechanism by which sensemaking is driven by plausibility rather than accuracy, is abductive reasoning. The author gives the following example to describe abductive reasoning:

> 'Major premise: IF my daughter's temperature is over 38ºC,
> THEN I will not allow her to go to school.
> Minor premise: She did not go to school today.
> Conclusion: Her temperature was over 38ºC'
> (Lundberg 2000, p. 702)

This example demonstrates what Lundberg (2000, p. 702) terms the 'opportunistic nature of abduction', as the daughter may have stayed away from school for other reasons.

This is contrasted with deductive reasoning, in which an outcome is derived from true assumptions, and inductive reasoning, in which an outcome is inferred from observation. In deduction, given the assumption that the sum of angles in a triangle is 180º for all triangles, if a particular triangle has angles of 90º and 25º, then the third angle can be deduced with certainty. Induction requires empirical evidence, confirmation by sensory experience. The statement 'the river has broken its banks' is invalid until someone goes to find out whether it is true or not.

Lundberg (2000) and Lundberg and Frost (1990) observed that traders frequently changed their minds about how they viewed a market situation in a manner Lundberg describes as 'fickle' (2000, p. 693). They moved from simple forecasting methods to more complex processes, depending upon whether share prices moved in the direction they predicted. If they were correct about the share price, there was no need to continue the sensemaking process. Their selected explanation would be upheld until new information was received that might impact upon that view. The author's explanation is that the traders are making sense 'on-the-fly' (Lundberg 2000, p. 693), to take account of and deal with the vast quantities of incoming information. It is a way of keeping up with changing circumstances.

Albolino, Cook and O'Connor (2007, p. 135) also observed sensemaking 'on-the-fly'. In a study of medical staff in an intensive care unit, the ward round was found to be an exchange for building sense, defining what to do, why and when. The time in between the rounds was where sensemaking on-the-fly was taking place, performing the sense that had been built at the ward round, and evaluating and updating that sense in parallel with the real time pace of work.

Returning to Lundberg (2000), he suggests that the trader fickleness, or sensemaking on-the-fly, is a representation of abductive reasoning, in which '...experts with vast and highly interconnected knowledge structures will consider multiple interpretations of the situation when confronted with fuzzy or ambiguous information' (Lundberg 2000, p. 701). This explanation could be equally applied to the medical staff in the study conducted by Albolino, Cook and O'Connor (2007).

As was seen in the example of the daughter staying away from school, abductive reasoning may reach an incorrect conclusion. However, the process can quickly limit the amount of data being dealt with in order to find the most plausible explanation for that data at that time, and enable action to be initiated.

The above discussion has shown that the seven sensemaking characteristics are each concerned with action and with context. Each characteristic has its own dynamic, but they are interrelated, with each having implications for the others. Identity construction emerges as the most influential of the characteristics, the foundation upon which our sensemaking is determined. The discussion has also identified similarities between sensemaking processes and those involved in the proliferation of tacit knowledge, suggesting to the researcher a close relationship between the making of sense and Cook and Brown's (1999) notion of *knowing*. Further investigation of the literature may shed more light on this.

2.3.4 The data/frame theory of sensemaking

The literature review will now turn to a theory that is concerned with the processes involved in the deliberate sensemaking that occurs when a person has an intentional need to understand what is happening in a particular situation. As previously discussed (see Section 2.2.7) Ringberg and Reihlen (2008) argue that intentional sensemaking is achieved by the selective application of cultural and private mental models, dependent upon the person's needs, goals and cognitive capacity. Cultural models are easily recognized interpretive frameworks that are internalized and reinforced by shared experience. Private models arise from the combination of cultural models with a person's own cognitive disposition. This researcher suggests that the data/frame theory proposed here by Klein *et al.* (2007) might perhaps be regarded as the mechanism for deliberate sensemaking as it concerns propositions concerning the actual cognitive processes that the authors consider to be involved.

2.3.4.1 Development of the theory

The data/frame theory of sensemaking proposed by Klein *et al*. (2007), originally suggested by Klein *et al.* (2002) in a report supported by the U.S. Army Research

Institute for the Behavioural and Social Sciences, was developed from research in a variety of domains including military operations, fire fighting, nursing, commercial air navigation and anaesthetics. The authors consider that the theory applies to all situations in which people need to deliberately generate an explanation of what is happening. The theory takes what the authors term a *macrocognitive* perspective to reflect the sensemaking carried out by practitioners in real-world situations. Macrocognition involves the mental activities necessary for effective task performance or achievement of goals (Klein *et al*. 2003). This complements the microcognitive perspective of traditional, laboratory-based investigations into the basic elements of cognitive mental processes, such as stimulus recognition, reaction time and attention mechanisms. Macrocognitive research usually takes the form of field studies or studies conducted in real world domains and equates to what is also termed naturalistic research. The essential distinction between macrocognitive and microcognitive research is that understanding is in itself dynamic, not frozen meaning. 'The domain practitioner's higher purpose is not to perceive stimuli, but is, simply put, *to make sense of things*' (Klein *et al*. 2007, p. 114).

Why is this particular theory of interest? The data/frame theory is based on research carried out in a variety of complex domains that depend upon highly reliable operation and, hence, effective sensemaking to support that process. Macrocognitive research has the following characteristics (Klein *et al*. 2003):

- complex situations, often involving high amounts of data;
- high risk or critical situations, often involving time pressure;
- domain practitioners as participants rather than research volunteers;
- ill-defined and multiple or even conflicting goals;
- lack of control over a number of situation variables.

The authors acknowledge the laboratory-based cognitive research and draw on both this and sensemaking research where appropriate, but the orientation of their own work and the focus of the model is that of deliberate sensemaking by individuals in real-world contexts. The above factors relate well to the research context of a clinical shift change handover and also to the purpose of the research of investigating deliberate, intentional sensemaking.

Certain of the research from which the model is developed involved the use of scenarios or gaming simulation, where a simulated environment is created with the aim of eliciting real world behaviour. This introduces an element of caution regarding any inferences drawn from those particular research findings. Scenarios were mainly used in military contexts and to investigate social issues until being introduced as a

strategic business methodology by Pierre Wack (1985a), who reviewed their use by Royal Dutch Shell. One criticism of scenarios is the difficulty of fully engaging participants to the level of motivation they would have in a real world situation (Mason & Herman 2003). This author would add that if the purpose of the scenario is overtly for education, as part of a training programme for example, then certain participants might be quite eager and anticipate instances of whatever is being taught at every turn. There is also the issue of constructing the scenario. 'Scenarios are not developed in isolation, but are fashioned against a backdrop of competing and shared understandings and history, and geopolitical and cultural practices' (Wright 2005, p. 89).

This author suggests that it is possible that these factors might actually lead to the construction of scenarios with very focused intended outcomes, so that rather than '... communicat(ing) environmental uncertainty in a way that results in people seeing their worlds in new and different ways' (Barry & Elmes 1997, p.438), a form of indoctrination takes place.

However, a combination of scenarios and mentoring has been used to identify sensemaking activity (Phillips & Battaglia, 2003) and to demonstrate variation in levels of situation awareness (Baxter, Harris-Thompson & Phillips, 2004) in a range of military personnel. Wright (2005) also writes in support of scenarios, particularly those developed to enhance prospective sensemaking, which is, indeed, the concern of the scenarios that informed certain aspects of the data/frame model. Also, their use appears to have been limited and the particular study could not reasonably have been conducted within an actual battlefield operation. There appears to be a valid case for the use of well-constructed scenarios within sensemaking research, provided that the findings are interpreted within that context and it is understood that they may not be a direct representation of what might happen in a real life situation. The author will make any specific comments relating to the scenarios used as they arise in the discussion of the model.

The interaction between data and a frame is the key element of the sensemaking theory. Klein *et al*. (2007) propose that when people attempt to understand a situation or event, they try to match data, perceived cues or information, with a viewpoint or perspective, some sort of framework drawn from their experience, even if it is poorly constructed or minimal. The data identifies a frame relevant to the situation and the frame determines which data are perceived.

Klein *et al*. (2007) acknowledge the existing literature on frames or schemata and cite authors including Bartlett (1932), Minsky (1975) and Neisser (1976), whose work has influenced their use of the *frame* concept. They define a frame as '... an explanatory structure that defines entities by describing their relationship to other entities' (Klein *et al*. 2007, p. 118), as a map does in locating us in relation to various landmarks, or an organizational chart. It is a mental story constructed from previous experience (Phillips & Battaglia 2003) that can take the form of, for example, a person's medical history notes, describing the development of various signs, symptoms and diagnoses and any causal relationships between them, or the script we follow at a restaurant in which we wait to be seated then order drinks, starter and the main meal.

The frame determines which data items are noticed or selected from all that are available and the data elicits and assists the construction of the frame. The frame guides the search for data and at the same time, each person's portfolio of models or constructs influences which data items are selected for consideration and how they are interpreted. But the frame may also be changed as data items are acquired. The data may provide more detail, adding to the completeness of the picture and providing meaning, or may be incongruous, leading to uncertainty and perhaps selection of a new frame. Data identifies and helps to develop a frame, and the frame filters, defines and makes connections between the data. It is a two-way process in which neither the data nor the frame comes first. They work together, using the frame as the basis for understanding an event or situation. 'Sensemaking is a process of framing and re-framing, of fitting data into a frame that helps us filter and interpret the data while testing and improving the frame and cyclically moving forward to further adapt the frame' (Klein *et al*. 2007, p. 119).

The interactive process between data and frame in an attempt to make sense of a situation parallels the earlier discussion on the data-information-knowledge hierarchy and its reverse hierarchy, in which data and information are structured into knowledge, but knowledge is necessary for the selection and organization of data (see Section 2.2.2). It is also very similar to the interplay between knowledge and knowing proposed by Cook and Brown (1999), in which knowing uses knowledge as a tool, and knowledge is tempered by knowing, the productive inquiry resulting in the generation of new knowledge (see Section 2.2.6.2).

2.3.4.2 Assertions of the data/frame theory

The data/frame theory is developed from a number of assertions. These are listed in Table 4.

1. Sensemaking is the process of fitting data into a frame and a frame around the data.
2. The data are inferred, using the frame.
3. The frame is inferred from a few key anchors.
4. The inferences used in sensemaking rely on abductive reasoning as well as logical deduction.
5. Sensemaking usually ceases when the data and frame are brought into congruence.
6. Experts reason the same way as novices, but have a richer repertoire of frames.
7. Sensemaking is used to achieve a functional understanding – what to do in a situation – as well as an abstract understanding.
8. People primarily rely on Just-in-Time mental models.
9. Sensemaking takes different forms, each with their own dynamics.

Table 4: Assertions of the data/frame theory of sensemaking (Adapted from: Klein *et al.* 2007, p. 120)

2.3.4.2.1 Fitting data into a frame and a frame around the data

Klein *et al*. (2007) view sensemaking as the attempt to balance data and frames. When data is noticed which does not fit the current frame the incongruity initiates sensemaking. This is directed either at the frame, by modifying it or searching for one which is a better fit, or at the data, by searching for new data or reclassifying the current data, which in turn may result in discovering a new frame (Klein *et al*. 2007, p. 120). This is associated with what Weick (1995) describes as '... a continuous alternation between particulars and explanations, with each cycle giving added form and substance to the other. It is about building confidence as the particulars begin to cohere and as the explanation allows increasingly accurate deductions' (Weick 1995, p. 133).

Just as the process of productive inquiry (see Section 2.2.6.2) was seen to have the potential for producing new knowledge through the interplay between knowledge and knowing, so the interaction between data and frame, the data guiding the selection of the frame and the frame directing the identification and interpretation of data, may result in a new understanding or sense of what is happening.

2.3.4.2.2 The data are inferred using the frame

The earlier discussion on the notion of plausibility rather than accuracy in sensemaking (Weick 1995) and the tendency to simplify the world in order to make sense of it (Feltovich *et al*. 1997) are influential here. It is suggested that data elements are not true representations of what is in the world but are constructed, dependent upon each person's experiences and goals, so that people will remember different elements of the same event. Similarly, Ringberg and Reihlen's (2008) proposals for individually mediated cognition, discussed in Section 2.2.7, suggest that environmental information is decoded in a way that is personally meaningful, according to that person's frame of understanding. Thus, an expert and a novice may derive different meaning from the same data element, and also the consultation at which a patient is given a diagnosis of a malignant tumour will be perceived very differently by the patient, by the oncologist and by the patient's relative.

2.3.4.2.3 The frame is inferred from a few key anchors

Following on from the work of Tversky and Kahneman, (1974) and Feltovich *et al*. (1984), that people use certain initial, key data as anchors in the search for additional data, the authors assert that the number of anchors people use when deriving a frame is limited to perhaps no more than three. Support for this may also be drawn from the findings of Oskamp (1965), discussed in Section 2.3.3.1.2, that psychologists fixed their opinions after extracting only eight data items from case notes.

2.3.4.2.4 Abductive reasoning predominates during the process of sensemaking

This assertion of the predominance of abductive reasoning in sensemaking draws on the propositions of Weick (1995) and Lundberg (2000), discussed previously in Section 2.3.3.1.7, that effective sensemaking is more dependent upon plausibility, pragmatism and reasonability, than upon accuracy. If the match between particular data and a frame seems more plausible than the match to a different frame, then the first frame is taken as being the most probable. Research by Phillips and Battaglia (2003) supported this, showing that military Information Operations specialists used abductive reasoning more often than deductive logic to explain situations '… they were more likely to speculate about causes, given effects, than they were to deduce effects from causes. If one event preceded the other (simple correlation) they speculated that the first event might have caused the second. They were actively searching for frames to connect the messages they were given' (Klein *et al*. 2007, p. 125).

Although this research was based on scenarios, it is supported by Crandall and Getchell-Reiter (1993), who conducted observational and interview research with neo-

natal nurses, and Pennington and Hastie (1993), who investigated the role of plausibility in generating mental simulations, which were discussed in Section 2.2.8 as an outcome of storytelling, influential to sensemaking and sharing knowledge. However, Klein *et al*. (2007) observed that in their scenarios the participants were not only actively searching for frames but '... found connections between all sorts of messages, not just the themes we had intended. They seemed unable to stop themselves from seeing linkages and deriving inferences' (Klein *et al*. 2007, p.126). Weick (1995) warns us that people cannot help making sense of things, and it should be noted that the participants were military Information Operations specialists undergoing training to analyze intelligence communications. This may have accounted for some degree of their enthusiasm and perhaps anticipation that the messages would be richly laden with fruitful leads.

2.3.4.2.5 Sensemaking usually ceases when the data and frame are brought into congruence

The authors assert that sensemaking continues while key elements of data or components of a frame remain in doubt. But once a valid explanation has been found for the data and the frame and an acceptable match achieved, there is no further motivation to continue sensemaking and it ceases. 'Thus, sensemaking has a stopping point – it is not an endless effort to grind out more inferences' (Klein *et al*. 2007, p.126).

This is not at odds with Weick's (1995) notion of sensemaking being a continuous process. As noted previously, the data/frame model is concerned with deliberate sensemaking, in which there is an intentional effort to make sense of what is happening.

2.3.4.2.6 Experts reason the same way as novices

This assertion acknowledges the importance of expertise to sensemaking, as identified by authors such as Barrows *et al.* who compared the work methods of physicians and medical students. Klein *et al. (2007)* assert that experts and novices employ similar reasoning processes, but experts perform at a higher level as they have a richer repertoire of frames to draw upon. 'Their (the experts') mental models were richer in terms of having greater variety, finer differentiation, and more comprehensive coverage of phenomena. Their comments were deeper, more plausible, showed a greater sensitivity to context, and were more insightful' (Klein *et al*. 2007, p.127).

The greater repertoire of frames also enabled the experts to make more correct assumptions, draw on more possible routines for getting things done and recognize

more connections between data. They also had a clearer understanding of what had to be achieved in a situation and the ability to view events within the context of that goal.

2.3.4.2.7 Sensemaking is used to achieve a functional and an abstract understanding

Klein *et al*. (2007) assert that experts strive to achieve a functional understanding of a situation, to know what to do in a situation, not just what is going on. The authors look to the work of Chi, Feltovich and Glaser (1981) to support their assertion, who found that in solving physics problems, experts called upon principles they could use in a functional way, whereas novices used very few action-based procedures. The novices could identify the relevant cues, but did not know what to do with that knowledge. This functionality of sensemaking helps experts to think ahead and anticipate future actions that need to be taken. The anticipatory thinking form of sensemaking will be discussed in more detail later in this chapter.

2.3.4.2.8 People primarily rely on just-in-time mental models

The authors describe a mental model as a form that a frame can take, such as a story or a map, as previously discussed, providing a causal understanding of how something works. For example, a person may have a mental model of how to process an expenses claim in an organization, or a mental model of the blood circulatory system. A heating engineer will have a comprehensive mental model of a domestic boiler and radiator system, but while the enthusiastic DIYer or apprentice may have some basic knowledge of the system, theirs will be an incomplete model. If something is wrong with the system, sensemaking takes people beyond their limited knowledge to make inferences and develop some notion of what is happening. This is what the authors refer to as a just-in-time mental model. It is not a model constructed under pressure of time, it is constructed at the time that it is needed. The authors assert that in many instances people rely on just-in-time mental models, building on the causal connections they know about, rather than having an array of comprehensive, fully worked out models of entire systems. The just-in-time models are constructed from fragmentary knowledge drawn from long-term memory to build an explanation of a situation. The quality and quantity of these fragmentary models determine the selection and interpretation of data, so that an expert will have a richer repertoire to apply to unusual events than a novice. Consequently, sensemaking skill is context-dependent (Phillips & Battaglia 2003).

2.3.4.2.9 Sensemaking takes different forms, each with their own dynamics

The authors propose that there are seven forms of sensemaking activities. These are summarized in Table 5, and will be described in the following section.

Connecting data and a frame
Elaborating a frame
Questioning the frame
Preserving the frame
Comparing frames
Reframing
Seeking a frame

Table 5: The seven sensemaking activities

2.3.4.3 The seven forms of sensemaking activities

Klein *et al*. (2007) have represented the sensemaking activities in the data/frame model, an adaptation of which is shown in Figure 4 below.

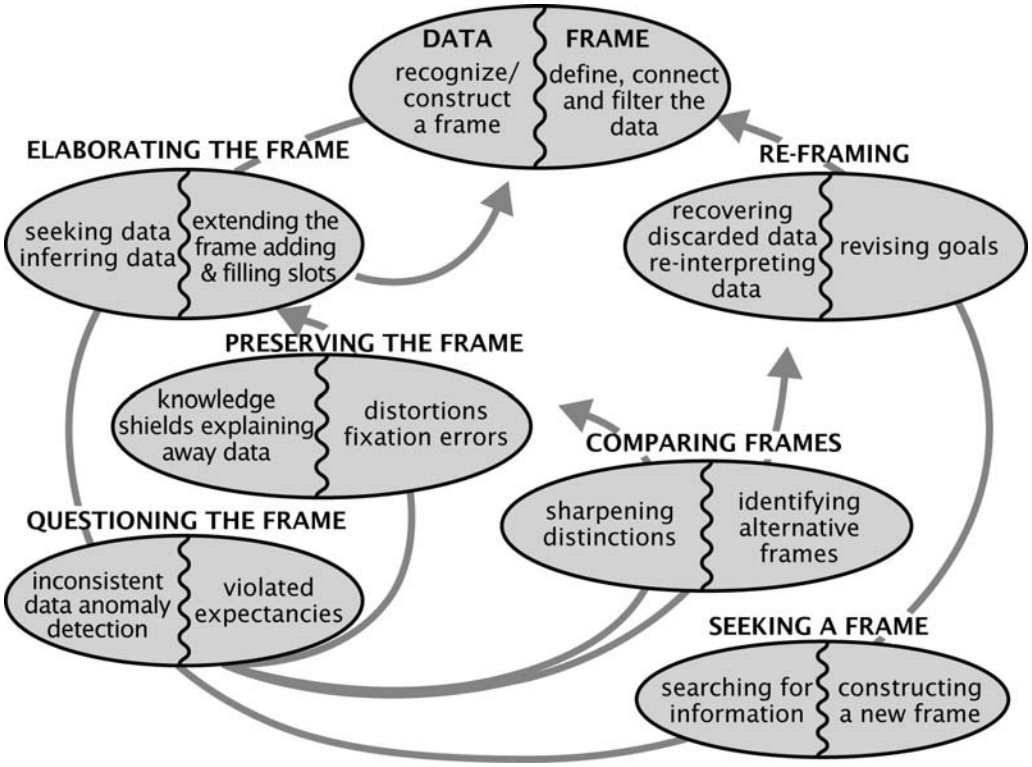

Figure 4: The Data/frame model
(Adapted from: Klein *et al.* 2007, p. 133)

The authors propose that there is no starting point on the model. Sometimes an inconsistency in data will trigger sensemaking. On a different occasion it might be that a person is faced with two plausible frames and has to select one. Also, there is no particular sequence to follow, new data might be identified at any time and any of the activities may be brought into play to manage it. Some situations will involve several

sensemaking activities, while others may simply consist of recognizing a plausible frame and the data/frame match is made; nothing else is done. Within each sensemaking activity, the data and frame define, inform and update each other. The authors have prepared several representations of the model, each involving these seven sensemaking activities, but with arrows flowing in different directions between the activities, emphasizing the fluid nature of the process. For the purpose of this thesis, the overriding theme of the model is represented in Figure 5, below, which shows that within the process of connecting data and a frame, the frame that is selected influences the data that is identified and the data influences the frame selected. The activities involved in this process are discussed in the following sections.

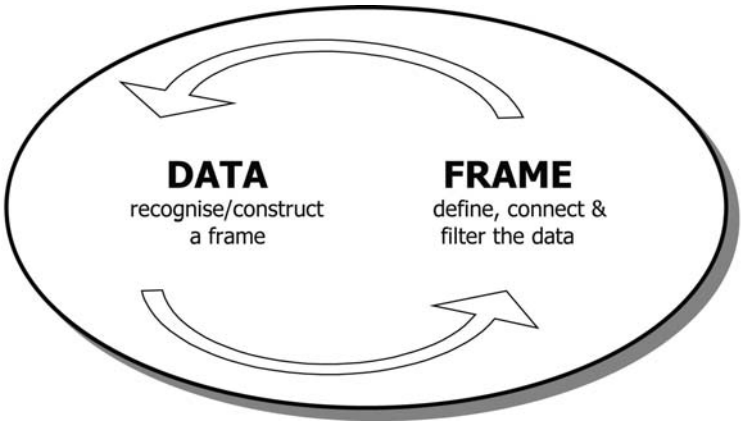

Figure 5: Connecting data and frame

2.3.4.3.1 Connecting data and a frame

The particular frame a person selects is dependent upon the available data, the person's repertoire of frames, the person's goals and what the authors term 'the person's stance', which relates to individual differences, for example, the level of commitment to that particular sensemaking activity, tolerance for ambiguity, current workload or level of fatigue. A person will often unconsciously recognize a match between data and a frame. This automatic recognition, or pattern matching, requires no deliberate sensemaking effort. The authors consider that there is a continuum between unconscious and conscious processes, with automatic recognition at the unconscious end, comparing frames at the other, and a varied blend of conscious and unconscious processes from one end to the other. The initial frame selected to explain the data has important implications in that it sets the scene for action and further sensemaking. The richness of experts' mental models and repertoires of frames is significant here in that data are only selected and used to generate the inferences necessary for understanding when they are recognized as relevant. The authors use the example that the way a fire commander assesses a fire in the first five minutes

after arriving at an incident determines how the fire will be managed over the following five hours.

2.3.4.3.2 Elaborating the frame

People elaborate and extend the frame as they learn more about the environment. Provided that no anomalies appear, they will maintain the frame and initial data elements, but add more details and fill in gaps, using their past experiences to guide their environmental exploration. It brings depth and texture, and helps to confirm the sense of a situation.

2.3.4.3.3 Questioning the frame

Questioning the frame begins when a person is faced with data inconsistent with the frame being used, realizes that the data and frame do not match and begins to question the accuracy of the frame in use. It is a form of problem detection, not the process of diagnosing the nature of the problem, but the establishment of a suspicion that the current understanding of events is incomplete or incorrect. Questioning the frame may arise when salient data presents a clear contradiction to the frame in use, which is then discarded in favour of one that is more appropriate. A frame may also be questioned when a subtle cue is noticed that might have possible implications, the presence or absence of something that may seem quite small and difficult to detect, but which causes doubt. In a range of studies conducted by Klein *et al.* (2005), three factors were shown to be significantly influential in determining whether the presence of a problem would be noticed: expertise, stance and attention management. Expertise confers a clear advantage in the speed of noticing that something is wrong, detecting subtle anomalies, and in building a portfolio of experiences, which can be linked to form causal relationships and generate expectancies, as was discussed in relation to sensemaking and cues (see Section 2.3.3.1.6). Stance refers to a person's orientation towards a situation, ranging from perhaps an overconfident attitude that nothing can possibly go wrong, to a state of suspicion, in which the person is vigilant and actively searching for anything unexpected. Stance and level of expertise influence attention management, determining what is noticed, what is ignored and how the search for cues is conducted. All of these factors are influential in giving rise to questioning the frame.

In the earlier discussion of sensemaking and cues (Section 2.3.3.1.6) it was seen that there are also disadvantages associated with expertise, such not noticing what a novice may see, and other factors that prevent anomalies from being noticed, in particular Mack's (2003) work on inattentional blindness. In these cases, the frame will not be

questioned. However, situations also occur in which an inappropriate frame is firmly adhered to and this will be discussed in the following section on preserving the frame.

2.3.4.3.4 Preserving the frame

Frames are preserved or fixated upon by explaining away data that do not match the frame. In order to differentiate fixation from simply continuing with a frame, the authors refer to the fixation criteria proposed by De Keyser and Woods (1993), that the initial account of the situation was incorrect and the person maintained the incorrect explanation, even though there were opportunities to revise it. Such was the case with the psychologists studied by Oskamp (1965) (see section 2.3.3.2). In the study, even those psychologists who had reached an incorrect diagnosis from case notes persisted with their conclusion and interpreted additional patient information in ways that would confirm their opinions rather than leading to reconsideration.

Vaughan (1996), in a study of decision-making relating to the *Challenger* disaster, described how abnormal events can come to be perceived as familiar events so that their impact is lessened and people do not find them fearful. The recurrent medical equipment alarm, for example, can come to evoke a routine response of switching it off so that the alarm does not sound, rather than a response of checking for a functional problem with the equipment or, if attached, the patient. The explanation is not that the patient's condition has changed or that the equipment has malfunctioned, but that this is a situation requiring the equipment to be switched off.

Feltovich *et al*. (2001) used the term *knowledge shields* to describe the activity of preserving initial accounts of situations when confronted with inconsistent evidence. Knowledge shields appear to be quite elaborate constructs. 'Many of these knowledge shields minimize the importance of the contradictory data. Examples of knowledge shields include arguing from a position of authority, resorting to bad analogies, ignoring secondary effects, arguing from special cases, and arguing that a principle has a restricted applicability' (Klein *et al*. 2007, p.138). Returning briefly to the basis for questioning a frame (see Section 2.3.4.3.3), Cowan (1986) in developing a process model of problem recognition, suggests that small discrepancies in environmental data accumulate and when they exceed a threshold the person becomes aware that there is a problem. Klein *et al.* (2004) disagree, arguing that if a person with appropriate knowledge and experience has not noticed the initial subtle discrepancies, then the person is probably consciously or unconsciously explaining them away using knowledge shields.

Rudolph (2003) used a garden path methodology to lead anaesthetists to a position of fixation. The research was based on a clinical simulation model and the findings may, therefore, be viewed in the same light as those of a scenario, but it is an accepted method to use in training anaesthetists and the results should be considered. The garden path methodology provides data that leads to a particular interpretation, in this case an obvious diagnosis, then additional, highly salient information is provided which should suggest an alternative interpretation or diagnosis. Remarkably, it was found that the anaesthetists either ignored the additional data or distorted it to fit the original diagnosis. This suggests that quite an influential underlying process was in operation. Klein *et al.* (2007) propose that rather than making deliberate attempts to fixate, people are simply good at developing explanations, and the knowledge shields are additional tools that people use to explain how unexpected data has arisen by chance.

Questioning the frame in use was seen to be influenced by the person's level of expertise, stance and attention management. These factors increase the likelihood of subtle cues being noticed, leading to re-examination of the frame, and the person would then go on to re-frame. If the person's level of expertise, attention and their stance are such that subtle cues are not noticed or are explained away with knowledge shields, then the frame is preserved (Klein *et al.* 2004).

2.3.4.3.5 Comparing frames

People sometimes need to compare frames to decide what is actually happening, for example, when making a medical diagnosis. This is particularly important when encountering novel situations and those with changing circumstances. Feltovich *et al.* (1984) found that cardiologists could follow up to three alternative frames at one time and Rudolph (2003) found that anaesthetists became more focused and efficient in assessing a complex situation once they had identified a set of frames to work from. Selecting an initial cluster of frames, such as a group of diseases sharing many common symptoms, enables comparisons that will identify critical differences. The competing frames can then be set against each other in the light of the patient's current condition.

2.3.4.3.6 Reframing

Reframing is more than acquiring inconsistent evidence; it requires a complete reorganization of how a situation is being understood. The sensemaker needs the replacement frame to guide the search for and definition of new cues, and those cues are needed to identify a replacement frame. The two processes occur simultaneously. The concept was originally introduced by Duncker (1945), who demonstrated that

reformulating the way a problem is understood could facilitate insight, which assists the identification of a solution. No answer could be found to the problem of how to irradiate a tumour without harming healthy tissue. But those who were able to reframe the problem to how radiation intensity could be minimized except at the site of the tumour, were able to devise the solution of focusing multiple weak radiation beams to converge on the tumour. During reframing, data elements that have been rejected are reconsidered, so that previously incompatible cues may now fit.

2.3.4.3.7 Seeking a frame

When the data makes no sense at all or when a frame is questioned and is clearly inadequate, the sensemaker will deliberately try to find a frame. It may be that the frame can be replaced with another, but at other times it is necessary to search for more data to find anchors to construct a new frame.

In their discussion of the sensemaking activities, the authors refer to an interview carried out in a related piece of research (Klein *et al*. 2002) concerning a navigation incident. The example is reproduced in Appendix B to illustrate a situation in which various sensemaking activities are carried out, together with a brief analysis giving the authors' perspective.

The data/frame theory provides a convincing account of the cognitive processes a person might use to deliberately generate an explanation of events. As we have seen, accounts of sensemaking acknowledge the process to be retrospective, reliant upon past experience to understand the present, and once we are aware of a present event, it is already in the past. It is a process for diagnosing problems and explaining situations. However, it also has a forward-looking orientation by which expectancies are formulated concerning future events. This is particularly evident in the functionality of deliberate sensemaking, in not only making sense of a situation but also in knowing what to do about it, and is referred to as anticipatory thinking (Klein, Snowden & Pin 2007).

2.3.5 Anticipatory thinking

Klein, Snowden and Pin, (2007) describe the future-oriented form of sensemaking as anticipatory thinking and offer their preliminary thoughts as encouragement for further research. The authors acknowledge some overlap with prediction and also with Level 3 of Endsley's (1995b) model of situation awareness, but assert that anticipatory thinking is essentially different to each of these concepts as it involves constantly managing our attention to monitor certain events and either ignore or reduce the significance of others. 'We are building directly through experience and indirectly

through stories, patterns of meaning and responses which can be used or blended to deal with an as yet unknown, and unknowable future' (Klein, Snowden & Pin 2007, p. 1). Anticipatory thinking is also unique in necessitating not only an appreciation of a possible future event, but the capability to do something about it.

2.3.5.1 Anticipatory thinking and prediction

Looking firstly at the distinction between anticipatory thinking and prediction, anticipatory thinking is a functional sensemaking process in which people *prepare* for future events. It arises from the interweaving of external events with internal capabilities. These future events include those that are less likely to occur and may have critical, high-risk outcomes, such as those that may be experienced within the HROs mentioned previously, and not simply those events which are more readily expected to occur. Prediction is concerned with making a guess about the state of future situations, based upon given data, while anticipatory thinking includes the additional element of preparing to respond to those situations. It is this functionality; sensemaking combined with preparation to act, which differentiates anticipatory thinking and prediction.

2.3.5.2 Anticipatory thinking and situation awareness

Situation awareness was described in Section 2.3.2 as a state of environmental knowledge from which predictions about the impact of future actions can be made. The concept gained wide currency during the 1990s in the fields of applied psychology and human factors as a tool for decision-making in a variety of organizational contexts. Endsley (1995b) provides a theoretical framework for the formation of situation awareness comprising three stages, referred to as levels: perception, comprehension and projection. A brief overview will help in clarifying the distinction that Klein, Snowden and Pin (2007) make between this concept and anticipatory thinking.

Perception, or Level 1, is the most basic level of situation awareness at which the environment is monitored and detection and recognition of cues such as people, objects and events takes place, and their current states, such as locations, conditions and actions are noticed.

Comprehension, or Level 2 situation awareness, involves synthesizing the discrete elements perceived at Level 1 by pattern recognition, interpretation and evaluation. This draws upon memories and experiences and is shaped by goals and objectives, so that a more comprehensive image of what is happening is developed.

These two levels can clearly be seen to have similarities with processes in the sensemaking literature previously described.

Projection, Level 3, is the highest level of situation awareness and is achieved by progressing through Levels 1 and 2 and having acquired knowledge of the status and dynamics of the environmental elements. This information is then extrapolated forwards in time so that a projection of the future actions of the environmental elements can be made. It is here that Klein, Snowden and Pin (2007) draw their distinction. Anticipatory thinking is an ongoing, motivated effort to understand the connections between elements, for example, people, places or events, so that their trajectories can be anticipated in order to take effective action, whereas situation awareness is an achieved state of knowledge, either of the current data elements, or the inferences drawn from those data, or predictions made using these inferences, to inform decision-making. 'Endsley ... is describing how people notice and make inferences about data, whereas we assert that people use their frames to define what counts as data in the first place. We view sensemaking as a process of constructing data as well as meaning' (Klein *et al.* 2007, p. 120).

Klein, Snowden and Pin (2007) suggest that anticipatory thinking 'intersects' with decision-making, and also with planning and replanning, altering the way situations are expected to develop, and coordination of both events and teams, in that it is essential to their success, but it differs from these processes by its functionality and action orientation. 'When we anticipate events we are also preparing ourselves to react' (Klein, Snowden & Pin 2007, p. 2).

2.3.5.3 Types of anticipatory thinking

Klein, Snowden and Pin (2007) identify three forms of anticipatory thinking; pattern matching, trajectory tracking and conditional anticipatory thinking.

2.3.5.3.1 Pattern matching

In pattern matching, elements of the current situation elicit similar past events and clusters of cues from those events. Experts have large portfolios of patterns and so are quickly alert to anything unusual, as were the chess grandmasters mentioned below (see Section 2.3.5.4), so that the likelihood of accurate and successful anticipatory thinking increases with greater experience and sophisticated expertise. It should be noted however, that a high level of experience may lead to over confidence, so that a conclusion may be reached while not noticing a novel cue, one which a less experienced person may see.

2.3.5.3.2 Trajectory tracking

Trajectory tracking is described as '...preparing yourself for how the events are unfolding and how long it will take to react' (Klein, Snowden & Pin 2007, p. 2). The process for associating cues with outcomes is more complex for tracking a trajectory than for pattern matching. The authors liken it to a child learning to move to catch a ball; the situation necessitates thinking ahead, but in a functional manner. The child learns with age and practice to reach out to where the ball will be by the time his or her hand is moved. Narrative, as a sensemaking mechanism for developing meaning and learning from the experiences of others, is particularly useful to trajectory tracking. Its strength lies in assisting our understanding of the trajectories of others involved in various situations, for example in stories about how particular past events were dealt with or how problems were solved. In this way new associations between events are constructed that can be used to inform responses to future situations.

2.3.5.3.3 Conditional thinking

Pattern matching and trajectory tracking involve making responses to cues or events. Conditional anticipatory thinking requires an appreciation of the connections between cues or events, the interdependencies between them, their inconsistencies and their implications. The authors suggest that this form of anticipatory thinking may require mindful or heedful behaviour. As discussed in Section 2.3.3.1.4.3, this refers to the ability of individuals or groups to notice a significant cue, however weak, that might indicate the onset of a problem, and their individual or shared expertise to deal with it (Weick & Roberts, 1993).

Klein, Snowden and Pin (2007) provide an example of the failure of conditional thinking, which is summarized here to illustrate the concept. One of their number was returning home on a plane that had to land at an airport other than the one at which his journey had begun. A relative drove to the airport to collect the author and take him to the other airport to collect his car. Arriving at the airport car park, the author decided to leave his heavy luggage in the relative's car, as they would both be going to the same house. The relative drove off. On reaching his car, the author realized that his car keys were in one of his cases, in the relative's car, being driven home. The outcome of failing to anticipate conditionally in this case resulted in inconvenience to those involved, but in the context of a domain requiring reliable sensemaking, such as the management of a patient with complex medical needs or a battlefield situation, the importance of the capability for anticipatory thinking becomes apparent.

2.3.5.4 Anticipatory thinking and expertise

Klein, Snowden and Pin (2007) suggest that the ability to perform anticipatory thinking is an indicator of expertise and is expressed through attention management. In a training programme, new Marine Corps officers were informed that something unexpected would be happening and a trail of cues was set, but the officers were unable to anticipate what would happen. They then observed nearby units being subjected to the event, but even this had no effect. Without the experience necessary to understand the meaning of the cues, the officers were unable to engage in anticipatory thinking (Baxter, Harris-Thompson & Phillips, 2004).

In further research, relatively junior military Information Operations specialists were found to straightforwardly note the literal content of messages, while experienced specialists interpreted the messages from the perspective of the actions they would be able to take in response to them. The same research found that the senior, experienced military officers were also sensitive to non-events such as an absence of enemy radio messaging. Junior ranks interpreted this as radio silence, but the senior officers correctly identified it as the final stages of preparation before an enemy attack (Klein *et al.* 2007).

Studies on move recognition by chess grandmasters (deGroot 1978) and comparison of the eye movements of skilled and inexperienced drivers (Pradhan *et al.* 2005) also support this argument. The grandmasters were able to recognize immediately whether a particular move would enable them to take control of a situation or if it would lead them into a dangerous position, without having to spend time considering the outcomes of a range of subsequent moves. The inexperienced drivers maintained their gaze on the road immediately ahead, concentrating on staying within their driving lanes and what was directly in front of them, while those with more experience scanned around and focused on potential trouble spots which were completely ignored by the novices.

According to Klein, Snowden and Pin (2007), in the above cases the experts are not expecting or predicting probable hazards, they are using the right mental patterns, developed through experience and training, to appropriately manage their attention. Collecting additional environmental data does not increase a novice's capability for anticipatory thinking. As asserted by Weick (1995), additional data simply adds to confusion (see Section 2.3.3.1.2) and, according to Feltovich, Coulson and Spiro (2001), may also be explained away by means such as the as the knowledge shields used to rationalize inconsistent data (see Section 2.3.4.3.4). As the authors observe, '... people cannot will themselves to be smarter' (Klein, Snowden & Pin 2007, p. 5).

Consequently, anticipatory thinking cannot be improved by efforts to encourage vigilance or open mindedness, or by interventions such as the use of devil's advocates to challenge current thinking. Experts are more attuned to weak cues and information that would be ignored by those who are less experienced, and are therefore better able to detect situations in which problems may occur. Thus, anticipatory thinking is not simply dependent upon the sensemaker's ability to predict future states, but necessitates contextual knowledge and experience, through which a capability is developed to do something about what might happen. This capability enables the sensemaker to anticipate future events.

2.3.6 Establishing the research question

The literature review has examined the processes by which we make sense of the world around us. The characteristics of sensemaking (Weick 1995) were examined in some detail to gain an understanding of the concept and it was seen that these characteristics do not operate in isolation but are closely associated with one another. A differentiation was made between the ongoing sensemaking, by which we appreciate what is happening around us, and the intentional sensemaking in which we make a conscious effort to understand conflicting or ambiguous information or environmental data.

The author identified a number of similarities between processes within the knowledge and sensemaking literature. The increasing levels of structure within the knowledge hierarchy from discrete data through to knowledge (Bhatt 2001), was likened to the sensemaking process of punctuation and bracketing, whereby a flow of random environmental data is bracketed into portions and are increasingly organized and structured so that they become meaningful (Weick 1995).

The proposal for reversing the knowledge hierarchy (Tuomi 1999), and the suggestion that both hierarchies are valid, but each having a different status (Klein 2009), parallel the punctuation and bracketing process and also the matching of data and frame in intentional sensemaking (Klein *et al.* 2007). The high level complexity of existing knowledge informs the selection and integration of data and information, and the structuring of data and information may then be used to generate knowledge. Similarly, in intentional sensemaking the frame that is used guides the identification of relevant data, and the data influences which frame is selected, or the development of a new frame.

Sensemaking and knowledge from the practice-based perspective are both considered to be social, action oriented and belief driven concepts, for which individual

interpretation and meaning are central. Existing knowledge and previous sensemaking experiences appear to share a similar role in determining what data or environmental cues are noticed and selected and what is inferred from them. The influence of individual interpretation on these processes provides both sets of literature with an explanation of how people can give differing explanations of the same situation (Hislop 2005; Alavi & Leidner 1999; Smith 1998; Weick 1995).

Previous experience was seen to play a significant role in assembling an increasing portfolio of sensemaking events against which current situations may be compared. However, exposure to a number of past events in itself does not confer sensemaking skill; what is required is active participation. Cook and Brown (1999) provided an analysis of how a person cannot learn to ride a bicycle by being told how to do it or watching a rider; it is essential to get onto and engage with the bike. In precisely the same way, Klein *et al.* (2007) demonstrated that people who observed situations were not able to make sense of and appreciate what was about to happen to them, without having sufficient experience to understand the meaning of the cues presented. This was particularly evident in anticipatory thinking, where the ability to anticipate and prepare for future events is associated with expertise, rather than habituation.

A consistent thread throughout the literature review has been the importance of identity construction. It is considered to be a fundamental factor in all aspects of sensemaking (Mills 2003; Weick 1995). Within the knowledge literature it is central to the values, beliefs and other qualities that determine how we individually interpret data and information in the generation of knowledge (Ringberg & Reihlen 2008; Hislop 2005; Alavi & Leidner 1999), and influences individual decisions on sharing knowledge (Hsu *et al*. 2007; Kankanhalli, Tan & Wei 2005; Bock & Kim 2002; Bandura 1997). The medium for identity construction was seen to be narrative; we think, locate ourselves within our world and make sense of things narratively, and we use narratives as a highly powerful means of sharing knowledge.

Several authors taking a social perspective of knowledge, particularly of tacit knowledge (Ringberg & Reihlen 2008; Cook & Brown 1999), have considered sensemaking concepts within their research. D'Eredita and Barreto (2006) make perhaps the closest association in proposing that tacit knowledge is episodic in nature, the episodes being formed according to Weick's (1995) punctuation and bracketing, under the guidance of a knowledgeable person's attention directing skill (Tsoukas 2003).

Sensemaking has been considered as a subjective process, conducted according to individual interpretation. The literature review has identified various methods by which we confirm the sense that we have made. It has also shown that we are equally capable of pursuing an incorrect conclusion and that we can be highly creative in generating a persuasive rationale for following that course. If the arguments for establishing a close relationship between sensemaking and knowledge are correct, then it might be assumed that sensemaking will have an impact upon knowledge, in particular upon knowledge sharing. The implications of this within an HRO context may be significant, both in enhancing performance when making *good* sense, and having a detrimental impact when an inadequate conclusion has been reached.
The research will now examine the relationship between sensemaking and knowledge sharing more closely, within the HRO setting of a Department of Medicine, to establish whether or not the research participants, first year HOs, engage in sensemaking activities in relation to clinical handovers, and what impact that has upon the communication of knowledge within that domain. The approach taken will be of relevance to authors of a socio-cognitive persuasion, enquiring into socio-constructionist sensemaking processes to expand theories of knowledge proliferation, an emerging direction noted by this author within the literature review.

Specifically, the research will investigate whether the HOs engage in the individual, intentional sensemaking activities proposed by Klein *et al.* (2007), and suggested by those authors to be applicable to all deliberate sensemaking situations.

The research will also investigate the activities that HOs engage in when preparing for handovers, during handovers and after handovers, thus addressing that particular gap in the literature (see Section 2.1.3). In addition, the research will identify what is communicated during the handovers, how that communication takes place, and whether there are any changes in these processes over time, as the HOs become more experienced. The literature review identified existing studies examining the content of medical handovers, however, no research was found that was specifically concerned with the content of junior doctors' late afternoon handovers, which is the focus of this research. Additionally, the research involving different types of handovers did not look at whether those handovers changed over time, which is a concern of this study. Further, studies into how communication at handovers takes place appear to be oriented towards practical processes such as whether or not those involved meet, whether the handover is verbal or written and factors such as the use of information technology (see Section 2.1.3). In contrast, this research identifies the practical methods used then investigates more deeply, making a structural and narrative analysis of what is communicated. The author could find no other research taking this

approach and the findings may therefore be of interest to academics within the fields of both knowledge management and narrative studies. The coding process for the sensemaking analysis, based upon the data/frame theory of sensemaking (Klein *et al.* 2007), was devised by the author and she is unaware of any other research into handovers that has been conducted in this way. Thus, the research may also be of interest to those whose attention is drawn towards sensemaking.

At a local NHS level, the research has relevance to the host organization in defining and characterising the late afternoon handover process, which the organization considers to be contributory to good quality patient care.

As described in Section 1.1, future studies by the Dr Foster Unit into patient mortality rates at particular times of the year will consider the quality of junior doctors' handovers as an influencing factor, particularly within Departments of Medicine, which is the speciality in which this research is set. The research therefore also has relevance to current NHS studies at a national level.

It will be seen within the following chapter (Chapter 3, in particular Sections 3.9 and 3.13) that as a result of delays in the NHS process for obtaining ethical approval for the study, the research commenced after the intended group of HOs had completed their six month placement within the department, and the group to be studied were several months into their placement. This had the unexpected outcome of revealing a late afternoon handover style that was very different. In light of this, the research question was then extended to investigate why the different handover style had developed and what impact that style had upon sensemaking and knowledge transfer. On a less positive note, the delays meant that the author could not observe the group over an entire six month placement, but relied more than had been planned upon participants' accounts of past experiences. As will be seen, the author was able to address this issue by incorporating observations of a less experienced group into the research. The outcome was a comparison of two groups of HOs, one approaching six months experience and the other approaching twelve months experience.

Chapter 3 Methodology

3.1 Introduction to Methodology

This chapter begins with an introduction to the research context and selection of the methodology to be used. A discussion of some of the problems that may be encountered by healthcare researchers leads on to a description of the ethical review process and how ethical approval for the research was achieved. Practical recommendations on this, resulting from the author's experience, are given in Appendix D. The research protocol as prepared for ethical approval is given, followed by a description of how this fared in practice. The ethical considerations of the study are discussed, together with the measures taken to minimize the impact of the researcher upon the research. The chapter concludes with a description of the late afternoon handover in practice.

3.2 The research context

The late afternoon shift handover between junior doctors, first year HOs in an acute general medical department of a large teaching hospital group, having a similar caseload to medical departments in many other city hospitals, was selected as the context for the research. The author identified this area as potentially useful for sensemaking study whilst observing clinical shift handovers as part of an unrelated project, and was invited to explore this further by means of observations and interviews with HOs during their placements within that speciality as part of their training. This group of HOs, named Group 1, formed an effective comparative study for the later research with Group 2 (see Section 3.9).

The department consisted of a number of wards and specialist units, sited at various locations throughout the hospital. During the late afternoon there was a shift change between the day duty HOs and their colleagues taking over from them. Unlike the morning and weekly handovers, usually associated with ward rounds, that involve all levels of medical staff and also include other healthcare professionals, those involved in the late afternoon handover were HOs all of the same level of seniority and there were no staff from other disciplines present. Therefore, any sensemaking activities and knowledge transfer or sharing processes that took place would not be influenced by anyone with greater or lesser knowledge or experience, or from a different profession.

Previous sensemaking research has been carried out within the context of medical handover but has examined the handover between doctors of various levels of seniority, usually in the form of ward rounds, either in the presence of or away from

the patient (Broekhuis & Veldkamp 2007). The studies involved medical handovers in which every patient in the team's care were discussed rather than selected patients, and were also conducted from the perspective of the handover as an educational forum, primarily for medical staff (Albolino, Cook & O'Connor, 2006). The research described here is novel in that it studied the handover between HOs in their first year of clinical practice, of the same level of seniority, in which they were responsible for selecting which patients to include in the handover.

3.3 Which HOs should be included in the research?

The late afternoon handover did not consist of providing the HOs coming on duty with a report on every patient within the department. Those going off duty were responsible for deciding what needed to be handed over to those coming on duty. This could include informing the oncoming shift of outstanding tasks which could reasonably be dealt with during the evening and tasks which needed be carried out at particular times falling within the evening shift. But each HO also needed to consider the condition of all the patients in his or her care, anticipating what the progress of each patient was likely to be during the next shift, and decide if any needed to be brought to the attention of the HOs coming on duty. It was assumed that some form of sensemaking might be involved in assisting those going off duty to make this assessment. It was therefore considered important to involve the HOs going off duty in the research.

However, at this particular shift change, two HOs came on duty to take over from up to eight day duty HOs ending their shifts. The HOs coming on duty decided between themselves how to deal with the accumulated information from all those going off duty, the allocation of duties and responsibilities, and the order of priorities, while bearing in mind that each HO ending their shift was handing over only that which they considered to be important. It was therefore decided that the HOs going off duty would also be included in the research.

3.4 Quantitative or qualitative methodology?

Sensemaking is a concept that does not readily lend itself to quantitative study: the research is generally of a descriptive nature, involving qualitative methodologies. Can quantitative methods be used to measure sensemaking skill, to evaluate a clinical handover and determine that one handover has been executed more proficiently than another? The number of patients and tasks mentioned in the handover could be counted, on the assumption that more experienced doctors would be able to stabilize their patients and complete tasks during a shift more efficiently than those with less experience, and would therefore have only a small number of urgent cases and tasks

to pass on. But patients' conditions do not alter in accordance with shift patterns and it could be the case that one patient requires significant attention during the shift so that many tasks for other patients are outstanding. There may also be patients whose treatment requires medical attention at specific times falling within the following shift that need to be handed over. Such a situation could arise for a doctor of any level of experience and ability; therefore, the number of patients and items mentioned is not a useful measure.

It might be that the length of time taken to deliver the handover could be considered, on the assumption that an experienced doctor would complete the handover more quickly than a novice. But there may be one or more patients with complicated needs, requiring a lengthy handover from even the most experienced consultant. The time taken for the handover is therefore not a useful measure.

It may be possible to develop a means of counting the number of occasions on which evening HOs were called out to attend to tasks which had been left out of the handovers from the day duty HOs, but this would not address their assessments of patients of concern and would therefore provide an unworthy evaluation of sensemaking.

Counting the number of tasks left uncompleted by the day duty HOs would not take account of, for example, patients with changing conditions necessitating lengthy attention, or other urgent situations that required their presence.

Similarly, quantitative methods alone will be insufficient in identifying evidence to support the sensemaking model proposed by Klein *et al.* (2007). The number of sensemaking activities engaged in during a handover may be counted, but identifying those activities accurately in the first place requires careful investigation that is more social in nature, taking account of participants' feelings, views and understanding of situations and processes.

The concept of sensemaking is largely appreciated by description and interpretation and many of its features are lost when viewed solely from a quantitative perspective. The important qualitative issues concerning to the late afternoon handover relate to the quality of what is being conveyed, in terms of features such as completeness, timeliness and accuracy; the handover process and whether it supports effective transfer or sharing of information or knowledge; the ability of the person giving the handover to make and convey his or her sense of the previous shift and direct

attention appropriately; and the ability of the receiver to make good sense of that sense and organize it so that it can be acted upon effectively.

In conclusion, the quality of the late afternoon handover is a better measure than any quantitative measurements that might be made of it, and it was therefore decided that the research would employ a qualitative methodology, involving observation of clinical handovers and interviews with those giving and receiving handovers.

3.5 Data collection methods

3.5.1 The interviews

The purpose of the interviews was to explore aspects that do not easily lend themselves to quantitative measurement: the participants' opinions, understandings, interpretations, perceptions and experiences in relation to the handover. The HOs were asked to reflect upon their sensemaking: how they made sense of the situation at the end of a shift and made decisions on what to hand over and, when receiving handovers, how they processed the information received from all those ending their shifts in order to make sense and prioritize. Semi-structured interviews were appropriate for this research as interest lay within the nuance, richness, depth and complexity of the HOs' contextual accounts of their experiences (Mason 2004). While some elements of the data gathered were quantified during analysis, the research was not dependent upon having asked each interviewee precisely the same questions. Unlike the structured questionnaires that accompany more survey-oriented research, a list of themes was used as starting points and the flexibility of the semi-structured format allowed the introduction of unexpected themes by both the interviewee and the author as the discussion developed. Burgess (1984, p. 102) describes this format as 'conversations with a purpose' and it has the potential to elicit rich data. The themes for the interviews are given in Appendix E.

It should be noted that in asking the participants to comment on their sensemaking processes associated with clinical handover, they are effectively being asked to construct or reconstruct situated, contextual knowledge and, as Mason (2004, p. 64) reminds us, '...the interview method is heavily dependent on people's capacities to verbalize, interact, conceptualize and remember. It is important not to treat understandings generated in an interview as though they are a direct reflection of understandings "already existing" outside of the interview interaction, as though you were simply excavating facts.' Taking this into consideration, the author was aware that asking participants to reflect upon their own sensemaking processes, and her own efforts to make sense during the interviews, would both exert some influence upon the

understandings that were reached. Ultimately, it is the participants' accounts of their sensemaking that are of interest to the author.

The length of each interview was dependent upon how much each HO wished to contribute and whether they were called to attend to a patient, but was expected to be approximately thirty minutes and that was found to be the case.

3.5.2 Observation

The purpose of observing and recording the handovers, and the observation carried out following the handover, was to complement the data collected by interviews in relation to sensemaking and knowledge. This would enable the researcher to see at first hand what information and knowledge was communicated between the shifts, the process involved during that communication, and how that related to the actual work carried out during the evening.

3.6 Conducting research within a healthcare setting

An acute medical department within the National Health Service (NHS) would seem to be an ideal context in which to study people working under demanding conditions: performance reliability is paramount; mistakes may have a critical, if not lethal, outcome; and even error-free interventions may be insufficient to prevent a patient's demise. While this environment is potentially a rich source of data for researchers, there are a number of barriers that may impact on studies. Certain of these barriers may be generic to many research contexts, but they have a particular relevance to research in healthcare settings and are outlined below.

3.6.1 Collaborative relationship

In their paper entitled 'Enhancing Safety in Accident and Emergency Care' Woloshynowych *et al*. (2006) indicate that it can be difficult for researchers and clinicians to develop and sustain the collaborative relationship necessary for productive research. A key reason for this is that it is difficult for researchers to gain access to clinicians and to clinical areas for study purposes. Also, according to the authors, clinicians often have little awareness of what other professionals can bring to the clinical setting and they '…by nature and training tend to assume that they will take the lead in solving problems' (Woloshynowych *et al*. 2006, p. 13). The collaborative relationship can also be affected by researchers having difficulty understanding the healthcare domain, the culture of each clinical area within each organization, and the relationships between the various healthcare professionals.

In the case of this study, the author had been previously employed within the particular NHS Trust and had a good working knowledge of the organizational culture and the relationships between healthcare professionals. The author had not worked within the Department of Medicine but was known to the consultant and some other members of staff within that speciality, and these relationships were helpful when planning and conducting the research. It was also helpful that the consultant had invited the author to carry out a study in the department and had a favourable, but not coercive, approach to this particular project. The author was aware that the consultant would not be readily available to respond immediately to emails or telephone messages concerning the research or to meet at short notice, and even planned meetings were occasionally not attended or were prematurely concluded due to patient care needs. This is something that has to be accepted in a healthcare setting. The author addressed this by presenting information in a succinct manner rather than copious documentation, increasing the anticipated time for planning the research and being available for meetings outside of office hours.

3.6.2 Complexity of the context

The scale and complexity of healthcare activity is enormous, arising from the complex nature of human physiology and the broad spectrum of disease; the acknowledged formal hierarchies which exist within and between healthcare occupations; and the enormous volume of recent advances in biosciences and medical knowledge (Woods & Patterson 2004). Within the vast machinery of what we know as the healthcare system, the potential number of interactions between individuals and processes is immense and it can be very difficult for researchers to know which of these elements will prove to be important. 'The truth is "in the details", but knowing (in advance) which details are important and worthy of attention is difficult' (Woloshynowych *et al*. 2006, p.13) This can result in research which often focuses on parts of processes in order to avoid the complexity, rather than examining the larger and more complex setting and possibly missing significant evidence.

In this research, the late afternoon shift change handover was considered to be a good sensemaking context but, to ensure that the fullest picture of that sensemaking was obtained, the research included in addition to those giving the handover, those receiving the handover. Participants were also asked to consider the late afternoon handover on other days of the week, including at weekends and at earlier times within their placements.

3.6.3 Trust

It is preferable that participants are able to trust researchers as mistrust may affect the participants' behaviour and impact adversely on the research, but it can be difficult for a trusting relationship to develop. 'Most (clinicians) will begin with an underlying suspicion that the researchers will either not understand the issues they face, or will sensationalize their problems, or both' (Woloshynowych *et al*. 2006, p. 14). Clinicians are busy and there is little time for the two parties to get to know each other, particularly if the research interactions are sporadic or infrequent. Furthermore, the healthcare sector is often referred to as having a blame culture (Woloshynowych, *et al*. 2006, p. 14). This, compounded by what Sir Liam Donaldson, Chief Medical Officer to the UK Government, referred to as 'Screaming tabloid headlines, knee-jerk suspensions of staff, (and) police bringing manslaughter charges against doctors who have made honest mistakes…' (Donaldson 2005, p.11), can result in research projects being perceived as hunts for errors and culprits, so that clinicians are less inclined to wholeheartedly welcome investigators into their domains.

What is meant by being able to *trust* researchers? According to the Concise Oxford Dictionary, having trust means to '…believe in the reliability, truth, ability, or strength of (a person, group, animal or entity).' Given the above factors, trusting researchers seems to be to do with clinicians having confidence that there are no hidden agendas embedded within the research, that the researcher is capable of operating in an ethical manner which will not have a detrimental impact, and that any problems found will be handled properly and without dramatization. However, clinicians cannot know these things without spending time with researchers, looking at project proposals and introducing researchers, particularly those without a clinical background, to an alien and perhaps daunting domain.

The author made a deliberate effort to develop a good working relationship with the consultant and other departmental staff, as will be seen in the following sections, and to give complete information about the study, in particular to potential participants. The aim of this was to inform and assure those concerned, including potential participants, of the research purpose, that there were no hidden aims, that measures to maintain confidentiality were in place, and to help develop a feeling of trust towards the author.

3.6.4 Regulatory requirements

The moral duty and legal requirements of clinicians to maintain patient confidentiality in an increasingly litigious environment present further problems for healthcare research, and clinicians may be disinclined to engage with certain studies (Woods &

Patterson 2004). A national regulatory framework, the National Health Service ethical review process, is in place in the UK to protect participants. Its aim is to ensure minimal risk from inappropriate studies or inadequate consent. The framework is the subject of continuing discussion as many researchers, while fully supporting the principle of ethical approval, regard the process necessary to achieve it as excessively tortuous, providing examples such as; 'The project was straightforward, but 200-250 hours were spent preparing submissions, 56 people had been involved and 900 A4 pages of documents generated' (Tysome 2007), and '...it (the online application form) is a very long and extremely repetitive document where the same ground is covered in several different sections of the form. Completing the form can take a great deal longer than writing an initial research protocol or the resulting paper.' (Oliver 2006). It could be argued that the difficulties encountered in preparing submissions are justifiable if participants are to be properly protected, but Glasziou and Chalmers (2004) describe instances in which delays in the progress of applications for clinical research have had a serious and detrimental impact upon patients by inhibiting efforts to evaluate certain treatments. Procedures to ensure ethical healthcare research should be in place, but the current debate and prolific anecdotal experiences of researchers indicate that the ethical review process is becoming a significant challenge to those wishing to engage in this field. The regulatory framework is discussed in Appendix C, together with an account of how the researcher achieved compliance with the requirements.

3.7 The research plan

The research ethics approval application requires a detailed research protocol. The protocol given here is the planned protocol, as prepared for approval, written in accordance with the National Health Service Research Ethics Service (NRES) guidance, and is reproduced from the application, which is why it is written in the future tense.

3.7.1 Planned protocol from research ethics approval application

- The research will involve qualitative analysis of the shift change handover between house officers in the Department of Medicine (Medicine). This will include observation and recording of the late afternoon shift change handover and interviews with house officers.
- Potential participants will be approached by the departmental consultant. The researcher will supply packs that will include a Participant Information Leaflet (see Appendix F). The consultant will address these and give them to his house officers at one of their weekly training sessions at a brief introduction to the research project. He will post packs to the work addresses of any house officers on night

duty. All the medical house officers at that time will be invited to participate; usually twenty-one.

- The information leaflet will clearly state that participation is voluntary and that house officers may decline without consequence. Those who are interested in taking part will be asked to arrange to meet the researcher. The invitation letter will give dates and times when the researcher will be available at the Education Centre to make individual appointments. For the convenience of the house officers, these times will be before and after a number of weekly training sessions. Contact details for the researcher will be given for those who are on night duty or those who decide at a later date that they are interested in taking part.
- At the individual appointments the researcher will discuss the study with the house officers and answer any questions Those who decide that they would like to take part will be asked to sign a consent form in the presence of the researcher agreeing to the observation and recording of handovers and interviews. Assurance will be given that all data will be managed in accordance with the Data Protection Act 1998, that recordings and personally identifiable data will be stored separately and safely and that transcripts of recordings will be completely anonymized. The house officers will also be assured that they may withdraw from the study at any time and without consequence.
- Observation and recording of the late afternoon shift handover between house officers will take place on one day each week, for four weeks at the beginning of the six month placement, four weeks in the middle of the placement and four weeks at the end. At this handover, two house officers coming on duty take over from a number of house officers going off duty.
- Depending upon shift rotas, house officers may be interviewed once, more than once or not at all.
- The handover usually takes place in the doctors' mess and this will not be altered. Interviews will also be held there.

*House officers coming **on duty***

- The researcher will confirm that the two house officers coming on duty have both previously given their consent to taking part. If one or both has not given consent the day for data collection will be moved ahead until two consented house officers are coming on duty.
- After recording the handover the researcher will ask the house officers to comment briefly on how they will plan the evening's work from all the information they have received.
- The researcher will remain with the house officers and record an interview with each individually later in the evening at a convenient time, which has no

detrimental impact on patient care. If events dictate that no suitable time is available that evening, arrangements will be made to reschedule the interview within the following two working days. If a house officer is required to attend to a patient-related matter during an interview, the interview will be suspended immediately and resumed at an appropriate time. Patient care will take priority at all times.

*House officers going **off duty***

- The house officers going off duty arrive at various times to give their handovers. As each house officer arrives the researcher will confirm that they have given consent. If a house officer has not given consent the researcher will withdraw until the next house officer arrives. The researcher will only observe and record those parts of the handover which involve house officers who have given consent.
- Two of the house officers going off duty will be asked to arrange an appointment to be interviewed within the next two working days. If a house officer cannot be interviewed within that time, the next in succession will be asked until two appointments have been made.

3.8 Ethical considerations

It was important to attempt to anticipate aspects of the research that may cause concern to the participants and ensure that measures were in place to address them.

3.8.1 Confidentiality

It was expected that at the handovers, HOs would clearly need to discuss patient details and may also mention the names of relatives, doctors, other health professionals, and other people, and may have concerns about discussing this information in the presence of the author. This would also apply to information given at interviews. Assurance was given that all information, including familial relationships, would be anonymized and that it would not be possible to identify any HO or any other person mentioned at handovers or interviews. The Participant Information Leaflet explained that all information would be handled securely in compliance with the Data Protection Act, 1998, and the University Policy on Research Integrity and Academic Conduct. The HOs were also assured that the research was being carried out with approval from an NHS Research Ethics Committee (REC) and the Departmental Consultant.

3.8.2 Observation

It was considered that the HOs might have concerns about being observed and recorded while going about their normal work. Assurance was given that this was not

for the purpose of disclosure in connection with individual performance or appraisal or for any purpose other than that of the research, and this was clearly stated on the Participant Information Leaflet.

3.8.3 Data security

To allay any concerns relating to the storage and handling of personal and other research data, participants were assured that all data would be managed in accordance with the Data Protection Act, 1998, and the University Policy on Research Integrity and Academic Conduct. The main elements of the arrangements to achieve data security are included in the Participant Information Leaflet (see Appendix F). The leaflet also informed the reader that the researcher would be available to discuss these and any other concerns by telephone or at a face-to-face meeting by arrangement.

None of the HOs approached in connection with the research raised these or any other ethical considerations as concerns.

3.9 The impact of the research ethics approval process

The research ethics approval process had an impact upon the research question, the research design, and the recruitment of participants.

The preparation process for the necessary documentation to achieve ethical approval for the research, and the waiting time for agenda space at a local REC meeting had both taken longer than anticipated. Once the REC had heard the proposal, approval was quickly granted. However, the timing meant that the present group of HOs were in their second six-month placement of clinical practice. Unlike the HOs in Group 1 who had been in their first placement following university graduation, this group had spent the previous six months working in surgery at various hospitals throughout the deanery. At such a late stage in the placement and with some HOs about to begin short secondments to other departments, there would not be the opportunity to carry out interviews and observations as planned over a six-month period. The impact of this was that the author would be unable to observe and record handovers in the early part of the HOs' placements when they were new to the department, to investigate whether or not there were any changes in the handovers over time. It was decided that the interviews and observations would be carried out as planned for the remainder of the placement but additional interviews would be carried out with as many other HOs from the group as possible, not only those who were on duty over the remaining weeks. The HOs would be asked for their views on past handovers, but this would necessitate more reliance than anticipated upon the participants' opinions of what had taken place. This alone was not considered to be a sufficient means of assessing changes in

the handover, as the accounts of events would potentially be susceptible to problems associated with memory recall concerning events and influences surrounding the planning and conduct of past handovers, and also the retrospective nature of sensemaking. To address this, it was decided that the data collected from Group 1(see Section 3.2), under approval from a separate research project in which the author had observed and recorded handovers including the late afternoon handover between HOs, would be brought into the main research and the current group would be named Group 2. None of these changes required further ethical approval. This would enable the desired study of sensemaking over time, but with a shift in perspective from following one group for six months, to a comparison of two groups; Group 1 with six months experience previously observed and recorded at handovers by the author, and Group 2 with twelve months experience, to be observed and recorded in this research. Unfortunately, the delays in the research ethics approval process meant that the author was unable to gather data from the very first handovers at the beginning of a placement. As a research limitation, the delays are discussed further in Section 7.4.

Recruitment then proceeded and the research began in parallel, with those participants who had signed consent forms, in order to include as many participants as possible in the remaining available time. As will be seen in Section 3.13, once the research commenced it became clear that Group 2 were conducting their late afternoon handovers in a very different way to Group 2. The difference in handover styles was so significant that it had a necessary impact upon the research question, extending it to ask what impact each had upon what was communicated during the handovers and how they had come about. The delays in the ethical approval process had presented challenges to the research, but it is possible that they also led to an enhancement. Group 1 began their first placement directly from university in August. Group 2 were in their second placement, commencing in February. This pattern is followed annually. Had the ethical approval process flowed swiftly, the research may well have involved only Group 1, in which case the author and the host organization would have been unaware of the different handover operated by Group 2.

The ethical approval process also impacted upon the recruitment process itself. Following approval by the REC and Trust R&D group, the documents for the information packs were prepared. By now, the provisional dates at which the HOs were to be informed about the research had passed and the consultant decided to inform them by email. Two weeks later the response rate was very low. The consultant posted a reminder on the website with no response. In contrast, the consultant had personally introduced the researcher to the first group of HOs, Group 1, for a separate project and all had agreed to take part. The consultant was unable to attend any of the

education sessions for the remainder of this group's placement in the department. It was out of the question for the researcher to approach the HOs directly as the ethical review process is based upon an opt-in system, whereby a potential participant responds positively to an invitation given by an NHS intermediary. Hewison and Haines (2006, p. 300) say that '...the ethical benefits of this approach are not proved and it can lead to low response rates, wasted resources and research of low validity.' Their discussion further concludes that there is no evidence to show that potential participants object to properly regulated opt-out systems. While this might be so, the author would not be comfortable with such an approach, even in the case of non-clinical research or to increase response rates.

A further reason for the initially low response rate might have been that the lengthy ethical review process meant that the research was commencing quite late into the HOs' placement in Medicine and much of their time was taken completing training portfolios and making arrangements for their next placements. Suspending the research until a new group of HOs was in post would have entailed a reapplication to the REC to extend the time limit given for the research and extended the PhD programme for at least an additional year.

The author then proposed a recruitment plan that would not require further ethical approval and this was agreed with the consultant and the Education Centre staff. As part of their training programme, HOs are required to sign in when attending the education sessions and to hand over pagers and mobile phones. They are also given documentation and information relating to their training programmes. The administrator managing this agreed to give each HO the invitation letter and Participant Information Leaflet from the information pack on the consultant's behalf. The administrator also asked each HO if they had seen the consultant's message on the website, and identified the author to them, who would be available for the remainder of the afternoon to provide further information, and to register those who wished to take part.

On the agreed day, one of the HOs, referred to later as HO2M, approached the researcher with a small group of colleagues and asked what payment participants would receive. On hearing that no payment would be made he said: *'Come on guys, this is not for us.'* The group and several others who had been standing nearby all left and no participants were recruited. Undeterred, the researcher obtained agreement to repeat the session. With the addition of a large display board advertising the project, the author continued recruiting at the education sessions over the following four weeks, eight days in total. The time spent at the education centre was worthwhile; after

a slow start, a very pleasing response was achieved with 14 of the 19 HOs agreeing to take part in the research, including HO2M. This alteration to the recruitment process required some effort on the part of the author and the goodwill of the Education Centre staff. However, with hindsight, it was later found to be useful for the author to have had the opportunity to observe the Group 2 HOs and how they interacted with each other, as this helped to shape the author's own sensemaking as to whether these HOs functioned independently of each other or as a group (see Section 5.6), an important element within the analysis of data.

When prepared for non-clinical research, the requisite Participant Information Leaflet can seem somewhat awkward (see Appendix C). The leaflet was carefully worded to reduce this, but in order to comply with the NRES guidance, it became three pages in length. The author observed that when the HOs were given the leaflet they skimmed the front sheet, turned the page and then closed it without reading any further. The author went through the leaflet with each prospective participant before they signed the consent form. Very few of those who agreed to take part had read the entire leaflet before meeting to sign the consent form, and only the opening paragraphs seemed to be relevant to their decision on taking part. Had the author relied upon the information pack alone as a method of recruitment, numbers might have remained very low.

3.10 Data management

The author transcribed the recordings of handovers and interviews shortly after the recordings were made and the names of patients, HOs and any other persons mentioned were anonymized so that they could not be identified. The transcripts were double checked by reading them backwards, which proved to be a useful method of picking up any omissions.

Procedures for handling, processing, storage and destruction of data complied with the Data Protection Act, 1998, and the University policy on Research Integrity and Academic Conduct.

All personally identifiable data, such as consent forms, was stored in locked cabinets at the University of Southampton. The author held the keys.

Only anonymous data was stored on a University computer file and this was protected by a password known only to the author.

The academic supervisors, in the presence of the author, were given access to the recordings and anonymized transcripts. This was for tutorial and supervisory

purposes, to ensure that categorization for analysis purposes was carried out appropriately and without researcher bias, and to verify that the transcripts were a true record of the recordings. It also provided a further check that names and places had been anonymized. The recordings were then destroyed.

In accordance with the Data Protection Act, 1998 and the University policy on Research Integrity and Academic Conduct, transcripts are stored for ten years following completion of the research and are then destroyed.

3.11 Reading the data

3.11.1 Literal reading

Literal reading enabled the author to examine the literal form, style, structure and content of the data (Mason 2004). As will be seen, the words and language used as the HOs interacted were important in identifying various themes including the sensemaking activities.

3.11.2 Interpretive reading

Interpretive reading takes a researcher '... *through* or *beyond* the data in some way' (Mason 2004, p.149), to construct a version of what he or she thinks the data mean or represent or what can be inferred from them. Interest may lie within the participants' understandings of events or phenomena, or the emphasis may be more upon a researcher's own interpretation. In this research both perspectives were important: the participants' accounts of how they made sense of the handover and how that sensemaking had evolved, and the author's interpretation of that understanding and the social phenomena involved.

3.11.3 Reflexive reading

Reflexive reading situates researchers within the data so that they can explore the role they have played in generating and interpreting the data. In this research, for example, the author interpreted a situation in a particular way and made field notes concerning it. When reading the notes again at a later date, the author had gained more contextual knowledge of the research domain and in view of this, came to a different interpretation of what had taken place.

3.11.4 Coding the transcripts

It was seen in Section 2.3.4 that the Klein *et al.* 2007 propose that the data/frame theory of sensemaking has universal applicability to HROs and that it describes individual, intentional sensemaking. The interviews were therefore studied with

reference to the sensemaking activities that form the theory, and also to anticipatory thinking, a form of sensemaking for future events. Using the data/frame theory as the core structure, the author produced a guideline for coding the interview transcripts (see Table 6).

CODING GUIDE

The transcripts of the handovers were analyzed by literal reading and examining them to identify any of the sensemaking activities proposed by the data/frame model. The activities are listed below with an explanation of the type of text to be searched for. The text identified could range from a single word or a phrase to several sentences. Once identified, the text was marked up according to the colour coding shown below.

Elaborating the frame

Instances of HOs looking for additional information to extend or elaborate their understanding of a situation. The initial understanding is not changed as a result of the additional findings, but gaps are filled.

Questioning the frame

Here the HOs' expectations have been disrupted. They realise that some of the data does not match the frame and begin to question the accuracy of the frame.

Seeking a frame

The HOs are deliberately trying to find a frame, either when the frame in use seems to be inadequate, or when confronted with data that simply makes no sense.

Preserving the frame

In preserving the frame, HOs have come to an inadequate conclusion about what is happening and continue to maintain it, even when data is available indicating that their understanding is faulty. The HOs find ways of explaining away the data.

Comparing frames

The house officers are making a deliberate effort to compare different frames in order to make a judgement about what is actually happening.

Reframing

In attempting to link a frame and data, inconsistencies and contrary evidence leads the HOs reformulate the way a situation is understood. They need a new frame to search for cues and they need the cues to define the frame. The process can include appraising previously discarded data.

Anticipatory thinking

The HOs are looking ahead to the way they think a situation will develop, and preparing to deal with it.

Table 6: Coding guide

3.11.5 Reliability and validity

Reliability and validity, in their traditional sense of seeking repeatability and methods attempting to objectify the subjective to prove the results of research, do not sit comfortably within an interpretive paradigm where no objective truth exists. From the interpretive position, reliability is less to do with objectivity and repeatability and more concerned with demonstrating that the data generation and analysis are appropriate to the research and have been carried out with thoroughness and accuracy. Thus, the process of coding the transcripts does not lend itself to objective verification by, for example, comparison with the findings of a second coder. Using the coding guideline, two coders who had not taken part in the interviews and observations might produce very similar results, but this would lose sight of the aim of the coding, which is to reflect what was observed and heard by a researcher. If the coding was conducted in isolation, the richness of research context would be lost. The coding builds upon the contextual knowledge and understanding developed during the process of gathering data. Indeed, this serves to enhance a researcher's sensemaking of the participants' sensemaking processes.

To demonstrate this, one of the supervisors used the coding guideline to code a transcript extract and compared the conclusions with the same extract coded by the author. While both noted similar general characteristics and sensemaking activities, the author was able to make a richer interpretation by employing contextual knowledge developed by being present at the handover, noting such things as the tone of voice used by speakers, gestures and the non-verbal means by which the HOs interacted with each other and responded to what was said.

There are instances in which researchers ask participants to review and confirm transcripts of their interviews, observation notes and the interpretations made. While there are situations in which this might be appropriate, following on from the above argument, it was decided that participant verification would not be sought as the author's interpretation was considered to be of importance, once the procedures to achieve thoroughness and accuracy, as previously described, had been met. Having established these procedures demonstrated the author's commitment to taking responsibility for the data, rather than situating that responsibility with the participants. Furthermore, while the participants might have had some interest in the broad theme of the study, the author had no reason to assume that any of the participants had sufficient knowledge of the concepts being investigated to be in a position to make a judgement about the interpretations made. Even if this were the case, it would not be appropriate to privilege participants in such a way, as the author is responsible for these interpretations (Mason 2004). The researched should not control the analysis and outcome of the research (Skeggs 2001). Researchers must clearly identify the routes by which the interpretations are made, in ways that are sensible to the reader, and this is perhaps the best means of conferring validity upon interpretive research.

3.12 Researcher effects

Efforts were made to minimize any researcher effects upon the handover. The participants had met the author usually twice before the study commenced, which may have helped to reduce the impact of researcher presence at handovers. Also, the author had a level of knowledge of the specialist medical language used and did not ask questions or make comments while handovers were in progress, other than to confirm that all present were consented participants.

The Participant Information Leaflet and the opportunity to discuss the study and ask questions was intended to reassure participants about the purpose of the study, confidentiality and what would happen to the information recorded.

Knowing that interviews and handovers were being recorded may have been disconcerting to the HOs at the outset, but it was expected that with assurances about confidentiality and the use of a discrete recording device, the effects would be reduced.

The activity of asking HOs to consider their sensemaking processes would doubtless have an influence upon those processes, but as the author was interested in the

participants' views on this, there was no other way in which the required information could be accessed.

3.13 The clinical shift handover in practice

As the recruitment process progressed, an unexpected situation developed. It became clear that the HOs in Group 2 were not carrying out the late afternoon shift handover in the same manner as the HOs in Group 1.

Group 1 organized themselves so that the two HOs coming on duty collected their pagers and went to the doctors' mess. The HOs going off duty went to the mess to meet those coming on duty and gave their handover reports there. Occasionally, a day shift HO would be involved with a patient or a situation that would continue past the shift change time. Once they had finished, he or she would either page the evening HOs to give a handover by telephone or would see one of them on a ward and would let them know of anything they had to hand over there.

It was only discovered during the recruitment process that the current HOs, Group 2, were not working as expected by the consultant and other medical staff. They used the telephone as their prime method of handing over and would only occasionally hand over face-to-face, usually if they happened to meet by chance somewhere in the hospital. Those coming on duty collected their pagers individually and went straight to the wards, where nursing staff would have work for them to do. Within a short time they would begin to be paged by those going off duty who would give their handovers by telephone. Observations and recordings of Group 2 handovers were therefore limited to one side of a telephone call.

The discovery extended the study to question why the two groups had organized themselves so differently, and what impact this had on the late afternoon handover, particularly in terms of knowledge and sensemaking.

This chapter has illustrated the unpredictable nature of conducting research in naturalistic or real world situations rather than in experimental settings. The REC approval process initially appeared to be straightforward, but was found to be rather more complicated and certainly more time consuming. Even with the greatest attention paid to planning, real world events impacted upon the research protocol so that new methods of achieving it needed to be devised within a short time frame and within the necessary constraints of the research ethics approval.

Chapter 4 Structural analysis of the late afternoon handover

4.1 Introduction

The research findings were examined from three perspectives: a structural analysis to identify the handover processes and their characteristics; a sensemaking and knowledge perspective, predominantly from appraising the narrative qualities of the handover; and the possible reasons for the development of two very different handover styles. Direct quotations from interviews have been included to demonstrate the findings and to provide the basis from which the author's interpretations have been drawn.

This chapter concerns the structural analysis and begins with a brief account of an evening shift spent with each of the two groups of HOs, which is intended to provide the reader with a flavour of how differently the two groups operated. The main themes identified in the data are then presented in a summary table, together with a more detailed analysis of the different handover styles and the HOs' opinions of them.

4.2 Data collection

The data collected from Group 1 consisted of observation notes from four late afternoon shift change handovers, each involving two HOs coming on duty and six HOs going off duty, and interviews with four of them, two going off duty and two coming on duty. Two of the handovers and two of the interviews were recorded. Written notes were made during the other handovers and interviews. The HOs all consented to note taking and recording and all appeared to be happy with the process, with one house officer pausing after making a particular point to ask if the author had had time to write it all down. There were also observation notes made during two shifts following the late afternoon handover.

The data collected from Group 2 consisted of interviews with fourteen house officers and handover observations of three going off duty and three coming on duty, who were shadowed during the evening. All interviews and handovers with this group were recorded. The participants did not appear to be concerned by the presence of the recording device.

Field notes were made when working with both groups, which included, for example, reactions of HOs, administrators and other staff to the author during the recruitment

process and during observations, interactions between others and the participants, and comments made to the author about the participants and the handover process.

All interviews and notes were anonymized and transcribed by the author, as indicated in Chapter 3, The Methodology.

4.3 First impressions

Before examining the data in detail, a general overview of how the two groups of HOs operated has been included to demonstrate the impact of the two different handover styles on how the HOs approached their work in terms of planning and prioritizing, and how they then operated during their evening shifts. The evenings for both groups were busy times. The two groups carried out their handovers in different ways, but there was also a very different *feel* between each and the author will attempt to convey that sense in a brief account of the evening section of a shift spent with each group. Each of the evenings selected was during the first week of research with each group. Detailing the events and discussing the progress of the shift with the HOs enabled the author to understand what each group might consider to be usual for that shift.

4.3.1 Shadowing Group 1

At 4.10pm the author arrived at the admission ward that is also the centre for collecting pagers at the beginning of each shift. The senior nurse remarked that the ward was busy, with a number of admissions and several patients had had eventful afternoons. One of the Group 1 night shift HOs arrived at 4.20pm. The author and HO went to the doctors' mess where the other night shift HO, who had arrived earlier, was eating sandwiches at one of the tables. Medical staff other than the HOs were using the mess for its intended purpose, as a general common room, with a lounge area, kitchen and lockers. Several were watching television and a member of the domestic staff used a vacuum cleaner for all but the last five minutes of the handover.

The day shift HOs began to arrive giving their handovers in turn, some leaving straight afterwards, others staying to engage in discussions about particular patients or procedures that had been carried out, or to wait for other HOs. They also made social arrangements and talked briefly about matters other than the handover. Occasionally, one of the night shift HOs would go to the telephone to respond to a pager call, and on returning would be updated on what had been handed over by his evening shift colleague. At the end of the handover, which lasted approximately thirty minutes, the two night shift HOs discussed priorities and work allocation, the latter taking account of whether one of them had previously cared for a particular patient. This took only two or three minutes. They arranged to meet later in the evening. Both agreed that the

handover was sometimes shorter, or might be a little longer if there were several very ill patients to discuss. They said that there were occasions when one of them was needed urgently and would leave the handover, but would meet the other for an update once the emergency had been dealt with.

The author shadowed one of the night shift HOs. On arriving at each ward he went to the nurses' station where he would be given drug charts to update, some having been mentioned at the handover and others that had not, and various other work to attend to, such as clinical reports to check. At one ward a newly admitted patient had a secondary condition concerning an open pressure sore. A specialist nurse was preparing to perform a wound debridement and asked the HO if he would like to be involved in the procedure, as it was new to him. He agreed to this. In addition to the planned work from the handover, the nursing staff had lists of other tasks that had recently arisen. This included alterations to drug charts, writing a prescription for a patient who was being discharged that evening, assessing two patients who gave nursing staff cause for concern and talking to a registrar about one of them, and reassuring relatives. He also resited an intravenous cannula, while the appropriately qualified nurse was at her tea break. On receiving a request to attend a particular ward, the HO asked the nurse to bleep his colleague, as she would be attending to another patient there that evening, explaining, *'If it was a dire emergency I'd go straight away, but if it can wait a bit we fit things in with where we're going to.'*

The plan of work was interrupted by a call to attend urgently to a patient with respiratory problems. The HO was with the patient for around forty minutes, during which time he received five pager calls, which nursing staff responded to. He also telephoned the senior registrar who came to see the patient. The fifth call was from his colleague, as their agreed meeting was now late. Once the patient was settled, the HO replied to one of the messages taken by nursing staff, called his colleague, then attended to two other tasks on that ward from the handover, before going to the rescheduled meeting. The HOs restructured their work plan to include a new patient who needed to be formally admitted. Both HOs said that the evening was typical. They would need to rearrange meeting up *'fairly often'*, but valued the meetings, as it was *'… important to know what's going on and check we're ok'.*

The evening continued in a similar manner and when the author left the HOs were still busy. In addition to the handover work they were called to a very disoriented patient who would need further attention later, another whose blood pressure was unstable and there was a further patient admission to deal with. One of the HOs said that while it was a busy evening, *'… we'll get it sorted'*, although he felt it might be a little late to

carry out one procedure. His colleague thought it should be done anyway, as in this case the patient was probably not resting in anticipation of it and would be more comfortable once it was over. He agreed and went to see the patient.

4.3.2 Shadowing Group 2

The author met one of the Group 2 night shift HOs at 4.15pm, collecting her pager. The second night shift HO was not there. Looking through the pagers, she said that he had not yet collected his and would probably arrive soon. It was not unusual that the two would not meet at the start of the shift. The HO wanted to check on a patient who had been very ill the previous day and went to that ward. On the way, the HO was paged and went to a telephone to take the call, which was a handover message. Notes were written concerning two patients. Along the corridor, one of the day shift HOs who was leaving the hospital stopped to talk briefly. The conversation did not include any handover information. Arriving at the ward, the HO discussed the patient of concern with nursing staff, and during that discussion there were two more pager calls. Both were handover messages, which were taken by telephone. The HO then asked the nursing staff what they wanted her to do and was given a pre-prepared stack of prescription charts and some paperwork to attend to, some of which had been marked as urgent. While these were being dealt with there were four pager calls from nursing staff asking her to go to their wards. Before completing the charts, she was asked by a nurse to speak to some relatives. The HO said that she would do it later as she was needed elsewhere, but would be back soon.

At the next ward the HO went to see the patient handed over from the day staff, taking around ten minutes to read notes, check charts, discuss the patient with a nurse and write up an ongoing prescription. A follow-up call was received from a ward asking when she might arrive. She was then given more drug charts to deal with, some additional paperwork, and she was asked to see two patients and discuss another with a nurse.

On the way to the next ward, she called in to another to write up an intravenous fluid prescription that had run out. There was a further pager call, again from nursing staff saying that she was needed. Before reaching the ward, the HO was called by the registrar asking her to attend an admission with him. It was not an unusual condition, but she had not seen it previously and examining the patient would be useful experience. Backtracking to the admissions ward, a further call reminded the HO that visiting time would soon be over and the relatives were still waiting to talk to her. The HO said that she could not do it, but the relatives were now waiting in the visitors'

room. Both parties were clearly unhappy with the situation, with the HO saying *'Nothing's going to change tonight. Tell them I've got an emergency. I can't come.'*

When asked if the evening so far was as usual, the HO said *'It's always like this, it's non-stop, busy all the time. You just have to get used to it and get on with it. If they (nurses) looked at what I'll be dealing with later tonight they'd get the right perspective, this is just not important.'*

By 9.45pm only three handover calls had been taken, but there had been six HOs on duty that day. The evening HO said that it was not unusual as *'They only call you if there's something to do.'* When asked if she thought she would catch up with everything she had to do, she replied *'I'll do the urgent things. That's what you do you get called and go. It's reactive work at night. What's important changes when new things happen.'*

We returned to the ward where relatives had been waiting, as there was a further call to see another patient. There was a brusque exchange with the senior nurse concerning the waiting relatives. The registrar appeared and there was a further exchange with the HO; he had been to meet the relatives and dealt with the matter himself. Afterwards, the HO commented: *'They all think what they want you to do is the most important but it's up to me to decide at the time.'* When asked how she made that decision she said that it was quite straightforward: *'If a drip's run out that takes priority over talking to relatives.'* From the HO's perspective, the decision was clear, but her view obviously differed from that of the registrar and nurses. The HO's different understanding of the situation might relate to her relative inexperience compared to the registrar and nurses. From the nurses' persistence and the registrar's decision to talk to the relatives himself then take the matter up with the HO, we might infer that the reason for talking to these relatives was a medical issue and of some importance, rather than a social event. The reasons for talking to relatives can have many implications for patient care. In this case, it might be that the phrase *talking to relatives* was being used as a genre, such as the *typical Wednesday morning* discussed in Section 2.2.8, in this case having a meaning shared by the nurses and the registrar, which was not understood by the HO.

The second HO arrived on the ward; the first time that the two had met that evening. He said that he too was busy, but that it was not unusual. He had been called to the ward to attend to a drug chart and commented that it was a waste of his time as the other HO was already there. He said that the nurses were disorganized and *'If they thought about it better we could get on with things.'* He put this to the nurse who had

called him, who replied that the call had been made almost an hour previously, before his colleague had arrived. He insisted that his time had been wasted *' … they should sort out what needs doing first then bleep us.'*

4.3.3 Comparing the two shifts

The difference between the shifts spent with each group was remarkable and continued to be so throughout the research. The Group 1 HOs worked as a team, both when engaged in the handover and during the evening shift, keeping each other updated on events. Even though each had their own responsibilities, they worked together to accomplish what needed to be done. They were busy, but the small amount of time they spent organizing their workload and revising their position during the evening enabled them to work efficiently and with a sense of awareness that they said was important to them. They spent time liaising with nursing staff and relied on them in many ways, for example, to provide or confirm information about patients, to be reminded about drug charts that needed to be attended to, and for advice. One of the HOs was observed asking advice from a specialist nurse who then offered to show him how to carry out a particular procedure. However, the HOs also discussed clinical matters amongst themselves, with the day shift during the handover, and with each other during their own shift.

There was no sense of team work with the Group 2 HOs, who operated as individuals, often with no idea of what the other was doing until they met to give the registrar an update late in the evening. They did not consider it necessary to know what was happening across the department and the minimal handover input from their day shift colleagues was not a concern, as the emphasis was very much upon nurses keeping them informed. They had a similar amount of contact with nursing staff as Group 1, but the author would describe the Group 1 interaction as *liaison*, whereas with Group 2 there were instances where it appeared to be more instructional, and as can be seen from the above descriptions, somewhat confrontational, on the part of both HOs and nursing staff. There was no clinical discussion with the other Group 2 HOs either on the evening described or during any of the handover observations.

It might be considered that the Group 2 HO above was perhaps just an irritable personality, but she spoke about the evening's events in quite an accepting manner. She did not seem unduly concerned about the encounter with the nurses and only marginally so about the registrar: *'I can only deal with what I know… they should have explained properly … '* Other Group 2 HOs on other evenings responded to some requests in a similar manner. The evening had begun with a visit to a patient that had not been handed over by the day staff and quickly developed into rushing from one

ward to another, sometimes not reaching the intended destination before being called somewhere else. Urgent patient care issues and events such as admitting new patients can arise at any time and will naturally alter the order of priorities, but the Group 2 HOs had insufficient information with which to organize their evening's work in the first place. Moreover, they generally seemed to accept that this was the way that the evenings were conducted.

Having set the scene broadly for an evening shift with each group, the data will now be presented and examined in more detail.

4.4 Analyzing the data

A summary of the main themes found within the data is given in Table 7.

The table shows a subgroup of Group 2. The members of the subgroup were three of the Group 2 HOs who had been involved in two incidents in which patient care had been compromised as a result of not having adequate patient information, two of them being held jointly responsible on one occasion, and one on the other. Senior medical staff had confronted the HOs quite publicly about the incidents and all HOs in the group were aware of what had happened. Their handover style differed to that of the other Group 2 HOs. The different approaches will be examined in the following sections.

Group 1 n=8	Group 2 n=14	Subgroup of Group 2 n=3
Face-to-face handover in doctors' mess.	Telephone. Go to wards and answer bleep when called.	
Prepared handover notes on their patient lists.	6/14 prepared notes on patient lists.	Prepared notes on patient lists.
Information made available to both evening shift doctors.	Information received only by doctor answering bleep.	
Mix of priority patients & tasks.	Priority patients, few tasks, fewer items overall than Gp 1. Reliance on nurses to alert them.	
Interactive handover. Sensemaking activities: Elaborating frame 97 Questioning frame 19 Comparing frame 28 Seeking a frame 27 Reframing 2	One-sided. Fewer questions from receiver of handover. Sensemaking activities: Questioning frame 2	Instructional when giving handover. Specific information requested when receiving.
Timely. Handover took place at beginning of evening shift, 30mins duration. Confirmation of 'nothing to hand over.'	Most calls in first two hours of shift but some late in the evening. Would not know when complete.	
Able to prioritize and plan workload, accommodate new events.	Dealt with issues as they arose. Could only plan once a number of tasks had accumulated.	
Identified problem: Friday handover. Written handover notes to cover weekend given at shift change.	Identified problem: Friday handover 11/14. 4/14 passed on written notes. 12/14 agreed that Friday handover should be formalized and face-to-face.	Gave handover notes. Would only change format of Friday handover.
Aware of changes in handover over time.	10/14 said no change in handover over time.	Deliberately changed handover.
Poor opinion of Gp 2 handover.	Considered Gp 1 handover unworkable.	

Table 7: Data analysis summary

4.4.1 The handover process

This section of the analysis examines the two handover processes in practice, with particular reference to their timeliness and completeness, and the influence of this upon managing priorities.

4.4.1.1 Handover procedures

As described in Section 4.3, Group 1 had an interactive, face-to-face handover, while Group 2 handed over by telephone.

The Group 1 handover took place at 4.30pm as the day shift HOs were ending their duty. The two HOs coming on duty went to the doctors' mess to meet the day shift as they were going off duty for a face-to-face handover, and would therefore both hear what the day shift had to report. There would often be several day shift HOs present and there were instances in which a round table discussion of a particular patient would develop, perhaps concerning an unusual medical condition or something that was new to them.

Group 1 HOs all said that they made notes of items of importance as they occurred, usually on the patient lists that they each printed out when arriving on duty in the morning. The status of these items might vary during the day and they would alter their notes accordingly, but at the end of the shift would be able to refer back to them to give their handovers. All of the HOs observed coming on duty made notes on what was reported to them:

HO1C: *'If something happens, if a patient say goes hypertensive, then I write the reading down. I know it's on the chart but I can say it's this much above normal and give them an exact idea of what's happening … which is better for them knowing exactly and I don't have to keep it in my head.'*

HO1D: *'You'd know straight away the main patients, you know, very poorly and needing a lot of attention, a lot of things, but just like you note you're coming back at whatever time to check or to do something, then you can say at the end of the day look, this happened and I've done this or I've given this amount IV whatever, so they know just what's going on. Not everything, that's pointless and some things you'll just remember, but the main things. It's good to tell them that otherwise you might as well just say here's the names of six patients you need to see and leave them to read the notes. That's not a handover, it's not a good handover.'*

The Group 2 HOs going off duty paged their colleagues so that they could hand over by telephone. The following example was given during an explanation of how the oncoming shift would be contacted for the telephone handover:

HO2M: *'… bleep them and wait for a reply … if they don't answer, well after a while you try the next one. Eventually someone replies.'*
Author: *'Eventually?'*
HO2M: *'… most times. If they don't and you haven't got much to say then you just ring in again later … (if a nurse calls back) leave a message … sometimes I call from my mobile so I can get away. '*

Six of the Group 2 HOs, including the three subgroup HOs, said that as Group 1 had done, they made brief notes on the patient lists during the day. One showed the author her list with a large asterisk marked by the name of one patient, saying '... he's very sick...'. The names of drugs were marked against two others, and the printed name of a procedure was circled. She said that she would look over the list towards the end of the shift, review the notes according to the status of the patients, and then refer to them when giving her handover. When the HO gave her handover later that day only one patient was mentioned. It was not the patient described as very sick as the HO did not expect that he would need any medical intervention that night:

HO2K: *'… he doesn't need anything right now. He's been started on different antibiotics so we'll see how he is tomorrow. The nurses are looking after him and if anything changes they'll let someone know.'*

The remainder of the group took a different view, saying that while they might make notes of something they needed to attend to during the day or put a mark against the appropriate patient's name to remind them of something, this was not to do with preparing to give their handover at the end of their shift:

HO2M: *'There's really no point. I know who needs to be kept an eye on at night so I don't need to write it all down again. I'll say check on this one and they'll go and see him… it will all be in the notes.'*
HO2N: *'… they only need to know about the serious ones and we know who they are, it's obvious.'*

Of the three Group 2 HOs observed coming on duty, two made notes on what was reported to them, the third did not. When asked why, he replied:

HO2M: *'If you're given important information you don't forget it … I find out the details when I see the patient.'*

4.4.1.2 Timeliness and completeness

The length of time taken for the Group 1 handover varied depending upon the content but was usually around 30 minutes. HOs would not always have something to hand over. As the handover took place in the doctors' mess it was easy for those coming on duty and those going off duty to see each other and they would confirm that there was nothing to be handed over. The author observed this taking place. Those coming on duty would therefore be aware of the day staff they had spoken to and would know when the handover was complete.

Group 2 said that most of their calls were received soon after coming on duty, but it was not unusual for calls to be taken much later in the evening:

HO2F: *'… this one didn't ring until after 7(pm) and the relatives had been there for ages.'*

HO2M: *'… maybe 8 or 9 (pm). But if it was me I wouldn't bother at that time. If it was important I'd have told them before I went off.'*

Unlike the Group 1 HOs, Group 2 had no confirmation if one of their colleagues had nothing to hand over and had no way of knowing if or when another HO might call them. They would therefore not know whether the handover was complete. Only one of the HOs raised this point:

HO2F: *'I've thought it's so busy already and what if I get something else … but it's the same thing if something urgent suddenly happens so you can't worry about it.'*

When the other HOs were asked if they had considered this, one of the subgroup HOs replied:

HO2E: *'… didn't tell me till half six and I already knew by then because (senior nurse) came after me to find out why he (patient) was still waiting … sometimes you don't get told anything at all till it's too late.'*

Although HO2E and HO2F expressed a degree of concern regarding late handover messages, the majority of Group 2 said that it was not a problem:

HO2B: *'If you have a critical patient you won't forget to hand that on you do it as soon as you can so they know what the urgent things are early on.'*

HO2L: *'… it wouldn't be that important if it's not something you think of handing over straight away… nurses will tell them whatever it is anyway.'*

4.4.1.3 Workload planning

One of the Group 2 HOs gave an animated account of how he mentally structured the handover he received. The transcript of that part of the interview is reproduced below:

Author (A): *'When you've received a handover in the afternoon, do you think you have a good sense of what's happening across the department?'*

HO2F: *'… I'd say I have a pretty good picture, but of course it depends on what I've been told. And when I've been told it because if I'm told about something later then I'm going to see things differently to how I did earlier. It's kind of dynamic up to when everyone's handed over.'*

A: *'When you say dynamic, what form does it take?'*

HO2F: *'I'm not sure what you mean.'*

A: *'That impression you have of what's happening, is it like a list of things that change when new ones are added, or something else?'*

HO2F: *(Pause) 'It's like having a plan of the wards and the ward with the main things, the priorities is big, then they get smaller and smaller as there's less to do there. It's very weird thinking about it.'*

A: *'Do you have the plan in your head all night?'*

HO2F: *'I don't know. It would have to be there for it to change when I get more things to do. After everything's handed over I probably don't think about it.'*

A: *'But you don't know when the day shift have finished their handover, you can only guess as the evening goes on.'*

HO2F: *'Good point.'*

A: *'When do you think it begins to form?'*

HO2F: *'Maybe when I've had a call and picked up one or two things on the wards. It's in there like the maps on the boards but it's in 3D (Plan of hospital wards on information boards. 3D because the department has wards in various locations over several floors.) and it's faint, like a negative, then I get bleeped and that's the first thing I know so the ward that patient's on gets outlined and bigger. Then I get bleeped again and another one comes up and I go there and I have to see an admission then*

(nurse) wants me and it's all moving and changing. Will you be able to do that? Is it some sense software, modelling how we understand things?'

A: *'No, no. Do you see other concepts that way?'*

HO2F: *'I've never thought about it. Thinking about it makes me … well thinking about how I think about things is strange.'*

A: *'As new things happen, do you think you'd be able to refer back to your, image or model? Do you think it updates itself or do you have to consciously do it?'*

HO2F: *'Lots of things go into your head without you consciously thinking about them don't they? So perhaps it's all chugging away in there. I don't know. I think it gets less as the night goes on … but not if we have a really busy night. I don't know.'*

This response from HO2F was unusual, as for the other Group 2 HOs, their evening's work seemed to be a process of trying to act upon each call as it was received, whether it was a handover call, a call from nursing staff or from other medical staff. Some said that they would try to deal with the work that nurses had for them at the same time that they were attending to a patient on that ward. Others, HO2A and HO2E, members of the subgroup, took a different view:

HO2A: *'I don't want to spend all night walking around so if I can I'll do a few things on one ward … but if it could have been done during the day and it's safe to leave and doesn't need doing there and then, I leave it.'*

Patient emergencies and new admissions can arise at any time in an acute medical setting and the ongoing workload must be adjusted to accommodate these events. As the Group 2 HOs could receive handover calls at various times they would not know what they had to deal with until later in the evening, which would clearly impact upon their ability to plan their work effectively. Also, as they took handover calls independently during the evening, they would not know how much work they were each accumulating unless they met by chance, or if one of them called the other for some reason. They did not routinely call each other and several commented that they might not see each other until much later at night when they would give the registrar an update. It is therefore possible that their work might not be evenly distributed between them but importantly, without a complete handover early in the evening, they would be unable to assess and prioritize their work. Group 2 did not have a sense of what was happening across the department and nine of them did not consider it necessary:

HO2D: *'We do the jobs we don't need to have the big picture.'*

HO2M: *'The work is different (at night) … you have a few calls and go to see the first patient then there's an urgent call and you get involved somewhere else … it might be that that takes a long time to deal with and you might even forget the other things but it's not a problem because if it's important you'll be bleeped.'*

The more timely Group 1 handover with both HOs present enabled them to take an overall view of their workload and plan a work schedule for the evening. This was a straightforward process, taking just a few minutes, but by preparing an initial plan and meeting again for a short time during the evening or talking on the telephone, they were able to incorporate new events relatively easily, without losing sight of their priority patients and tasks. Also, as was seen in Section 4.3.1, the Group 1 HOs felt that it was important to know that they were each able to cope with their workload.

4.4.1.4 Previous handover experience

To begin the investigation into why these two very different handover styles were adopted, HOs in both groups were asked how their particular late afternoon handover procedure had come about. As Group 1 were in their first rotation to clinical practice, they had no experience of any handovers, other than those that took place at times when they were observing clinical practice in hospitals. However, in the week prior to commencing their rotation, the consultant had invited them to attend the weekly ward round. This took the form of a meeting at each ward lead by the consultant and attended by as many of the department's other medical staff as possible, senior and specialist nurses and other appropriate health professionals. Each patient would be reviewed and where there were particular concerns or points of interest, the patients would be visited and assessed in person. The aim of the invitation was to introduce the HOs to the departmental staff and the medical conditions currently being dealt with. When asked about their late afternoon handover style, Group 1 said:

(HO1D): *'I think we sorted it out at the end of induction. It was so we could decide how the others would know what was going on and someone said well we'd better meet up so here's a good place (the doctors' mess).*

HO1F: *'One of the doctors said we shouldn't forget to let each other know about any problems but he didn't say this is how you do it.'*

Group 2, entering their second rotation of clinical practice, would have arrived from surgical placements, mostly at other hospitals. They would have attended an induction session but would not have been invited to the weekly handover due to the practical

problems of releasing them from their previous hospitals; there is no free time between the changeover from one placement to the next.

When asked about the late afternoon handover style in their previous surgical placements, one said that it had been explained informally on the first day but he could not remember by whom, that if there were any problems at the end of the shift, they should let the night duty HO know before going home. This was done by telephone, unless a night duty HO appeared on the ward before the day duty HO left. Most of them agreed with HO2M:

HO2M: *'There was no formal handover so if you only handed jobs over if there were any … by phone.'*

HO2F: *'I was on days I was with the registrar with a patient and when we'd finished he said I'd better bleep the night duty to check on her later and that was it really.*

HO2L: *'We didn't have a set handover procedure (for the late afternoon) so mostly if there was anything it was done over the phone.'*

According to a registrar at the medical unit, the surgical wards that these HOs had been working on would have admitted a high number of planned surgical cases, in which many patients would have made an uneventful recovery, whereas the caseload of the acute medical unit was quite different with fewer planned cases and many patients with a number of conditions in addition to that which they were admitted for. If the surgical patients were largely progressing in a routine manner, it might be the case that there were generally fewer patients causing concern that required handing over at the late afternoon shift change.

The HO's appear to have drawn upon their previous experience of handovers: Group 2 adopting the late afternoon handover style of their previous hospitals, and Group 1 adapting the handover they were invited to by the consultant to the late afternoon situation.

4.4.1.5 Changes in the handover over time

Each group was approaching the end of their placement and they were asked whether they thought their handovers had changed during that time.

4.4.1.5.1 Changes in the Group 1 handover

All of the Group 1 HOs said that the way they gave and received the late afternoon handover had changed during their placement and they considered that their handovers had improved:

HO1A: *'As we became more experienced as a group we handed over less and became more concise with the more important issues.'*

HO1C: *'At the start we had lots of callouts for things that should have been included in the handover. We didn't think far ahead enough about jobs. Now we're at the end of the rotation we're much better. Mainly callouts are for things that have just happened.'*

Group 1 gave examples from early on in their placement of not planning their work in a timely manner:

HO1A: *'… getting there late when the patient's gone to sleep and the nurse won't let you do it (wake the patient for a procedure).'*

HO1B: *'I've had to get the lab to do routine blood work out of hours when it wasn't a real emergency but I hadn't sent it in time and we needed the results the next day … when the results came she'd put the time and my name with urgent request on it and marked it with a highlighter pen on the paper copy … so I still had to explain what I'd done, or not done.'*

They were aware of changes in their handovers as they gained experience and became more accustomed to their work environment:

HO1H: *'Gradually you learn how to handover the patients that really need to have a doctor there overnight and you look back and think it's obvious really … they all look so terribly ill at first, well they wouldn't be in hospital if they were ok … you realize they're not alone, the nurses are watching them, then you think right, who needs something medical done tonight and who am I worried about?'*

HO1D: *'… you're learning and it's not being blasé but you get a better idea who you should hand over.'*

They said that the handover had initially taken longer, as when they ended day shifts they wanted to say something about as many of the patients they had seen as possible, just in case they missed something. However:

HO1C: *'We missed stuff anyway because we didn't know what we were looking for. Well we knew some things but you don't really know what it is you're looking for at first. You're just out of being a student really and even though you've examined people and watched doctors doing things you're suddenly just there in that job. It's a really sharp learning curve. You're thrown in at the deep end.'*

The Group 1 HOs were in agreement that it took around two months for them to *'(HO1F)… get the handover right'*. This view was confirmed in an incidental conversation between the author and a senior nurse who said:

'It takes them a couple of months to get to know their way around, Octoberish, they'll be getting to know the team and how things are done and we're not chasing them around too much … then once we're getting them nicely trained they move on.'

A member of the haematology staff commented:

The first few months are the worst, ordering tests for everything known to medical science except what they really need, wrong bottles, bleeding people two or three times and sticking needles everywhere trying to get a vein … they made a shambles of the automated request system and we shut it down for a week.'

4.4.1.5.2 Changes in the Group 2 handover

With the exception of two HOs in the subgroup, Group 2 said that there had been no change in the way they gave or received the late afternoon handover during this placement, and that it was generally very similar to that of their first placement.

Two of the subgroup said that their handovers had changed, describing them as 'more focused' and 'precise'. Rather than accepting loose terms such as 'keeping an eye' on a patient or 'checking' results, they wanted to know exactly what they were being asked to look for and what actions they were being asked to take and why. This may well have been related to them both being involved in problems relating to handover information:

HO2E: *'I want to know why they're (patients) being handed over and what they (HOs) want me to do, how I'm supposed to act on the results. They always say 'Check the bloods' and they don't tell you what they're interested in … I try to get people to say specifically what it is they're*

worried about … otherwise you don't understand and you end up suffering later on and I'd rather know earlier on than later what they think is going on.'

'... suffering later on ...' was a reference to the problem that arose from an inadequate handover in which this HO had been involved.

HO2A: *'What really annoys me is when I'm given some really loose message and you waste your time interrogating them till you find out what they want you to do. Sometimes they don't know themselves. It's like a game of charades. It would be better if they just went home and left me to it. You have to be clear. If you're handing something over then it needs to be important and if it's important it needs to be precise. I tell them exactly what has to be done and why. First get the right patient and what's wrong. You don't want to know their hobbies. And anything else like allergies but only if it's relevant. And the current problem and what the action plan is. Get it right and get it clear, then you don't have a problem.'*

This particular HO spoke of how the quality of the handover information was also important when communicating with patients, remarking that:

HO2A: *'… sometimes patients ask questions and they check with nurses … you get into all sorts of trouble if you say something a bit different.'*

The HO said that it was important to be able to tell them why they were having particular medication or procedures and all staff should be saying the same thing. One of the patients was known to look up his symptoms and treatment on the internet and, having a wealth of knowledge about his illness, would question his treatment. The third subgroup HO was unhappy with the way the afternoon shift change was carried out but said that she had not altered the way she gave or received it. Some of her colleagues occasionally made joking comments or tried to rush her if she had a great deal to say about a patient:

HO2L: *'It's not a proper handover … I might want to ask something but it's all quite rushed… (Giving a handover by phone) is quite difficult I know they're busy and it can be hard to get it all over to them … some want to know more detail when you're handing over and that's fine but mostly*

you just need to point them in the right direction, not give a history or anything … I usually just say this patient, do this.'

As the HO had expressed some concern about this style of handover she was asked if she had taken any measures to address the situation:

HO2L: *'… it's just me. It's a busy place with continually things to be done and you have to keep a million things in your head but that's how it's done.'*

HO2L appeared to have a somewhat resigned attitude towards working within a process that she found inadequate.

The rotation of HOs taking place each February, when the Group 2 HOs would have joined the department, had a less clearly defined settling in stage. Some of the group members would have had their previous placement within the hospital and be familiar with the hospital layout, laboratory procedures and so on, but would be new to the speciality. Others would be new to both the hospital and the speciality. The senior nurse said:

'Logically, they should be picking things up more quickly, but with every group there are always a few that need to be checked on to do things properly even now (end of second six-month placement).'

4.4.2 The Friday handover

The night shifts in the department ran from Monday to Thursday, and Friday to Sunday, inclusive. The HOs covering the weekend shifts beginning on Friday evening through to Monday morning would not have worked during the previous week and would have no knowledge of new patients or changes to existing patients' conditions. All of the HOs apart from two in Group 2 identified the Friday afternoon handover as the one that had the greatest potential for information to be 'lost', and said that if any changes were to be made to the handover process, they should be centred on the Friday afternoon handover.

4.4.2.1 What was different about Fridays?

The patients that they were most concerned about were those admitted on Thursday nights, as the admitting HO would be going off duty for the weekend and there could be procedures to carry out over that time, which could potentially be overlooked. Critically ill patients were of less concern, as they would be monitored frequently. The

role that nurses played in alerting them to changes in patients and to outstanding tasks was particularly important at weekends. One of the Group 1 HOs explained:

> HO1E: *'If you've got a new admission on Friday or especially from Thursday night that might need something like say repeating some bloods on Sunday, then that's got to be handed on at the end of Friday up to when it needs doing. It could go to the wrong person or not go anywhere at all. If there's not much else happening with the patient it can get lost.'*

On Friday afternoons, Group 1 gave their handover in their usual way, but if they needed to include significant items that required attention further into the weekend or the following week, they would often also include a written note, to try and prevent the message from becoming lost in the system. They were aware that the written notes could be lost and may not be passed on from one HO to another, but could not think of a better system. One of them said that they had considered having a message book, possibly kept close to where they collected their pagers at shift changes, but this had been discounted as they had to remember to check the book and to go back to update it. HO2L had previously been at a smaller hospital where a system of keeping a book for weekend messages had been in place, but she too said that in this department, with many more patients and wards spread over a wide geographic area, it was not a practical solution:

> HO2L: *'Jobs to be done over the weekend were put into the weekend job book which was kept in the doctors office in the admissions unit where the weekend doctors would be. If anyone had any particular concerns regarding a patient they could discuss them there, everyone on that weekend was usually around there at some point. The weekend job book was the only handover for the weekend.'*

As seen in Table 7, four of the Group 2 HOs, including all three of the subgroup said that they had prepared written notes when there was something to be done over the weekend. Three of them left the notes with the senior nurse on each patient's ward, who would presumably take responsibility for passing them on to the right person at the right time. One of them said he left them in the 'doctors' in-tray' on the appropriate ward. When asked if one of his own initial actions when coming on weekend duty was to look through the in-tray, he said that it was not, especially if the department was busy, but that he would do so at some point during the weekend. This demonstrated a further opportunity for handover tasks to be delayed so that medical care might not be given at an appropriate time.

Group 2 were not in favour of changing the handover on other weekdays, with four of them saying that nursing staff would alert them to anything that was outstanding.

The purpose of leaving the notes was to ensure that aspects of medical care were carried out at the correct time, but for two of the Group 2 subgroup there was an additional meaning:

HO2A: *' … there ought to be a book to write it in so you can see exactly what you have to do … then if someone didn't act on it it's not my fault … it's obvious for everyone to see what was handed over and when … if it's very important it should really be written whatever the day.'*

HO2L would have liked this arrangement to be in place for every late afternoon handover but said that it was not practical, as it would take too much time. HO2E commented:

HO2E: *'It would be good to be more formal (on Fridays) … and it should be written down and kept somewhere so we can check it … when I'm handing over on a Monday morning and people say to me 'Oh what happened with this?' and I've never heard of them, nobody ever told me about them, then you just look stupid.'*

HO2A and HO2E seemed to view the written messages as proof of what had been passed on to the following shift as a means of apportioning blame, should it not be acted upon. Again, this might have related to these two HOs being involved in a handover problem. The HOs had not appreciated the practical problems noted by Group 1 concerning a suitable location for the book and having to return to it to keep it updated. When asked if she had suggested her idea to her colleagues, HO2E replied:

HO2E: *It's more of an ideal way really but it can't work … we'd have to have a crossover time between shifts and that's not going to happen. It's very busy and there are things to do for the patients that are here as well as having new admissions. You can't leave things until later and wake them up … the whole shift system would have to change.'*

4.4.2.2 Opinions of alternative handover styles

Having identified the Friday handover as potentially problematic and not having any reasonable suggestions for a solution, nine of the HOs in Group 2 were asked for their opinions of a late afternoon handover carried out in the style of Group 1. They were

not told that this was the actual style used by their predecessors. Four HOs, including those of the subgroup, thought that it might be a useful way of managing the Friday handover, but the group's general opinion was that it was too time consuming and also not necessary for the late afternoon handover on other week days:

HO2M: *'It's a waste of time … not needed in the afternoon.'*
HO2N: *'… completely unworkable we'd never get anything done.'*
HO2E: *'It's too busy at night and you need to get on … phone calls are fine.'*

There was agreement amongst Group 2 that it was not necessary to inform the oncoming shift about drug charts that needed updating, as this was something that nurses could alert them to, in some instances saying that it should be considered a nursing duty to do this:

HO2M: *'They (nurses) go through the charts all the time anyway to give patients their drugs so they can see what's needed and they all know when the IV fluids are going to run out.*
HO2L: *'When you go to the wards there's always a pile of charts waiting for you so there's just no point making a handover out of it.'*

This applied to a great deal of what the HOs considered to be routine tasks:

HO2D: *'This is really just for the most important things that have to be done and not for routine work that can be sorted out as you go round … a nurse can have a list of things ready.'*

There was also a sense that the HOs thought that much of this routine work should be actually carried out by nurses:

HO2M: *'If a drip's run out they know if it needs to be continued so I can't see why they can't put it up and I'll sign for it later when I'm there rather than being bleeped and running about the hospital … She knew he needed an ng tube and she should have been able to just do it but she had to bleep me … she's better at it she's done it hundreds of times and gets it straight down, I have them retching and coughing it up … it's not something doctors do very often it's a nursing job so I don't know why they need a doctor to sign it off.'*

When asked if they thought a Group 1 style of handover might help prevent incidents relating to poor handovers, two of them referred to their subgroup colleagues, one of them saying that with so much activity in the hospital '(HO2N) ...*they can't know everything'*, which seemed to overlook that the point of the handover was to inform the oncoming shift of important matters. HO2D also saw the situation differently, focusing upon the doctor who had confronted his colleagues, rather than the handover:

HO2D: *'... it wasn't right saying those things. It's his attitude. He could have gone to the office or something. He's always like that when it's busy.'*

Six of the eight Group 1 HOs were asked to comment on a telephone handover in the style that Group 2 had developed, again without informing them that this style was in operation. All said that they would be unhappy with it, preferring their face-to-face style of handover:

HO1E: *'You'd either hang around waiting for all the calls or start something and be bleeped in the middle of it ... it's too disorganized, you'd be all over the place.'*

HO1D: *'That's not a handover I could work with. ... who would want to do it that way?'*

HO1G: *'It's a waste of time. Everyone would be waiting to be called back so they might as well get together in the first place. It's actually quite useful talking something through with a few of the others as well and you get to know about what else is going on. When we have the main weekly rounds we know a bit about some of the other patients already so you're not totally in the dark.'*

HO1A: *'That wouldn't work because the patients here are very ill and there might be things to get clear. You can't do that very well on the phone ... it would be mad not to have the night duties working together they'd be, well not doing things very well. That's not what's going to happen is it?'*

The two groups of HOs had developed two very different handover styles that had little in common with each other. The Group 1 handover style brought together current information at the time of the shift change, which enabled the HOs to prioritize and plan their work. The Group 2 handover style did not allow such efficient organization, but the Group 2 HOs did not consider that this was necessary. The inadequacies in the Group 2 handover style did not seem to be acknowledged. Each group appeared to

have different views on the purpose of the handover and each was convinced that theirs was the way it should be conducted.

Chapter 5 A narrative and sensemaking analysis

5.1 Introduction

In this chapter late afternoon handovers from each group are analyzed from the perspective of their narrative and sensemaking qualities, and their knowledge content. The sensemaking analysis is centred upon the data/frame theory (Klein *et al.* 2007), considered by the authors to be a universal approach to individual, intentional sensemaking within HRO domains, but anticipatory thinking, sensemaking for future events, is included. The chapter concludes with a revision of the author's own sensemaking concerning the association between the Group 2 HOs.

5.2 The handover as a narrative and vehicle for knowledge proliferation

The handovers of both groups tended to include more priority patients than tasks to be carried out, but Group 2 handed over fewer items overall than Group 1. As will be seen, the Group 1 HOs asked questions and engaged in discussion about the priority patients, whereas the Group 2 HOs handing over tended to present a report with little interaction. However, it should be noted that the items included in a handover are, naturally, dependent upon the health status of the patients in the department and will therefore vary somewhat, dependent upon the complexity of the medical conditions and individual patients' needs at the time of the handover.

People make sense of things narratively, organizing and relating data in a narrative structure to understand situations (Lawler 2002; Weick 1999). Narratives are also an effective and compelling medium by which people share knowledge and learn from one another (Klein 2008; Connell, Klein & Meyer, 2004). In Chapter 2, the author concluded that the terms knowledge transfer and knowledge sharing had separate meanings and were not interchangeable. Information and explicit knowledge are communicated from a source to a recipient without any loss of content or further processing, and are considered to be transferred. Moving through the increasing levels of structure to implicit and tacit knowledge, communication becomes a more complex process necessitating effort from the source of knowledge and the acquirer. This type of knowledge is more difficult, and in the case of tacit knowledge impossible, to express. It cannot therefore be transferred, but proliferates through sharing processes, which usually have a strong narrative focus. This might take the form of a literal story about

how something is done, or even a visual demonstration of the various stages of a procedure; the sequential structuring of each stage takes on a narrative form.

Participation in narratives or storytelling was described in Section 2.2.8 as an optional activity with the teller and listener as willing participants (Connell, Klein & Meyer, 2004). In the research setting there was an expectation that at the end of a shift, anything that the next shift needed to know about would be communicated to them, but can that activity be described as a narrative? Both groups of house officers were obliged to make a handover report of patients of concern and tasks requiring attention during the following shift. However, it has been seen that they were under no obligation to conduct the handover activity in any particular way; the manner in which they gave and received the report was entirely optional. Pentland's (1999) analysis of narratives (see Section 2.2.8) enabled the structural characteristics of the handovers to be examined more closely and what was communicated was examined from a knowledge perspective.

5.2.1 The Group 1 handover as a narrative

The handover transcripts from Group 1 had a narrative style in which the HO giving the handover was telling a story about the patients concerned, while the HOs receiving the handover listened to and engaged with the stories, asking questions and adding their own comments. The handover transcript shown in Figure 6 provides a good example of this.

In this Group 1 handover transcript, HO1A and HO1E are coming on duty. HO1C, HO1F, and HO1G were going off duty and presented their handovers. HO1H was also going off duty but had nothing to hand over. He sat at the table listening to the handovers while waiting to meet one of the HOs.

HO1C: *(Gives ward, patient name and number. All know this patient.) We have a problem. (Patient)'s got oesophageal varices as well as everything else and he's really not well.*

HO1A: *Poor chap. Isn't that to do with alcoholism?*

HO1C: *Most times but apparently it can be a thrombosed artery as well, but anyway they burst. I was on the ward around 11 and they called me over to have a look at him and he was clearly not right. I thought I'd talk to (Senior HO) about him then they called me back and they'd gone and he was vomiting blood everywhere. (HO1E and HO1A lean forwards.)*

HO1E: *What caused it?*

HO1C: *No idea (Registrar) said it could have been there for a long time and just went.*

HO1E: *I've never seen it before.*

HO1C: *Nor me. (HO1A shakes head, has not seen it either).*

HO1A: *What was it like? Was it just…?*

HO1C: *(Leans forward towards colleagues) It was horrible really.*

HO1E: *I can imagine. (HO1E and HO1A both nod.)*

HO1C: *He was shouting and trying to get out of bed and pulled the IV stand over. (Senior nurse) was telling everyone what to do and telling him it was ok and a couple of others were sort of mopping him up and there were things everywhere. Then one of the other patients saw it all and wasn't feeling well.*

HO1E: *What did you do?*

HO1C: *I didn't really know what to do. Thankfully (Registrar) was there really quick with (anaesthetist) and they had a look and put a tube down.*

HO1E: *Did it stop straight away?*

HO1C: *Yes, pretty much. They sedated him really quickly but I think he must have been out of it by then anyway. He looked very strange. He's awake now and booked for endoscopy tonight or in the morning. Hope it's tomorrow so I can see it. We went through his history again. Says he's never been a big drinker.*

HO1A: *Depends what you call big I suppose.*

HO1E: *Well he's been here nearly two weeks and I haven't seen him in the bar. (All laugh). Do you think he's got a bottle in his cupboard?*

HO1C: *His past bloods don't show anything but we're double-checking his gamma gts. (Registrar) says his kidneys are nothing to do with it. He said to stop everything he's on and he's using beta blockers. I got him to write it up. (Emphasis on 'him'. HO1A and HO1E both nod their heads.) He's had two units of blood and the first of em terlipressin and the rest's written up IV for the next few days.*

HO1A: *Is that standard?*

HO1C: *Yes.*

HO1A: *So the beta blockers are to decrease flow?*

HO1C: *That's right. (Registrar) said it was actually quite a small bleed really and could have been a lot worse. We had (other medical staff) there when we took it out. I did that and we had to do it all there on the ward. There's no space anywhere and no ITU space. Had to be really careful in case it went again. His transfusion as well. That had to go through fairly slowly so's not to increase the pressure and bleed again.*

HO1A: *Would he have stayed in ITU?*

HO1C: *Well, he's still for resus. (Registrar) thinks they should be ligated but (consultant)'s interested in some sclerotherapy work or something, so there'll probably be a battle.*

HO1A: *He hasn't had the endoscopy yet. (All laugh.)*

HO1E: *So, what started it? Was it just going on all the time?*

HO1C: *Could be, if he's had cirrhosis long enough that might have caused some it, but there was nothing in his history to do with his liver and no-one's ever felt anything.*

HO1E: *Is it calcium?*

HO1C: *Not sure how that would work. (HO1A and HO1C shrug shoulders). What are you thinking?*

HO1E: *Not sure, sorry.*

HO1C: *We've run another batch (lists blood tests) and they should be ready later tonight so let (Registrar) know. He'll meet up with you at 8 on the ward to see him. Unless there's anything else going on before then.*

HO1A: *So how's he looking now?*

HO1C: *I think he's more settled now but he looks pretty bad.*
(Another house officer arrives and they say hello.)

HO1E: *He must have been terrified. What about the rels (relatives)?*

HO1C: *They're with him. (Registrar) talked to them and said we're investigating.*

HO1A: *They're so nice (Recounts a conversation and a joke shared with the patient and relatives).*

HO1E: *So, where are we going with this and the renal stuff?*

HO1C: *I think it's just obs at the moment, see what (Registrar) says later when he's talked to (consultant).*

HO1E: *What happens if it goes again?*
(HO1A's bleep sounds, checks number and leaves it.)

HO1C: *It's all on a trolley and we put another line in on his other side. There's (lists medication) written up to give and get (Registrar) and (anaesthetist). (Nurse manager)'s done it before so it will probably all be sorted when you get there.*

HO1H: *Is this your bleeding man?*

HO1C: *Yes.*

HO1H: *Oh, it's such a shame. He was going to (care home) wasn't he? His (relative)'s lovely. They here?*
(HO1A's bleep sounds again, goes to phone)

HO1E: *Anything we need to do for him till things get sorted out?*

(Another house officer arrives.)

HO1C: *They're doing quarter hourly obs and they'll let you know if there's any change and you just need to get the bloods back for (Registrar) at 8. And just take it as it goes. Might know more for the round tomorrow. (Registrar) thinks he should have this sorted out before anything else so he'll talk to (senior consultant).*

HO1E: *Ok, I'll go and see him after this.*

(HO1A returns with 2 other HOs.)

HO1E: *What else?*

HO1C: *On (ward) we've got (pt name and number) who you saw last night with LVF, obstructive airways and pleural effusion. He's still poorly.*

HO1A: *He looked green last night.*

HO1C: *Yeh. We've got a pump set up now going through in (gives details of medication) but the problem is the BP's creeping up and he's a bit more breathless. He doesn't like the oxygen mask. (Nurse) tried the um whatsit you know, (HO1C indicates towards nose and the others nod) but it's not really good enough and he needs to get used to the mask so he can have a nebuliser. He's written up for (lists drugs) but I think more fluids might need writing up for later tonight and he'll need arterial results checked. Can you see if it's any better? The oxygen's all on the chart. The path report might be there later. His ankles are swollen. They slowed the drip down this afternoon because his output wasn't so good so that needs to be looked at over the next few hours.*

HO1A: *Hold on, is he starting the nebuliser straight away?*

HO1C: *Yes if he'll keep it on. (Nurse) asked his (relative) to get him to keep it on.*

HO1A: *Probably be better when he goes to sleep. Last night (nurse) clipped it to the pillow by his face. (HO1A's pager - checks and goes to phone.)*

HO1E: *Is he eating anything?*

HO1C: *Em, I don't know. Wouldn't have thought he'd have had much.*

HO1E: *Maybe a high protein drink. Shall I check with (nurse)?*

HO1C: *Yes, she'll know what he's been having.*

HO1E: *Right. Next.*

HO1C: *(Gives ward, pt name and number.) Nothing confirmed from the lab yet. The swelling's now around mid thigh.*

HO1E: *That's the left?*

HO1C: *Yes, the left. I've increased his pain relief but we really do need to keep a check on his toes. The nurses are charting it but it's such a dark colour we could easily miss something.*

HO1E: *Is he still on PAS?*

HO1C: *That's right, it's increased now.*

HO1E: *His leg looks the same as (patient). Do you remember him?*

HO1C: *Oh yes. Didn't he get an ulcer? (A returns to table)*

HO1E: *He knocked it having an ultra sound and went into that dressings trial. Leaving him on the same antibiotics?*

HO1C: *For the next day or so, see what the lab comes up with.*

HO1A: *Can he bend his knee?*

HO1C: *No, too swollen and tight now.*

HO1A: *What do we need to do?*

HO1E: *Look at his toes.*

(Another HO arrives, all say hello, she sits at the table and begins some paperwork.)

HO1C: *I've got 2 warfarins to check please (gives wards, names and numbers). That's all. (Short conversation with others not related to handover then HO1C leaves)*

HO1A: *What have you got for us (name of HO)?*

HO1H: *Nothing, I'm just waiting for (another HO).*

HO1G: *I'll give you mine then. On (ward) I have a (name and number), Factor VIII deficiency, MS, who's now been confirmed with gall stones and she's having a cholecystectomy over the next few days.*

HO1E: *The whole gall bladder, not just the stones?*

HO1G: *Yeah, the whole thing. (Registrar) says it will be easier for her.*

HO1E: *Easier for her? But she'll be in for longer.*

HO1G: *(Shrugs) He didn't think she'd be able to cope and a GA was better.*

HO1E: *Did he ask her? (No reply. HO1E shakes head and all present display similar facial expression.)*

HO1G: *(Consultant from different speciality)'s happy with it. He'll keep her in Recovery a bit longer, maybe 24 hours, then send her back here. (Registrar) started her on desmopressin and some em antifibrinolyns.*

HO1E: *How's she doing?*

HO1G: *Glad to know the investigations are over and we can do something about it. She's a bit weepy. The relatives weren't around this afternoon but they'll be here tonight, might want to ask you about the op if you're down there and I think she'd like to hear it again as well. Em yes. Look, there's someone here (Gives patient's details and brief history.) She's been restless all afternoon, says she can't get comfortable but there's nothing specific. (Nurse) did a Reflo and urine and they were fine.*

(Registrar) saw her and didn't come up with anything. All we saw was a slight rise in temp and a bit flushed, but that's down.

HO1H: *What's she on now?*

HO1G: *(lists drugs)*

HO1H: *Responding ok?*

HO1G: *Fine. White cells were all down yesterday.*

HO1F: *Maybe she's just hot in here.*

HO1E: *If you're thinking bacterial or viral do you want me to repeat them?*

HO1G: *Not sure what I'm thinking of.*

HO1E: *How about if she doesn't settle I'll check her and if there's anything if she can describe anything or a rash or something I'll repeat the white cells. OK?*

HO1A: *Hourly obs?*

HO1G: *Yes. Let's get some swabs. Let's do it like an MRSA.*

HO1F: *Why?*

HO1G: *Just to be sure.*

HO1H: *Tut tut. What does your handbook say? (All laugh.) Look, if you're worried we should do it.*

HO1F: *We should, but it wouldn't be that, there'd be something to see, something definite before she started feeling odd.*

HO1G: *Yeah. Listen, go and see what you think later and if she's still not settled do a repeat FBC Us & Es and get a urine off too.*

HO1E: *You said the urine was clear.*

HO1G: *Might be something just brewing. (Nurse) will probably do another dipstick, but if she's still not right we might as well see what the lab says anyway.*

HO1E: *Ok. I'll have a word with (nurse) when I go and see (different patient) and look at her then.*

HO1G: *Thanks. I think there might be a chart on (ward) to do (patient details).*

HO1E: *How is he?*

HO1G: *Doing well. It will just be the fluids if anything but he'll probably be off it tomorrow. That's it.*

(Conversation unrelated to the handover.)

HO1F: *I don't have much.*

HO1A: *Seems quiet these last few days*

(Several tell her to be quiet.)

HO1F: *(Gives patient details) is on 24hour urine collection and he's radioactive. His Venflon's been irritating him, looks reddish. It's already been moved*

from the other side. I've flushed it through but you might get a call about it. There's nothing else you need to do.

HO1A: *How's (patient)?*

HO1F: *Not good. He's going to (ward) as soon as there's a bed.*

HO1A: *What's happened with his graft?*

HO1F: *It doesn't look very good. (Consultant) said today it might have been better to delay till we'd had better results back.*

HO1A: *Is the donor area ok?*

HO1F: *It's not too bad. (Nurse) put this dressing on like a plastic film bit like the IV stuff and there's a bubble of fluid collecting and she says treat it like a burn and leave it alone, just check in case it comes loose. She's swabbed it.*

HO1E: *Is that what they're using on (pt mentioned earlier in handover)?*

HO1F: *Don't know. That's one of (HO)'s isn't it?*

HO1A: *Yes, he's gone.*

Figure 6: Extract of Group 1 handover transcript, No. 1

Literal reading of the Group 1 handover transcript in Figure 6 showed that the handover was divided into distinct sections for each patient, in much the same way as a collection of short stories. The handover commenced with HO1C handing over to HO1A and HO1E. HO1C introduced his first patient giving an account of the unfortunate decline in his condition, and the analysis initially focuses upon this section of the handover.

Referring to Pentland's (1999) analysis of narrative texts (Section 2.2.8), it can be seen that the account had an actor, the patient of concern, and that HO1C provided a sequence of events from the time that he was initially asked to see the patient, the occurrence of various clinical events, the medical and nursing interventions made to stabilize the patient, through to the patient's condition at the time of the handover. The narrative voice was provided by HO1C giving his account from his own perspective as a junior HO, rather than for example, a detached statement of events. He said that he had never seen the particular condition before and *'I didn't really know what to do. Thankfully (registrar) was there really quick with (anaesthetist)…'* An evaluative frame of reference for the patient's condition was established by HO1C telling his colleagues of his response to it: *'It was horrible really'* and how one of the other patients had reacted; *'… one of the other patients saw it all and wasn't feeling well'*, assisting them in making a judgement about the condition. This was supported by his report of the swift arrival of the registrar and anaesthetist, which emphasized the extreme and

urgent nature of the situation. This was then further confirmed by HO1C reporting that the patient was *'… clearly not right…'*, *'… really not well…'* and *'… he's more settled now but he looks pretty bad'* reinforcing his message to the other HOs that the patient's condition was serious. Additional content and context indicators elaborated the handover report to assist HO1A and HO1E in interpreting the situation. There was for example, the description of the distressed patient's actions and the scene around his bed, and HO1C told his colleagues of one of the procedures *'… we had to do it all there on the ward. There's no space anywhere and no ITU space'*, an example of shared procedural knowledge, in which HO1C implied that it was something unusual that would normally have been carried out elsewhere in particular parts of the hospital. This was more than an HO giving his colleagues a factual account of what happened; they were confirming existing shared knowledge, and the new knowledge that HO1C had gained from being actively involved in the situation was being shared with all those actively engaged in the narrative.

Pentland (1999) also described four structural levels that may be identified within narratives (see Section 2.2.8). The first level, the text of the narrative, is evident in the transcript made from recording the handover. The second level, the story, is the perspective from which the account is being made. In this case, HO1C's personal view from the perspective of a junior HO of what happened when a patient suffered ruptured oesophageal varices.

The fabula, the third level, is the description of the events that took place in the case of the particular situation in question, and in the transcript HO1C gave an account of the actions taken by the patient, other patients, and nursing and medical staff, including himself. The fourth level, the generating mechanism, shapes the fabula by providing structures such as norms, procedures and protocols against which the fabula can be assessed. Within these deeper levels lies the coded data by which we understand complex relationships between elements of our environment, and by which our understanding of concepts such as organizational culture, values and expectations within situations can be seen. Several examples of this are present in handover report on this patient. In addition to telling his colleagues what they needed to know about the patient, HO1C implied that one of the medical interventions would normally have been carried out in a more specialist location, perhaps necessitating a period in the Intensive Therapy Unit. This indicated that there was an accepted procedure for this intervention, but that the nature of the department was such that under certain circumstances, it would be carried out where and when required. There was also a gentle suggestion that further medical procedures were being advocated on the basis of professional interest before the outcome of further investigations to assess the

situation were known. This inferred the recognized enthusiasm of senior medical staff for situations appropriate to their individual interests within this research oriented environment, rather than any lack of professionalism:

HO1C: *'… (Registrar) thinks they (oesophageal varices) should be ligated but (consultant)'s interested in some sclerotherapy work or something, so there'll probably be a battle.*
HO1A: 'He hasn't had the endoscopy yet.' (All laugh.)

There is an instance of terse storytelling (Boje 1991), when HO1C tells his colleagues about the patient's new drug regime:

HO1C: *'…(Registrar) says his kidneys are nothing to do with it. He said to stop everything he's on and he's using beta-blockers. I got him to write it up. (Emphasis on 'him'. HO1A and HO1E both nod their heads)…'*

The above exchange indicated the confirmation of some shared knowledge that the HOs could each refer to and understand without the need to elucidate. The knowledge was known to the HOs; the meaning of what HO1C said was clear to them but not to the author. HO1C's colleagues, rather than passively listening to his report, actively engaged with the handover, asking questions about the patient, the condition and treatment involved, suggesting possible causes for the condition, and contributing their experiences relating to the patient and relatives, thereby providing a fuller picture. This included one of the HOs who was not directly involved with this part of the handover:

HO1H: *'Is this your bleeding man?'*
HO1C: *'Yes.'*
HO1H: *'Oh, it's such a shame. He was going to (care home) wasn't he? His (relatives) are lovely. They here?'*

They were sufficiently involved with the story about the patient that they empathised with him:

HO1A: *'Poor chap…'*
HO1E: *'He must have been terrified…'*

HO1C might have chosen to convey the facts about this patient in an objective and detached manner, but in setting out his handover as described above, which facilitated

the participation the other HOs, they were all actively engaged in the construction of a narrative concerning this patient.

The HOs could have read much about the particular condition, the medical procedures, the drugs involved and ongoing care from a medical text, but hearing about the event from HO1C's personal perspective and contributing to the development of the narrative, provided additional qualities. Within the narrative format, HO1C's colleagues were drawn closely towards what he had experienced, the medical facts were set out from the perspective of an HO, one of their group, understood by all of them. They learned of the patient's distress, the activity at the bedside, the reaction of other patients, and importantly, as he told the story of the events leading to the patient's crisis, they learned it from the perspective of an HO in that situation.

For the second section of his handover report, HO1C again presented a sequence of medical events, this time telling the story of his second patient's deteriorating condition. HO1A and HO1E contributed to the evolving narrative and asked questions to develop their image of the patient and what was to be done for him:

HO1A: *'He looked green last night.'*
HO1A: *'… Last night they'd clipped it (oxygen mask) to the pillow by his face.'*
HO1E: *'Is he eating anything?'*
HO1A: *'Hold on, is he starting the nebuliser straight away?'*

The third section of HO1C's handover was again a narrative presentation in which his colleagues participated. He concluded his report by grouping together two patients whose drug charts needed to be updated.

The handover presented by HO1G followed a similar narrative structure with other HOs interacting. There was also a further instance of terse storytelling, in which the HOs confirmed shared knowledge:

HO1G: *(Shrugs) 'He didn't think she'd be able to cope and a GA was better.'*
HO1E: *'Did he ask her?' (No reply. HO1E shakes head and all present display similar facial expression.)*

The remainder of this handover followed a similar pattern, as did all of the Group 1 handovers observed.

The following extract from a different Group 1 handover again illustrates the narrative structure they used, this time with the addition of a diagram. The patient has presented with a bed sore, a large area of full thickness, ulcerated flesh. It is the first time that the HO handing over has seen such a severe sore. The others have never seen it. They ask questions of the HO who has seen it to elaborate upon their limited awareness of the condition. At this stage in their training, a little over five months, the Group 1 HOs are quite inexperienced, but are already developing a portfolio of real rather than textbook medical conditions against which they can make comparisons. At the end of the extract one of the HOs draws the attention of the others towards a patient with a similar condition, in considering measures to support the present patient's treatment.

In this extract from a Group 1 handover transcript, HO1D is handing over to HO1H and HO1F who are coming on duty. HO1E is present, waiting to hand over before going off duty.

HO1D: *'They'd tried some pigskin and all sorts but nothing's worked. It's all in a bag they sent in with him. (Wound care nurse)'s coming over soon'*

HO1H: *'What does it look like?'*

HO1D: *'Mainly black with yellow but there's a small area at one edge bleeding so... (draws a diagram and the others watch closely) but down here (indicates area of diagram) that's where you can see the bone. And the exudate all seems to be coming from here (indicates area of diagram). There's quite a smell. The black's sort of leathery, shiny, like a cover but the rest's... (the others replicate the first HO's facial expression).*

HO1F: *'Must be incredibly painful.'*

HO1D: *'He's written up for (lists analgesics) and he's been on (antibiotics) for his bronchitis.'*

HO1E: *'Have the physios seen him?'*

HO1D: *'Yes, he's had a sputum and em, yes he's had swabs.'*

HO1H: *'The skin around it must be inflamed.'*

HO1D: *'Yes it is, it's really fragile. You can see marks where the tape's been and they'd used em, eusol, it's made things worse.*

HO1E: *'What's that?'*

HO1D: *'Phenolic acid. It's leaked out and damaged the skin all around here (indicates area of diagram).'*

HO1F: *'What?'*

HO1H: *'Oh no.'*

HO1D: *'Yes. (Registrar) says it shouldn't have been used at all.''*

HO1F: *'Sounds dreadful.'*

HO1H: *'What's on it now?'*

HO1D: *'Just a drape over it and the nurses have got him kind of up on his side on a pile of pillows to keep him off it. (Registrar) was saying that this stuff used to be used fairly liberally for cleaning up infected things, wounds.'*

HO1E: *'Do you remember the woman on (ward) a few months ago with the leg ulcers, the one with MS?'*

HO1H: *'She went to (ward) didn't she?'*

HO1E: *'That's her. A lot of it was nutrition with her wasn't it? She was so wasted all of that had to be sorted out first.'*

HO1D: *'Why wouldn't she eat?'*

HO1E: *'She'd got this thing with the MS about being scared to swallow and was just having sips of some like em cactus juice.'*

HO1D: *'Cactus juice?'*

HO1E: *'Aloes or something.'*

HO1H: *'That's for putting on sunburn it's in shower things and body lotion.'*

HO1D: *'No wonder she was so ill. (All laugh)'*

HO1E: *'What's this chap like nutrition-wise?'*

HO1D: *'He's very frail. Shouldn't think he's much interested in food, he's very weak. With bronchitis and this (taps diagram with pen) he's exhausted.'*

HO1F: *'Must be looking at some months for improvement then?'*

HO1D: *'Easily. It'll be interesting to see what (wound care nurse) does with it.'*

HO1E: *'But the other one, she'd got it infected so it was going to take time anyway, but (wound care nurse) said that the most important thing was getting the eating problem sorted out.'*

HO1H: *'How did she get her from drinking shower soap to eating her dinner?'*

HO1E: *She didn't. She gave her some high protein stuff down an NG tube.*

HO1D: *'Something more for the psychs to deal with.'*

HO1E: *'It wasn't great, but the infection was cleared when she went to (ward).*

Figure 7: Extract of Group 1 handover transcript, No. 2

The HO going off duty had no actions relating to this patient that the others should carry out, but wanted to share what had been learned. The patient was waiting to be

seen by the wound care nurse and after treatment, would presumably have been made comfortable and cared for by nursing staff until his laboratory results were known.

The author concludes that the Group 1 handovers should be considered as narratives within which knowledge sharing was taking place.

5.2.2 The Group 2 handover as a narrative

The analysis will now turn to examples of handovers provided by Group 2 HOs. Figures 8 and 9 are complete transcripts of Group 2 HOs handing over before going home, with Figure 9 being from one of the subgroup HOs. As the two handovers were conducted by telephone the transcripts only include what was said by the HOs giving the handover, not those receiving it.

This is a complete transcript of a Group 2 HO, HO2M, giving his handover by telephone before going off duty, to an HO who has recently come on duty.

'Hiya, how's it going?'
(Laughs)
'My lady on (ward) (patient name). She's had a pretty poor day really. Can you go and see how she's doing? Her diamorphine's been increased and she's on a pump now. There's no change with (second patient). One way or another we've got to have a decision. Can you and (nurse) see if one of the more clued up relatives is there tonight? Get them to come in tomorrow afternoon (registrar) wants to talk to them.'
'Probably not. I've left an admission for you on (ward).'
'No way, far too hot for that. We're off to the (pub).'
(Laughs)
'Cheers.'
'Bye.'

Figure 8: Transcript of Group 2 day shift HO handing over

In contrast to the Group 1 handovers, those of Group 2 were more instructional in nature and one-sided, with few questions or contributions from the listener. The brief handover report in Figure 8 concerned three patients; no other items were included.

The tone was cheerful and the handover was completed within a few minutes. HO2M did not refer to any notes.

While Pentland (1999) says that the emphasis of narrative features will alter depending upon the nature of the story being told, there are few that could have been identified within the Group 2 handover in Figure 8, other than HO2M's value judgement of his second patient's relatives:

> HO2M: *'…Can you and (nurse) see if one of the more clued up relatives is there tonight?'*

HO2M said of his first patient:

> HO2M: *'…She's had a pretty poor day really…'*

However, his colleague was not informed of why it had been a poor day, or subsequently the circumstances leading to the changes in pain relief. The HO asked his colleague to *'… see how she's doing …'* but did not specify any particular aspect of the patient's condition that he was concerned with. From the listener's perspective, there is nothing in the transcript to indicate that any questions were asked about these matters. The second patient was named but no ward or diagnosis was mentioned, and he went on to say that a decision had to be made, but did not elaborate this point. HO2M went on to say that the registrar wanted to talk to the patient's relatives but did not say what this was about, and the transcript again indicates that his colleague did not ask. HO2M might have considered that his colleague was aware of the patient he was talking about and the ongoing medical concerns, but there was nothing in the handover observed to suggest that this was so. The third patient was simply identified as a new admission on a particular ward, with no name and no indication of the medical problem. HO2M left the formal admission procedures for his colleague to carry out.

This handover provided little insight into the condition of the patients concerned and while reading the transcript the author was reminded of the comment made by HO1D in Section 4.4.1.1 that *'… you might as well just say here's the names of six patients you need to see and leave them to read the notes. That's not a handover, not a good handover.'* Even if the HO coming on duty had some knowledge of the first two patients from a previous shift, in order to attend to them effectively, he or she would have had to go to the appropriate wards and refer to the patients' notes, probably discussing the first with nursing staff, certainly the second. The request to liaise with

relatives would clearly need to have been dealt with before the end of visiting hours, but other than that there was little in the handover that might have conveyed which of the other two patients should have been seen first. HOs receiving multiple messages of this type at various times during the evening would have had some difficulty in establishing their priorities from the handovers alone. This handover would not be described as a narrative.

From a knowledge perspective, HO2M communicated a number of factual statements about his patients:

> HO2M: *'Her diamorphine's been increased and she's on a pump now'*
> HO2M: *'Get them to come tomorrow afternoon (registrar) wants to see them'*
> HO2M*: 'I've left an admission for you on (ward)'*

The above statements might be described as explicit information as they are factual, set within a context understood by other HOs, and require no additional processing to derive meaning. However, the author's interpretation is that what was being communicated was explicit knowledge. Whatever process each of the HOs used, however simple or complex, they had in some way processed the information concerning their patients during the day and reached a decision to hand over particular patients to the night shift. Although HO2M did not say what his concerns were for his first patient, he wanted his colleague to visit her during the night and reported on her medication. HO2M's report confirms the comments that he made about details being unnecessary at the late afternoon handover (see Section 4.4.1.1):

> HO2M: *'… I'll say check on this one and they'll go and see him… it will all be in the notes.'*

Processing for the second and third patients would have been more straightforward. HO2M would not have been able to talk to the relatives himself as he was going off duty; the task is therefore handed over. Similarly, he had not formally admitted the third patient during his shift and handed the job over to his colleague. The content of the handover was explicit knowledge, the communication process was direct, and can be described as knowledge transfer.

The transcript shown in Figure 9 is a handover given by a Group 2 subgroup HO. While this and the example given in Figure 8 are typical of what was observed within Group 2 in terms of brevity and lack of discussion, there is a difference in the style and the

manner in which the handover is delivered that demonstrates the different characteristics of the HOs in the subgroup.

This is a complete transcript of a Group 2 HO, HO2A, handing over by telephone before going off duty.

'It's me. Where are you?'
'Has a (patient name) arrived yet?'
'Stay there you've got to clerk him. (Registrar) said he'd be up there at 6 to consent him so you've got to do it before then. He's going to endoscopy tomorrow. He's a GP admission with abdo pain but his haemoglobin's 5. (Registrar)'s going to look for lesions. The bloods the GP did should be ready soon and the path results but just clerk him don't do anything else with him till (registrar)'s seen him. After that there's (patient name) on (ward).'
'Yes that's him. He's complaining he needs more pain relief. (Nurse)'s not sure about him. We thought it would be good for him to see his psychologist so he's coming tomorrow. He's only on the Tramadol that neuro gave him 100mg tds. If he's still complaining at 10 don't increase it talk to (registrar) first. He might be better with Temazepam just for tonight.'
'Yes nothing else. See you.'

Figure 9: Transcript of Group 2 subgroup day shift HO handing over

The pauses during which time HO2A's colleague spoke were very short and it is clear from the transcript that this was not a discussion. The HO was not asked to remain on the ward he was calling from to attend to the new patient; he was instructed to do so. HO2A provided a reason, saying that the registrar would be there to see the patient at a particular time *'… so you've got to do it before then.'* In this extremely brief report, HO2A implied that if certain laboratory results were ready they should be presented to the registrar, but stated firmly that the formal admission procedure was a priority that needed to be completed within a given time frame and that nothing else should be done to the patient.

HO2A then reported on a second patient, who it seems from the transcript was known to her colleague. HO2A presented her reasons for including him in the handover, which were that she and a nurse were concerned about the patient's continued requests for

pain relief, and another healthcare professional had been asked to attend. Until then, if the patient remained unsettled, the HO was told to consult the registrar.

This Group 2 subgroup handover was extremely forceful and explicit. This is demonstrated by comparing HO2A's use of *'Stay there…' '… you've got to do it before then …' '… don't do anything else…'* and *'… don't increase it…'* with HO2M's far looser phrasing *'… Can you go and see how she's doing?'* and '*I've left an admission for you…'.* HOs receiving this type of handover would be in no doubt about what the presenting HO's priorities were, but with handovers being received at various times and no confirmation that all handover messages had been received, it would still be difficult to organize the evening's work effectively.

As with the previous example, there is limited interaction between the two HOs and little in the way of a story. Some rationale is provided for what is handed over, but it is not a narrative.

The handover shows HO2A communicating clear, straightforward messages to her colleague on night duty. The messages required no further processing and the night duty HO did not appear to ask any questions about what was said. There was little opportunity for misunderstanding and again the handover was largely a list of factual statements; *' … you've got to clerk him'* followed by the time that the registrar would arrive, the procedure to be carried out the following day, the patient's admission status, his haemoglobin level, and so on. In this case, processing was a simple matter; HO2A's first patient had not arrived on the ward at the end of her shift and was therefore handed over to the night duty HO for admission. The second patient's situation appeared to have had deeper consideration in that an alternative to his current medication was suggested if needed. This handover is a further representation of explicit knowledge transfer.

5.3 Are the HOs making sense?

As the data/frame theory concerns individual, intentional sensemaking, it was expected that any instances of the sensemaking activities would be found within the accounts the HOs gave of their sensemaking, i.e., within the interviews. The HOs were asked about how they decided what to include in the late afternoon handover at the end of a day shift. They were also asked about how they organized the information from the handovers they received from the day shift HOs when on night duty, and how they prioritized their work from this. The interview transcripts were examined to establish whether any sensemaking activities were carried out in relation to the late afternoon handover, according to the coding given in Table 6.

5.3.1 Group 1 sensemaking activities

The Group 1 HOs said that they were aware of their priority patients from their work during the day and knew as the day progressed which patients would require attention during the night. As was seen in Section 4.4.1, they kept brief notes on each patient during their shift. Most of them made a point of going back to see those patients before the handover to check the current situation and make a note of any relevant information, for example blood pressure readings, lung function values or whether the patient was pain free. In confirming the status of patients in this way the HOs were elaborating upon a frame. For the purpose of the handover they were not questioning the patient's diagnosis or condition, although they might possibly do so if upon attending the patient they noticed something unusual, but they were gathering additional information that confirmed and supported their understanding of each patient's situation in order to make their report.

HO1G described how a patient had complained of feeling unwell, but with no specific symptoms. He examined the patient but was unable to reach a conclusion, as the patient's symptoms did not match his examination findings. This was an instance of seeking a frame; the available data did not make sense. The HO then discussed the case with the registrar and tried to think of other patients with similar signs and symptoms: an attempt to compare frames. While this activity may well assist in reaching a diagnosis by identifying a similar frame, it can also operate by highlighting the critical differences between the current situation and a cluster of frames with similar characteristics (Rudolph 2003, see Section 2.3.4.3.5). As the latter process is a feature of sensemaking in experts and the HO had consulted a registrar, it may be that both forms of comparing frames were being conducted in order to assist the patient. They were unable to determine what might have been happening. The patient's temperature began to return to normal and the registrar said that it was probably nothing significant and no further action needed to be taken. However, HO1G remained concerned and included the patient in his handover.

It was not possible to identify any other sensemaking activities from the Group 1 accounts of how they prepared their handovers. This might be explained by their sensemaking during the day being carried out 'on the fly' (Albolino, Cook & O'Connor, 2007), or in a fickle manner (Lundberg 2000), both of which refer to the updating of sense in real time as work continues (see Section 2.3.3.1.7). Other deliberate sensemaking activities are carried out as the situation arises during the day, so that when the handover is due, the HOs' concern is to confirm their understanding. In the

case of HO1G, the process of seeking a frame was ongoing and that is what he took to the handover.

When receiving a handover, the Group 1 HOs said that while they trusted what they were being told, they asked questions to:

HO1B: *'… get the full picture … to get a feeling of what's going on.'*

HO1A: *'I might want to check I've got something right … or find out a bit more about the disease or something that's happened.'*

HO1D: *'When you're looking out for a patient or going to do something specific for them … to them … you can't just go and do it without knowing why and what's going on … I was asked to keep a check on a patient earlier this week who'd had a really rough time but before I saw him I needed to know was he awake, alert, cyanosed, what are his sats and how did his chest sound earlier? All that sort of thing. Lots of it's in the handover but there are things you want to know because that's how your thinking's going at the time. His nurse would know and of course, you always ask, but you need a base line, what was the doctor that saw him last thinking? … need to know what to expect at the start so you can see what the changes are.'*

The HOs were describing the process of elaborating a frame. They were not questioning or doubting the diagnosis or the understanding that the HO giving the handover had of the patient's situation, they were asking questions to add more detail to the image they themselves were developing. Having this richer perception of each patient, in addition to helping prepare the HOs for what they would be dealing with in the case of each individual patient, might also have helped them once the handover was complete, to set their priorities for the night.

The handover extract in Figure 7 was a further example of elaborating a frame, with the literal addition of a diagram, to explicitly illustrate what the HO had seen.

5.3.2 Group 2 sensemaking activities

The Group 2 HOs generally did not consider that the late afternoon handover required a great deal of preparation, saying that this was because the handover would only consist of patients requiring attention during the night and they would be readily brought to mind. HO2A, one of the subgroup HOs, followed a similar process to the Group 1 HOs, of making a final check of her priority patients to update on their current situation, or elaborate the frame, before giving her handover:

HO2A: *'… then I look to see if anything needs doing later on. I've a particularly sick patient at the moment so I want to make sure they keep an eye on him overnight … He's having a lot done to him so I know the nurses will be there and shout if there's a problem but I want one of the doctors to go and listen to his chest as well.*

The HO was asked if she would include a patient with an unusual condition, something that she had not seen before:

HO2A: *'Not if they don't need following up during the night … there must be lots of different things in the hospital but it's too busy at night to go and look at them … if it was something really unusual we'd all get to hear about it … they'd probably need a lot of attention so we'd all be involved with them anyway.'*

Only two other Group 2 HOs said that they would go and make a final check on patients, gathering current information, before the handover. The others said that if any changes had occurred they would have been alerted, and no calls meant that everything had remained stable. There were no other sensemaking activities noted within the Group 2 accounts of preparing late afternoon handovers.

No sensemaking activities were identified in the Group 2 interviews relating to receiving late afternoon handovers:

HO2M: *'… it's very simple you're told this patient needs this doing and you do it … there's no need to go over all the background, it's all in the notes.'*

Apart from clear priorities such as tasks that needed to be completed within a given timeframe and patient emergencies, there was no common pattern between the Group 2 HOs as to how their work at night would be carried out.

5.4 Sensemaking activities at group level

Although the interviews provided little evidence of the sensemaking activities, while reflecting upon the Group 1 handover transcripts, the recordings of the handovers in progress, it became apparent that the HOs were carrying out these activities while interacting as a group. To demonstrate, Figure 10 shows the extract from the Group 1 handover given in Figure 6, marked according to the colour-coded sensemaking activities given in Table 3.1. Although the instances have been counted and included in

Table 7, these figures have no relevance in themselves, as what is handed over is primarily dependent upon the individual conditions of the patients within the unit at that time. However, the figures have been included to demonstrate that the instances occurred.

This figure shows the Group 1 handover transcript from Figure 6, marked according to the following categories:

Key to text markings:
Elaborating the frame
Seeking a frame
Preserving a frame
Reframing
Comparing the frame
Questioning a frame
Anticipatory thinking

HO1C: *(Gives ward, patient name and number. All know this patient.) We have a problem. (Patient)'s got oesophageal varices as well as everything else and he's really not well.*

HO1A: *Poor chap. Isn't that to do with alcoholism?*

HO1C: *Most times but apparently it can be a thrombosed artery as well, but anyway they burst. I was on the ward around 11 and they called me over to have a look at him and he was clearly not right. I thought I'd talk to (Senior HO) about him then they called me back and they'd gone and he was vomiting blood everywhere. (HO1E and HO1A lean forwards.)*

HO1E: *What caused it?*

HO1C: *No idea (Registrar) said it could have been there for a long time and just went.*

HO1E: *I've never seen it before.*

HO1C: *Nor me. (HO1A shakes head, has not seen it either).*

HO1A: *What was it like? Was it just…?*

HO1C: *(Leans forward towards colleagues) It was horrible really.*

HO1E: *I can imagine. (HO1E and HO1A both nod.)*

HO1C: *He was shouting and trying to get out of bed and pulled the IV stand over. (Senior nurse) was telling everyone what to do and telling him it was ok and a couple of others were sort of mopping him up and there*

were things everywhere. Then one of the other patients saw it all and wasn't feeling well.

HO1E: *What did you do?*

HO1C: *I didn't really know what to do. Thankfully (Registrar) was there really quick with (anaesthetist) and they had a look and put a tube down.*

HO1E: *Did it stop straight away?*

HO1C: *Yes, pretty much. They sedated him really quickly but I think he must have been out of it by then anyway. He looked very strange. He's awake now and booked for endoscopy tonight or in the morning. Hope it's tomorrow so I can see it. We went through his history again. Says he's never been a big drinker.*

HO1A: *Depends what you call big I suppose.*

HO1E: *Well he's been here nearly two weeks and I haven't seen him in the bar. (All laugh). Do you think he's got a bottle in his cupboard?*

HO1C: *His past bloods don't show anything but we're double-checking his gamma gts. (Registrar) says his kidneys are nothing to do with it. He said to stop everything he's on and he's using beta blockers. I got him to write it up. (Emphasis on 'him'. HO1A and HO1E both nod their heads.) He's had two units of blood and the first of em terlipressin and the rest's written up IV for the next few days.*

HO1A: Is that standard?

HO1C: *Yes.*

HO1A: *So the beta blockers are to decrease flow?*

HO1C: *That's right. (Registrar) said it was actually quite a small bleed really and could have been a lot worse. We had (other medical staff) there when we took it out. I did that and we had to do it all there on the ward. There's no space anywhere and no ITU space.*

HO1A: *Would he have gone there?*

HO1C: *Well, he's still for resus. (Registrar) thinks they should be ligated but (consultant)'s interested in some sclerotherapy work or something, so there'll probably be a battle.*

HO1A: *He hasn't had the endoscopy yet. (All laugh.)*

HO1E: *So, what started it? Was it just going on all the time?*

HO1C: *Could be, if he's had cirrhosis long enough that might have caused some it, but there was nothing in his history to do with his liver and no-one's ever felt anything.*

HO1E: *Is it calcium?*

HO1C: *Not sure how that would work. (HO1A and HO1C shrug shoulders). What are you thinking?*

HO1E: *Not sure, sorry.*

HO1C: *We've run another batch (lists blood tests) and they should be ready later tonight so let (Registrar) know. He'll meet up with you at 8 on the ward to see him. Unless there's anything else going on before then.*

HO1A: *So how's he looking now?*

HO1C: *I think he's more settled now but he looks pretty bad.*

(Another house officer arrives and they say hello.)

HO1E: *He must have been terrified. What about the rels (relatives)?*

HO1C: *They're with him. (Registrar) talked to them and said we're investigating.*

HO1A: *They're so nice (Recounts a conversation and a joke shared with the patient and relatives).*

HO1E: *So, where are we going with this and the renal stuff?*

HO1C: *I think it's just obs at the moment, see what (Registrar) says later when he's talked to (consultant).*

HO1E: *What happens if it goes again?*

(HO1A's bleep sounds, checks number and leaves it.)

HO1C: *It's all on a trolley and we put another line in on his other side. There's (lists medication) written up to give and get (Registrar) and (anaesthetist). (Nurse manager)'s done it before so it will probably all be sorted when you get there.*

HO1H: *Is this your bleeding man?*

HO1C: *Yes.*

HO1H: *Oh, it's such a shame. He was going to (care home) wasn't he? His (relative)'s lovely. They here?*

(HO1A's bleep sounds again, goes to phone)

HO1E: *Anything we need to do for him till things get sorted out?*

(Another house officer arrives.)

HO1C: *They're doing quarter hourly obs and they'll let you know if there's any change and you just need to get the bloods back for (Registrar) at 8. And just take it as it goes. Might know more for the round tomorrow. (Registrar) thinks he should have this sorted out before anything else so he'll talk to (senior consultant).*

HO1E: *Ok, I'll go and see him after this.*

(HO1A returns with 2 other HOs.)

HO1E: *What else?*

HO1C: *On (ward) we've got (pt name and number) who you saw last night with LVF, obstructive airways and pleural effusion. He's still poorly.*

HO1A: *He looked green last night.*

HO1C: *Yeh. We've got a pump set up now going through in (gives details of medication) but the problem is the BP's creeping up and he's a bit more breathless. He doesn't like the oxygen mask. (Nurse) tried the um whatsit you know, (HO1C indicates towards nose and the others nod) but it's not really good enough and he needs to get used to the mask so he can have a nebuliser. He's written up for (lists drugs) but I think more fluids might need writing up for later tonight and he'll need arterial results checked. Can you see if it's any better? The oxygen's all on the chart. The path report might be there later. His ankles are swollen. They slowed the drip down this afternoon because his output wasn't so good so that needs to be looked at over the next few hours.*

HO1A: *Hold on, is he starting the nebuliser straight away?*

HO1C: *Yes if he'll keep it on. (Nurse) asked his (relative) to get him to keep it on.*

HO1A: *Probably be better when he goes to sleep. Last night (nurse) clipped it to the pillow by his face. (HO1A's pager - checks and goes to phone.)*

HO1E: *Is he eating anything?*

HO1C: *Em, I don't know. Wouldn't have thought he'd have had much.*

HO1E: *Maybe a high protein drink. Shall I check with (nurse)?*

HO1C: *Yes, she'll know what he's been having.*

HO1E: *Right. Next.*

HO1C: (Gives ward, pt name and number.) Nothing confirmed from the lab yet. The swelling's now around mid thigh.

HO1E: *That's the left?*

HO1C: *Yes, the left. I've increased his pain relief but we really do need to keep a check on his toes. The nurses are charting it but it's such a dark colour we could easily miss something.*

HO1E: *Is he still on PAS?*

HO1C: *That's right, it's increased now.*

HO1E: *His leg looks the same as (patient). Do you remember him?*

HO1C: *Oh yes. Didn't he get an ulcer? (A returns to table)*

HO1E: *He knocked it having an ultra sound and went into that dressings trial. Leaving him on the same antibiotics?*

HO1C: *For the next day or so, see what the lab comes up with.*

HO1A: *Can he bend his knee?*

HO1C: *No, too swollen and tight now.*

HO1A: *What do we need to do?*

HO1E: *Look at his toes.*

HO1C: *I've got 2 warfarins to check please (gives wards, names and numbers). That's all. (Short conversation with others not related to handover then HO1C leaves)*

HO1A: *What have you got for us (name of HO)?*

HO1H: *Nothing, I'm just waiting for (another HO).*

HO1G: *I'll give you mine then. On (ward) I have a (name and number), Factor VIII deficiency, MS, who's now been confirmed with gall stones and she's having a cholecystectomy over the next few days.*

HO1E: *The whole gall bladder, not just the stones?*

HO1G: *Yeah, the whole thing. (Registrar) says it will be easier for her.*

HO1E: *Easier for her? But she'll be in for longer.*

HO1G: *(Shrugs) He didn't think she'd be able to cope and a GA was better.*

HO1E: *Did he ask her? (No reply. HO1E shakes head and all present display similar facial expression.)*

HO1G: *(Consultant from different speciality)'s happy with it. He'll keep her in Recovery a bit longer, maybe 24 hours, then send her back here. (Registrar) started her on desmopressin and some em antifibrinolyns.*

HO1E: *How's she doing?*

HO1G: *Glad to know the investigations are over and we can do something about it. She's a bit weepy. The relatives weren't around this afternoon but they'll be here tonight, might want to ask you about the op if you're down there and I think she'd like to hear it again as well. Em yes. Look, there's someone here (Gives patient's details and brief history.) She's been restless all afternoon, says she can't get comfortable but there's nothing specific. (Nurse) did a Reflo and urine and they were fine. (Registrar) saw her and didn't come up with anything. All we saw was a slight rise in temp and a bit flushed, but that's down.*

HO1H: *What's she on now?*

HO1G: *(lists drugs)*

HO1H: *Responding ok?*

HO1G: *Fine. White cells were all down yesterday.*

HO1F: *Maybe she's just hot in here.*

HO1E: *If you're thinking bacterial or viral, do you want me to repeat them?*

HO1G: *Not sure what I'm thinking of.*

HO1E: *How about if she doesn't settle I'll check her and if there's anything if she can describe anything or a rash or something I'll repeat the white cells. OK?*

HO1A: *Hourly obs?*

HO1G: *Yes. Let's get some swabs. Let's do it like an MRSA.*

HO1F: *Why?*

HO1G: *Just to be sure.*

HO1H: *Tut tut. What does your handbook say? (All laugh.) Look, if you're worried we should do it.*

HO1F: *We should, but it wouldn't be that, there'd be something to see, something definite before she started feeling odd.*

HO1G: *Yeah. Listen, go and see what you think later and if she's still not settled do a repeat FBC Us & Es and get a urine off too.*

HO1E: *You said the urine was clear.*

HO1G: *Might be something just brewing. (Nurse) will probably do another dipstick, but if she's still not right we might as well see what the lab says anyway.*

HO1E: *Ok. I'll have a word with (nurse) when I go and see (different patient) and look at her then.*

HO1G: *Thanks. I think there might be a chart on (ward) to do (patient details).*

HO1E: *How is he?*

HO1G: *Doing well. It will just be the fluids if anything but he'll probably be off it tomorrow. That's it.*

Conversation unrelated to the handover.)

HO1F: *I don't have much.*

HO1A: *Seems quiet these last few days*

(Several tell her to be quiet.)

HO1F: *(Gives patient details) is on 24hour urine collection and he's radioactive. His Venflon's been irritating him, looks reddish. It's already been moved from the other side. I've flushed it through but you might get a call about it. There's nothing else you need to do.*

HO1A: *How's (patient)?*

HO1F: *Not good. He's going to (ward) as soon as there's a bed.*

HO1A: *What's happened with his graft?*

HO1F: *It doesn't look very good. (Consultant) said today it might have been better to delay till we'd had better results back.*

HO1A: *Is the donor area ok?*

HO1F: *It's not too bad. (Nurse) put this dressing on like a plastic film bit like the IV stuff and there's a bubble of fluid collecting and she says treat it like a burn and leave it alone, just check in case it comes loose. She's swabbed it.*

HO1E: *Is that what they're using on (pt mentioned earlier in handover)?*

HO1F: *Don't know. That's one of (HO)'s isn't it?*

HO1A: *Yes, he's gone.*

Figure 10: Coded Group 1 handover transcript

The most frequent sensemaking activity that the HOs engaged in was elaborating a frame. The interactive, narrative style of the Group 1 handover would have facilitated questioning, and while the HOs were clearly keen for answers, the approach was one of sharing and drawing upon what others had experienced rather than being interrogatory.

The first section of the transcript was HO1C's handover to night duty colleagues of a patient suffering from ruptured oesophageal varices. It was previously seen that this condition was new to all the HOs present. The text marked in yellow indicates the HOs elaborating upon the frame of a patient with this condition, by asking questions and applying more detail to HO1C's already vivid description. HO1C's narrative approach drew them close to his experience and they jointly developed an image of the situation, including the medical condition, the procedures and the ongoing treatment. The night duty HOs also referred to their existing knowledge to explore the new event, for example, *'Isn't that to do with alcoholism?', 'So the beta blockers are to decrease flow?'.*

The precise cause of the condition had not been identified. To assist the discussion and the sense of what was happening, HO1C compared frames, by considering a liver condition: *' … if he's had cirrhosis long enough that might have caused some of it …'.* HO1E develops this by seeking a frame: *'Is it calcium?'* A conclusion could not be reached until further investigations had been carried out, but the handover provided a rich source of information about the patient and his condition.

HO1C's report on his second patient attracted more elaboration concerning the administration of the patient's medication and whether he was eating.

The following section of HO1C's narrative handover provided his colleagues with further opportunities for elaboration. In addition, HO1E compared the condition with that of a previous patient that all present recalled, thus providing a further reference for sensemaking.

The report on HO1G's first patient caused HO1E to question the frame of the procedure that the registrar had decided to carry out:

HO1E: *'The whole gall bladder, not just the stones?'*
HO1G: *'Yeah, the whole thing. (Registrar) says it will be easier for her.'*
HO1E: *'Easier for her? But she'll be in for longer.'*

HO1G gave the registrar's reason for carrying out the procedure but HO1E did not seem to be convinced and the response of the other HOs present implied that they are in agreement. When interviewed, HO1E said:

HO1E: *'I was concerned because it seemed a risky thing to do with her history and I know she's really anxious about everything and kind of hyper but she's usually ok when things are explained. She just needs a bit of time. She's got this really wound up image. People don't talk to her they talk about her. Doctors are just as bad.'*

HO1G then presented the patient with undiagnosed symptoms. The HO had not been able to decide what was wrong with the patient and whether the problem was associated with her original diagnosis or not, and was seeking a frame. After a brief history, HO1H asks further questions to elaborate upon the patient's medication and response. HO1F provided a frame for comparison, suggesting that the patient may simply be too hot on the ward, a reasonable proposition as the weather at the time was very warm. In a further attempt to seek a frame, the HOs consider various methods to focus on the problem. HO1G then reframed and decided to treat the patient as if having a particular infection. This frame was questioned by HO1F and HO1H. HO1G wanted to continue, to preserve the frame, *'Just to be sure.'* but to do so would have been against written procedures, *'(HO1H): What does your handbook say?'*. HO1H agrees to preserving the frame, *'Look, if you're worried we should do it.',* but HO1F points out that the frame is incorrect, *'… it wouldn't be that, there'd be something to see, something definite before she started feeling odd.'* HO1G then reverted to seeking a frame and asked his colleagues to carry out further investigations if the patient did not settle.

HO1F had a minimal handover, alerting the night duty staff that they might be called to attend to a patient's intravenous cannula. HO1A then asked HO1F about a different patient, which lead to a discussion about a particular dressing being used. HO1E suggested that the same dressing was being used on another patient, but the comparison could not develop as the HO who new more about the patient had left.

Other than the instance of HO1G and HO1H briefly preserving the frame noted above, it is not possible for the author to know if any of the medical assumptions such as

diagnoses that the HOs brought to the handover were incorrect. It is therefore not possible to make a judgement on whether or not they were involved in preserving frames on these matters. However, the concept of preserving frames is significant to this research and will be discussed further in Section 6.5

The Group 1 HOs were carrying out the sensemaking activities, but they were identified during group interaction and not within the HOs' accounts of their personal deliberations on the handover, where evidence of individual, intentional sensemaking had been expected.

5.5 Evidence of anticipatory thinking

Anticipatory thinking develops with and is an indicator of, expertise (Klein, Snowden & Pin, 2007). It was therefore considered that Group 2, approaching the end of their first placement, might display more anticipatory thinking than Group 2, with six months less experience.

Many of the Group 1 HOs said that at the beginning of their clinical work they had taken a short-term view of things, but recognized that had changed over time (see Section 4.4.1.5.1):

> HO1C: *'We didn't think far ahead enough … 'We missed stuff anyway because we didn't know what we were looking for.'*

In Figure 10, HO1C anticipated that there might be a particular development in a patient's condition and alerted the HOs that the patient's toes must be closely observed:

> HO1C: *'… it's such a dark colour we could easily miss something'*

In a further instance from that figure, HO1G gave a report on a patient described in the previous section by HO1E as 'anxious'. Some of the HOs appeared to know this patient quite well and, drawing upon his knowledge of her, HO1G asked his colleagues to explain her forthcoming operation to her again:

> HO1G: *'… I think she'd like to hear it again …'*

In the discussion concerning the patient with undiagnosed symptoms, HO1G asked his colleagues to carry out particular investigations and when questioned, replied that he thought a problem might be developing:

HO1G: *'… get a urine off too.'*
HO1E: *'You said the urine was clear.'*
HO1G: *'Might be something just brewing …'*

The final instance of anticipatory thinking concerns HO1F's report on a patient with an intravenous cannula that was causing problems. HO1F had attended to it but thought that further problems might develop:

HO1F: *'… looks reddish … you might get a call about it.'*

In Section 5.3.2, HO2A said that when preparing to give her late afternoon handover she visited the patients she was concerned about *'… then I look to see if anything needs doing later on.'* The HO had a particularly ill patient and said *'… I want one of the doctors to go and listen to his chest as well'*, indicating that she was concerned about possible developments in the patient's progress during the night, and that the routine observations being carried out might not be sufficient to detect whatever was happening.

HO2E alluded to anticipatory thinking (see Section 4.4.1.5.2), saying that she wanted to know precisely what was suspected when an HO handed over to her and asked her to carry out a procedure or pay particular attention to a patient:

HO2E: *'I try to get people to say specifically what it is they're worried about … what they think is going on.'*

These were the only instances of anticipatory thinking identified from the Group 2 interviews and handover transcripts. Although it had been expected that Group 2 would display more anticipatory thinking than Group 1, as with the sensemaking activities, this is dependent upon them being in a position requiring anticipatory thinking, which in turn is dependent upon each patient's individual condition.

5.6 Are the Group 2 HOs a 'group'?

Much of the data seemed to indicate that the Group 2 HOs worked independently of each other, while the Group 1 HOs worked much more closely together as a group. This was indeed the impression that the author had on commencing the observations and interviews, as can be seen in Section 4.3. However, as the study progressed, the author observed a number of events that lead to a reconsideration of this view. The data, taken from field notes, is presented here as it is of relevance to the discussion in

the following chapter, concerning the possible reasons why Group 2 adopted and maintained a problematic style of handover. It also demonstrates an example of the author's own sensemaking activity in noticing cues, the observations noted below, that caused questioning of the existing frame of HOs working independently with little reference to one another, leading to subsequent reframing.

During the third week of data collection, the author went to meet one of the HOs at the Education Centre. While waiting, a different HO was being questioned by the administrator about how he intended to complete his outstanding documentation in the available time. Positioning himself where the HO but not the administrator could see him, HO2M proceeded to fire imaginary shots at the HO and acted out a hanging scene. He clearly recognized that the HO was in some difficulty, a situation enhanced by his actions so that the administrator thought that HO considered her concern for his documentation amusing. Once the administrator had returned to the office, HO2M rushed over to the HO, expressed sympathy that he had outstanding work to complete, patted his shoulder encouragingly and even offered to cover a shift to give him more time. One of the other HOs present said that he too could cover a shift.

The author recognized HO2M and was reminded of an incident some weeks earlier during the recruitment phase of the research. At one of the recruitment sessions, HO2M asked how much money participants would receive. On being told that there was no payment he said to his colleagues *'Come on guys, this is not for us.'* The group left with him. Several days later when other HOs had been recruited, HO2M joined the research saying that he had more time available to participate.

On a later occasion, on seeing HO2M enter the Education Centre, the administrator remarked *'Here comes trouble'.* After dealing with his enquiry, the administrator asked HO2M to hurry his colleagues into the lecture theatre, referring to them as *'your doctors'.* The author asked the administrator if HO2M was the team leader and was told: *'Oh yes, he's top dog.'* A different member of staff added a humorous comment, confirming the administrator's view.

These events suggested that while the Group 2 HOs did operate independently as far as the later afternoon handover and their work at night was concerned, they were in fact quite a close group, and HO2M might be in the position of group leader. The implications of this for the Group 2 handover style will be discussed in the following chapter.

Chapter 6 Determinants of handover style

6.1 Introduction

This chapter explores possible reasons for the adoption and maintenance of the very different late afternoon handover styles. In addition to being a work process operating at the changeover from day to night shifts, the late afternoon handover might also be considered as a conceptual entity or genre (Cook & Brown, 1999). This characterisation assists in locating the discussion within a sensemaking perspective, drawing out the influential role of identity upon the two groups' sensemaking and providing possible explanations for the compelling question of why Group 2 persisted with a problematic handover style. This is investigated within abductive reasoning, groupthink and preserving frames.

6.2 Dynamic affordance

It has been seen that there were group differences relating to what was communicated during the handovers. The data also reveals that when considered as an entity or concept, the late afternoon handover had a different meaning for each of the groups. The discussion here is informed by the theory dynamic affordance (see Section 2.2.6.2). Affordances were defined as possibilities for action arising from the synthesis of environmental properties with an individual's ability to perceive those properties (Gibson 1979). From this, Cook and Brown (1999) developed the notion of dynamic affordance; an affordance arising from actual, dynamic interaction with the environment, essential to learning and the enactment of learning.

Knowledge assists our interaction with the environment, from which we come to know the characteristics of that interaction. This is the foundation for Cook and Brown's (1999) model of the bridging of epistemologies, by which they explain the process of knowledge proliferation. Within this model, genres play an important role in the distinction between knowledge and knowing. Extended from its literary sense, the term genre denotes the *meaning* that an individual derives from an entity or aspect of the environment, which can only be known by interacting with it in some way. The example given in Section 2.2.6.3 was that of two organizations holding regular events called *senior managers lunches.* The events can have very different meanings for the participants in each organization, perhaps a relaxed, social function at one and a more considered, politically oriented meeting at the other. But these meanings are indiscernible to an outsider, who simply sees senior managers meeting for lunch. A new senior manager can have knowledge of the existence of senior managers' lunches,

but will only know the meaning of senior managers lunches after participating in them and engaging with the concept.

The late afternoon handover as a concept or environmental entity, can be viewed as a genre, developed as each group of HOs engaged with it in the course of their work. The research findings show that this genre had a different meaning for each group.

6.2.1 Dynamic affordance: Group 1

During the daytime, the HOs operated independently of each other, working on wards at various locations throughout the hospital, but the Group 1 handover style provided an opportunity for many of them to come together as a group. As previously discussed, the HOs had been invited to attend the department-wide handover prior to commencement of their placement, and it was suggested that it was knowledge of the purpose of that and subsequent handovers that the HOs brought to their interaction with the late afternoon handover, adapting it to fit the new context. The Group 1 HOs used the late afternoon handover to inform the oncoming shift of patients requiring attention and tasks that needed to be carried out. However, rather than being recognized solely as the point at which an exchange of information was made from those going off duty to those coming on duty, the HOs' understanding of the late afternoon handover appeared to be that it was an event or work process at which knowledge was shared for various purposes.

One of these purposes was to provide the basis from which the HOs coming on duty planned the work, taking a few moments at the end of the reports to organize themselves according to what had been discussed and their understanding of it.

Unlike the Group 2 HOs, Group 1 also used the late afternoon handover to inform their colleagues of patients with unusual conditions, or conditions they had no previous experience of, even if no medical interventions were foreseen for that evening. The handover transcript shown in Figure 7 provides a good example of this. The patient's condition was unusual and all the HOs present were interested to hear about it, asking questions and discussing the condition in relation to a different patient, but no actions were required. HO1D drew a diagram to elaborate the description of what had been seen to the other HOs and the narrative format of the handover drew them even closer to the experience by facilitating knowledge sharing (see section 5.2.1).

As was discussed in Section 2.2.4, Broekhuis and Veldkamp (2007) found that doctors considered clinical dialogue and sharing experiences with peers of the same hierarchical level to be extremely valuable. The Group 1 late afternoon handover style

provided an opportunity for the HOs to learn about conditions and situations that they had not and might not experience themselves, and from the perspective of another HO.

The analysis has demonstrated that the HOs were engaged in sensemaking activity during the late afternoon handover, primarily, elaborating frames to confirm and extend their knowledge (Klein *et al.* 2007). Their views included:

> HO1B: *'…get the full picture … to get a feeling of what's going on.'*
> HO1A: *'… to check I've got something right … find out a bit more about the disease or something that's happened.'*

HO1D spoke of wanting to know more about the patients he was being asked to attend than could be seen from the notes and his immediate impression at the bedside including *' … what was the doctor who saw him last thinking? … need to know what to expect at the start so you can see what the changes are.'*

This handover style also enabled the HOs to develop a sense of awareness of what was happening across the unit. They said that this was important to them, not only from the perspective of the HOs coming on duty, in relation to their work that night, but for all of them so that '(HO1G) *When we have the main weekly rounds we know a bit about some of the other patients already so you're not totally in the dark.'* This might have indicated the development of anticipatory thinking, in that the HOs on night duty might have used this awareness in order to help prepare themselves for emergencies concerning patients currently within the department but not part of the handover, and also to have some level of preparedness for the weekly ward round and handover, a more formal learning context.

This sense of awareness was then confirmed and extended by the two night duty HOs communicating by telephone and meeting up during their shift to update each other. At these times, as was seen in Section 4.3.1, the HOs were able to consider patient care and perhaps reschedule their priorities, and would also check that each other was managing their workload as it was *' … important to know what's going on and check we're ok.'* This was an indicator of how these HOs considered themselves to be a group and were looking out for each other. The supportive nature of the group and the way that they valued the time spent together at the handover was also shown by HOs staying at the handover to join in discussions, even when they themselves had given their handovers and were off duty, and also asking the opinions of colleagues regarding concerns that were not essentially part of their handover, for example,

HO1G's patient who had no specific signs or symptoms (see Figure 10). This was supported by HO1G, '(HO1G) *It's actually quite useful talking something through with a few of the others as well and you get to know about what else is going on'* (see Section 4.2.2.2). The HO's comments again confirmed the perceived importance of dialogue and shared experience with peers.

The way that the HOs communicated with each other during the handover implied a sense of trust between them. In the handover shown in Figure 10, HO1C is quite open with his colleagues about his response to his first patient's emergency and they empathized with him, for example:

HO1A: *What was it like? Was it just…?*
HO1C: *(Leans forward towards colleagues) It was horrible really.*
HO1E: *I can imagine. (HO1E and HO1A both nod.)*

and

HO1E: *What did you do?*
HO1C: *I didn't really know what to do. Thankfully (Registrar) was there really quick with (anaesthetist) and they had a look and put a tube down.*

In the author's experience, it would have been unusual for HOs to speak so frankly to professional colleagues, medical or nursing, other than those they trusted and felt comfortable with.

Trust was seen to be one of several social factors influencing the willingness to share knowledge (see Section 2.2.4). A supportive social network such as that which Group 1 appeared to have was seen to encourage knowledge sharing with strong, trusted links between members facilitating the sharing of complex knowledge (Granovetter 1985). In addition to the explicit knowledge that was exchanged between the HOs at the handover, that drug charts needed to be updated, for example, Section 5.2.1 showed that complex knowledge was being shared amongst them. Much of this knowledge should more properly be termed implicit knowledge; knowledge that with considered effort may be expressed (Wilson 2002). Within the narrative structure of the handovers in which the HOs interacted with each other, they were able to share implicit knowledge of experiences with medical conditions that were new to them, and to confirm and share implicit organizational knowledge using terse storytelling and genres. This was particularly notable within HO1C's vivid account of his first patient's emergency in which his colleagues learned a great deal, not only of the medical

condition but the atmosphere on the ward, the patient's distress, the HO's own response, the impact upon other patients, and the seriousness of the situation, compounded by having to conduct a procedure on the ward rather than a specialist unit due to lack of bed space (see Figure 10). Similar knowledge sharing took place within the narrative surrounding the detailed verbal and pictorial description given by HO1D of a patient's tissue damage (see Figure 7).

The HOs used a structure based on the handover they had attended before their placement. They interacted with the concept of the handover and the process of the handover narratively. As they engaged further with the handover it evolved into a supportive and trusted network from which they derived new meaning. The handover came to represent a form of hub at which they shared knowledge. It became the focus for handing over matters relating to critical patients, it was the point at which they developed a wider sense of awareness as to what was happening across the department, informal learning took place and knowledge was shared. They valued the experience and within it, confirmed themselves as a group with it's own specifically constructed identity.

6.2.2 Dynamic affordance: Group 2

The Group 2 handover process appeared to have been based upon that which they were familiar with in their surgical placements.

For this group, the late afternoon handover was straightforwardly a means of informing the oncoming shift of any patients that would require medical attention during the night. There were often times that the HOs would not have anything they wanted to hand over and unlike Group 1, they did not use the handover to discuss unusual conditions or events. The HOs did not want to take any time longer than necessary for the handover and, as was seen in the transcripts in Figures 8 and 9, the information transferred was kept to the minimum. They did not engage in intentional sensemaking activities at this handover and the process was certainly one of information or explicit knowledge transfer rather than knowledge sharing. Information mainly flowed in one direction, from giver to receiver, with little interaction concerning patient matters.

The Group 2 HOs had much to say about what they did not want to include in the late afternoon handover, but with the exception of the subgroup, were vague about what should be included, other than that it should be: '(HO2D) *…really just for the most important things that have to be done and not for routine work'* (see Section 4.4.2.2) and '(HO2N) *…they only need to know about the serious ones.'* (see Section 4.4.1.1).

The analysis showed that a number of the HOs wanted to focus the late afternoon handover more narrowly by delegating responsibility for what they considered to be routine messages and tasks to nurses. As was seen in Section 4.4.2.2, they agreed that this included responsibility for informing them when drug charts needed updating and a number of tasks, which they said might even be carried out by nurses. This theme of devolving much of what they considered to be routine work to nursing staff will be returned to in Section 5.2.3. The HOs frequently commented that nurses would alert them to patients requiring attention and tasks to be carried out, and this reliance upon nurses to support their work may have somewhat diminished the importance of a more detailed handover at the late afternoon shift change, as illustrated by HO2M's comment in Section 5.1.2:

> HO2M: *'… you might even forget other things but it's not a problem because if it's important you'll be bleeped.'*

As was seen in the transcript in Figure 8, the Group 2 HOs did not include a great deal of detail in their handovers, saying that the patient's condition and clinical findings could be established at the bedside:

> HO2M: *'I'll say check on this one and they'll go and see him … it will all be in the notes' (see Section 5.1.2).*

This was problematic for the subgroup HOs, who wanted to know specifically why patients were being handed over, but the main group did not consider it necessary.

It is suggested that the Group 2 HOs understood the purpose of the late afternoon handover to be simply one of directing the HOs coming on duty towards patients who required attention. They had no need to derive anything more from it and there was little more that could become known from engaging with their particular handover style.

6.2.3 Dynamic affordance: Group 2 subgroup

The three subgroup HOs had been involved in incidents arising from inadequate handovers. All members of Group 2 were aware of what had happened but made no attempts to alter the handover at group level. The subgroup HOs had engaged with the late afternoon handover in the same way as the others but, in their words, *suffered* as a result of it. They responded by focusing upon their own handover styles. It was seen that regardless of their colleagues' opinions, two of them developed a very instructive

and precise handover style, and when receiving a handover wanted specific information about what they were being asked to do and why. The handover for them had become a potentially threatening situation, requiring clear information and some form of proof of what had been said to them and what they had said to their colleagues. Both suggested the use of written records of the handovers. The third subgroup HO spoke of being regarded by her colleagues as slow in giving handovers and having difficulty in eliciting sufficient information from them when receiving handovers. As was seen in Section 4.4.1.5.2, this HO had difficulty in adopting such a forthright handover manner as her colleagues, but had found a way to manage the situation, and was also in favour written records of handovers for the same reason as her colleagues; to provide evidence of what had been handed over, should a problem arise.

It would be reasonable to assume that their views on structuring the handover information were driven by their experiences of inadequate handovers. The BMA guidance 'Safe Handover, Safe Patients' (BMA, 2004) also advocates structuring handovers, but the rationale for doing so has a different orientation in being patient-centred. While these HOs clearly wanted to hone in on the precise problems facing each patient being handed over, as seen by them asking specific questions and instructing their colleagues on what was to be done, the consideration of the handover almost as a form of self-protection, revealed the HOs' own identity needs surfacing. An example of this was given in Section 4.4.1.5.2, when HO2E said of ambiguous handover information '*… you end up suffering later on (HO2E)*" In this reference to the incident in which she was involved, the HO viewed the handover from the perspective of its impact upon her rather than upon the patient. In a further example, HO2A said that some patients investigated their conditions and treatment on the internet and would also question nurses. Clear handover information was therefore important, in the HO's opinion, to help ensure that patients' questions were answered in the same way from each member of staff, as ' *… you get into all sorts of trouble if you say something a bit different*' (see Section 4.4.1.5.2). The potential for Friday handovers to be particularly problematic was identified to the author by one of the subgroup HOs. The HO said that if any change was to be made to the handover process, it should be to formalize the Friday handover and include a written report. The efforts made by the subgroup HOs to minimize ambiguity appeared to be primarily driven by the need to be able to exclude them from blame, should any problems arise.

It is suggested that it is from within this context of seeking and providing highly specific, structured information to address particular patient needs and to protect themselves, that the Group 2 subgroup HOs developed meaning for the late afternoon handover.

6.2.4 The three genres

The discussion indicates that each group of HOs derived different meaning from the concept of the late afternoon handover. Each group used the handover to indicate the patients that were of concern and required attention. As a genre, Group 2 derived little further meaning from the late afternoon handover; its purpose was to direct the oncoming shift towards the essential matters of concern. For Group 1 it was a forum for knowledge sharing, and for the Group 2 subgroup, a means by which to convey specific instructions, which would help in protecting themselves from blame.

Gaver (1991) developed Gibson's original ideas on affordances to emphasize the relationship between environmental characteristics and peoples' needs. This work was situated within the physical world, extending the notion of how, for example, a small, spherical object that fits comfortably into a hand might invite us to throw it, to the considerations of our needs when interacting with the environment, such as the relationship between accessibility and architecture. This might also be said to be operating within the conceptual context of the late afternoon handover, that the meaning each group derived, the way it perceived and engaged with the possibilities for action, or affordances presented by the handover, was influenced by their needs; the need for a supportive, knowledge sharing situation, the need for a quick and simple transfer of information, and the need for protection from further blame. As the HOs in each group performed the handover, that interaction reaffirmed the particular meaning the handover had for them and it became, in Cook and Brown's (1999) terms, known.

6.3 Groupthink

It was seen from the data that the two groups of HOs were not given any specific instruction on how to conduct the late afternoon handover, were not aware of any national or local policy or guidelines concerning the handover process and were able to follow whatever handover practices they chose. They seemed to have drawn upon their previous experience of handovers as a foundation from which to develop very different styles.

The style of handover adopted by Group 2 had clear inadequacies, particularly in respect to timeliness and completeness, and all the HOs were aware of the incidents in which patients had been put at risk as a result of unsatisfactory handovers. Yet the HOs, including three group members who had been reprimanded, persisted with this style of handover. Why was their chosen handover style so compelling?

The Group 2 HOs' persistence with their handover style might be considered in terms of groupthink, which was discussed in Section 2.3.3.1.4.1. To assist the present discussion, the concept will be summarized again here. In order to emphasize the severity of an incorrect decision taken as a result of groupthink, Janis (1972) defined the concept as '... a deterioration of mental efficiency, reality testing and moral judgement that results from in-group pressures' (Janis 1972, p. 9). The efforts of the group members to achieve unanimity disrupt critical thinking processes and the group's ability to assess other possibilities realistically. Groupthink is focused upon high group cohesion, but this will only result in groupthink in the presence of at least one of two antecedents: faults in the structure of the group, such as a lack of procedural norms, impartial leadership and homogeneity of group background; or a provocative context, such as stressful or threatening situations involving difficult decision tasks. The symptoms of groupthink are:

- An illusion that the group is invulnerable, encouraging risk taking
- An illusion of unanimity, in which silence is perceived to be agreement
- Rationalizing challenges to group assumptions
- Self-appointment of members as mind guards to exclude dissenting information
- Self-censorship of ideas that deviate from consensus
- Belief in group's moral position, so that the consequences of decisions are not fully considered
- Use of pressure upon members who question the group by alienation, and labelling opposition as inferior and incorrect

These symptoms lead to defective decision-making, characterized by:

- Incomplete assessment of objectives
- Incomplete assessment of alternatives, including those previously rejected
- Failure to examine risks associated with preferred decisions
- Poor information search involving selective bias
- Failure to develop contingency plans

According to the above definition, from Janis's (1972) perspective, the Group 2 handover might described as being conducted in a manner that provided little opportunity for sensemaking, prioritizing or efficient work practice, in which the group members disregarded evidence that the handover style was problematic, and did not acknowledge the detrimental effect it could have upon patients and upon group members themselves.

6.3.1 Antecedents of groupthink

Both of Janis's (1972) antecedents concerning group structure and a provocative situational context were present. Structurally, the group members shared the same educational background in studying medicine, being members of the same profession and sharing the same level of experience and peer group within the organization. There was also a lack of procedural norms concerning how the late afternoon handover was carried out; HOs organized the handovers amongst themselves with no specific instruction or reference to local or national guidelines. It has been seen that the HOs developed a style seemingly based upon their previous experience.

The situational context could certainly be described as involving difficult decision tasks. The department falls within the definition of an HRO, in that an incorrect decision, or failure to make a decision, can have a serious, if not lethal, outcome. The HOs were as yet within their first year of clinical practice, within a busy department with many acutely ill patients, a number suffering from complex and multiple medical conditions. Although working under the supervision of more senior medical staff, the HOs would be expected to take increasing responsibility for decisions concerning their patients. It was also their responsibility to recognize those that needed to be brought to the attention of the next shift for ongoing care.

6.3.2 Presence of an influential leader

Concurrence in groupthink is strengthened by the presence of a leader who has the recognition and approval of the group. As discussed in Section 4.4.7, HO2M was identified as fulfilling such a role and was seen to be influential within the group. He quickly took control when one of his colleagues was in difficulty, even though he had played some part in enhancing that situation. Acting out gunfire and a hanging scene behind the administrator was noticeably distracting for HO2M's colleague, who was already struggling to convince the administrator that he would complete his documentation on time. After aggravating the situation, HO2M then rushed to his colleague's rescue, sympathizing and offering his assistance, with another HO following HO2M's example and offering his support too. In a further example, at one of the recruitment sessions HO2M was able to guide his colleagues away from joining the research project with ease. He and a number of those present at that session eventually did participate, but this was after the consultant circulated an email reminding all HOs about the project, which might have influenced their decision. It was seen from their comments that HO2M was also considered to be the group leader by the administration staff in the Education Centre.

HO2M appeared to be acknowledged and accepted as the group leader and his views on the late afternoon handover influenced his group colleagues. The analysis showed his handover content to be minimal and he held the most extreme views on how the late afternoon handover should be conducted and become more narrowly focused. The transcript of his handover in Figure 8 supports the opinions he gave during interviews that those coming on duty needed only be directed towards the patients of most concern as details could be established once in attendance. He also considered that it should be a nursing responsibility to identify and alert the following shift HOs to what he considered to be routine work, possibly carrying out some of that work themselves. He said that some HOs included too much detail and unnecessary information in their handovers. These comments were supported by several of the HOs, including one who identified him as someone whose handover she was unable to derive sufficient information from. The three HOs who had been involved in incidents as a result of this handover style, supported it and continued with it even though they complained about it during interviews. One of them, HO2L was concerned by the handovers from many of her colleagues and identified HO2M's handovers as being problematic, saying that he gave her insufficient information when handing over to her. She was aware that he thought she took too long when giving a handover and he would try to rush her and made jokes about her being slow, but added that the problem lay with her and not with the process; when asked directly, she wanted to continue with the minimal handover style.

6.3.3 Symptoms of groupthink

A number of factors identified within the data can be described as symptoms of groupthink, with consequent poor decision outcomes (Janis 1972).

Symptoms of groupthink were evident when the HOs were asked to give their views of a late afternoon handover carried out in the manner of Group 1. Unwilling to consider an alternative process, they defended their handover by rationalizing it, notably saying that the more structured, face-to-face handover was not necessary as *'*(HO2M) *It's a waste of time … not needed in the afternoon'*, was unachievable as *'*(HO2E) *It's too busy at night'* and consequently *'*(HO2N) *… completely unworkable we'd never get anything done'.* The subgroup HOs complained about other HOs' handovers but supported the continuation of the current practices, agreeing with the majority of the group that if any changes were made it should only be to the Friday handover. The majority said that they had no need to be told of cases that were out of the ordinary but did not require their specific attention, and no need for an awareness of what was happening across the unit during the evening as that was the concern of more senior medical staff; their own role was to get jobs done when asked.

When considering the suggestion that their handover style was less than effective, i.e. that three of the group had been involved in incidents concerning inadequate handover information, the HOs restructured the evidence to divert the cause of the problem elsewhere. HO2N inferred that the pace of work was to blame, '*… they can't know everything, this is a very busy hospital*', and a different HO ignored what had happened, focusing on the way that the senior doctor had challenged the subgroup HOs on the ward rather than privately (see Section 4.4.2.2).

Opinions that deviated from group consensus were subject to self-censorship. Two notable examples of this can be identified within the data analysis. The first was in Section 4.4.1.2, in which HO2F spoke of being concerned about the impact of receiving handover calls late in the evening, giving an example of one instance in which this had resulted in a patient's relatives being kept waiting at the hospital. A further concern was that when the department became very busy, she was anxious that she might receive even more handover calls to deal with. The HO then qualified her remarks, saying:

> HO2F: *'… but it's the same thing if something urgent suddenly happens so you can't worry about it.'*

In aligning the handover calls with urgent calls to attend patients, the HO was censoring her own concerns, rationalizing that all calls for her attention should be treated similarly and that she should not worry about the possibility of receiving handover calls late in the evening. Clearly, this could not address the impact of late handover calls, but would rationalize her decision to operate in the same way as other HOs in her group when on night duty.

The second example was in Section 4.4.1.5.2. HO2L expressed concern about handovers being conducted by telephone and in a rushed manner with little discussion, realizing that it had a detrimental impact upon her performance. She had difficulty obtaining all the information she would have liked when receiving a handover, and conveying information fully when giving a handover. The HO commented:

> HO2L: *'… it's just me. It's a busy place with continually things to be done and you have to keep a million things in your head but that's how it's done.'*

The HO was labelling her concerns as a problem attributable to her personally, which she would have to overcome because *'*(HO2L) *… that's how it's done'* rather than her concerns being the result of a problematic process. However, she supported the continuation of the handover in that way; she identified the group preference and took action to support it.

A further symptom of groupthink is the positioning of those with differing views or who do not completely conform to group practices as different, perhaps weaker or inferior, to other members of the group, in an effort to achieve consensus. HO2L was aware that she was considered sometimes to be slow at giving her handovers due to the amount of information she might want to convey, and that some of the HOs tried to hurry her, which contributed to her concerns about delivering her reports. A number of the HOs said that some of their colleagues asked too many questions when receiving a handover, remarks that may have been directed towards HO2A and HO2E, subgroup members who recognized that other HOs felt this way about them. See, for example, their comments in Section 4.4.1.5.2 about needing to gather more information as *'*(HO2E) *I want to know why they're (patients) being handed over and what they want me to do, how I'm supposed to act on the results.'* and *'*(HO2A) *What really annoys me is when I'm given some really loose message and you waste your time interrogating them till you find out what they want you to do.'*

The illusion of group invulnerability, characterized by a tendency towards risk taking, was evident from the Group 2 data. An example of this is demonstrated by HO2M's opinions on the role of nurses, that they should be able to administer drugs not written up on the prescription charts for example, and that they should be able to carry out various procedures without medical reference. A number of the Group 2 HOs, including HO2M, suggested that nurses should be responsible for alerting HOs at shift changes of routine medical tasks so that the late afternoon handover would take an even more narrowly focused format. The data revealed many instances in which the HOs responded to the possibility of a problem with their handover style by using nurses as a form of safety net. If a night duty HO did not respond to being paged when a handover was being called in, the day duty HOs would often leave a message with a nurse. One HO said that important weekend handover notes were left with a nurse to pass on to the right person. If something significant was not handed over '(HO2L) … *nurses will tell them whatever it is anyway'*. The perceived blurring of the nursing and medical roles, particularly with regard to a reliance upon nurses to alert oncoming shifts to medical matters, provides many opportunities for deficient communication of information. While this overlap between the two professions does exist and a number of nurses have an extended role that includes prescribing, although less frequently in

ward situations such as in this department, the reliance and expectations of the HOs, particularly with regard to communicating handover matters, had the potential to put patient care at risk. It was outside the scope of this research to question the nursing staff on their perception of this.

Other than HO2F, who in Section 4.4.1.2 gave an example of the impact that a late handover had had upon a patient's relatives, the remainder of the group did not appear to consider the consequences of their handover style and no contingency plans were developed following incidents resulting from the handover process. In addition to their inclination towards risk, they said that their handover style did not need to be changed and they developed reasons such as time and work pressures to explain why the handover could not be changed. They also disregarded the fact that three group members had been disciplined as a result of the handover style, thus failing to consider the consequences of their decision to maintain that handover style upon patients and upon the group members. The subgroup HOs had given the handover style consideration, but this was from the perspective of the impact it might have upon themselves rather than patients, hence their view that written handover notes could be used as evidence of what had or had not been communicated, in the event of a problem. The data demonstrated that the Group 2 HOs were processing information in an ineffective manner; the focal defect identified within groupthink (Janis 1972).

Criticism of groupthink was noted in Section 2.3.3.1.4.1 and those arguments will therefore be considered here. Whyte (1989) suggested that groupthink alone did not provide a complete account of decision fiascoes, as they were influenced by the way in which groups structure their decisions. Reflecting upon the decision made by each group of HOs on how their late afternoon handover was conducted, it was seen that both groups had been given limited guidance on this and drew upon their previous handover experience. Group 1 had attended one weekly handover and ward round, but had no late afternoon handover experience, while Group 2 had been involved in late afternoon handovers on surgical wards. The late afternoon handover as a concept or genre was seen to be viewed differently by the two groups and by the subgroup, having a different meaning and purpose for each. From a sensemaking perspective, the way we act towards others and towards elements within our environment is determined by the meaning those people and entities have for us (Weick 1995, see Section 2.3.3.1.4). Consequently, as the late afternoon handover had different meaning for each group, the decision on how to engage with the late afternoon handover would have been framed differently by each group. However, Whyte's (1989) argument was based upon the assertion that decision fiascoes were framed, correctly or incorrectly, as a choice between two or more unattractive alternatives. The option selected would

be influenced by the group's risk-taking propensity within that situation. From this perspective, if it is accepted that the dynamic within the Group 2 handover is groupthink, then the Group 2 handover can be viewed in two ways. Firstly, it might be considered that Group 2 did not have such a decision choice. Rather than being faced with making a selection from one or more handover options, they were free to develop whatever process they could create. If this was the case, framing effects could not be said to contribute to all decision fiascoes.

The alternative view is that Group 2 were faced with deciding between two unattractive options; the late afternoon handover style they were familiar with from their previous hospitals, or in the style of a ward round which they would have experienced at other times of the day. The analysis showed that while the Group 2 handover style was similar to that in their previous hospitals, it was perhaps considered an unattractive option as the HOs appeared to want to hand over as little as possible. A number of the HOs were described as including too much detail and unnecessary information, and the HOs' views were moving towards a more minimal handover, with nurses communicating certain matters. Group 2 considered a handover in the style of Group 1 as most definitely unattractive, describing it as unnecessary and a waste of time. It would therefore be reasonable to assume that they would have similar views of a ward round being conducted at the late afternoon shift change, in which they would conduct the handover at each patient's bedside. This would provide some support for the role of decision framing in groupthink. However, a more detailed examination of Whyte's (1989) argument is outside the scope of this thesis.

McCauley (1998) proposed a shift in the focus of groupthink to an aversion to critical evaluation of information and ideas. The argument for this is that exploring information and ideas would involve criticism. In a cohesive group in which cohesion is centred upon the personal attractiveness of its members, such criticism would be interpreted as criticism of the individual presenting the ideas, and thus a threat to the group.

In the case of Group 2, the data showed that some group members were critical of certain of their colleagues' handovers and these opinions were not kept private; their colleagues were aware of them. For example, HO2M was one of several HOs who said that some handovers included too much unnecessary detail and were unduly lengthy. HO2L was one of the HOs who was aware of these opinions and knew that she was one of the HOs they were directed towards. HO2A knew that some of her colleagues thought that she asked too many questions when they handed over to her. However, while she was annoyed that she had to ask many questions to get to the information

she needed: '*What really annoys me is when I'm given some really loose message and you waste your time interrogating them till you find out what they want you to do. Sometimes they don't know themselves. It's like a game of charades*' (see Section 4.4.1.5.2), she did not seem to be annoyed about the criticism itself, and this seemed to be so throughout the group. As the HOs did not appear concerned about criticizing each other, this particular data does not contribute to McCauley's (1998) proposals. An explanation for the Group 2 behaviour might be that in order to continue working together they had reached an accepted understanding about how they criticised each other's handover, especially as the data indicated that these HOs did function as a group outside the late afternoon handover context. They might not have felt so comfortable about criticism concerning a different issue.

The difficulty in replicating groupthink in laboratory studies was discussed in Section 2.3.3.1.4.1. A further observation made by this author is that groupthink is concerned with threats to self-esteem and group efforts to reinforce self-esteem. Self-esteem is one of the three core needs driving the development and maintenance of each individual's sense of self or identity (see Section 2.3.3.1.1). In addition to managing uncertainty about gaining sufficient commitment from participants in laboratory experiments, researchers have the additional problem of creating a sufficiently believable experimental scenario to influence identity needs. Janis (1972), however, developed his ideas on groupthink from observations of real world situations in which individuals were fully engaged.

Finally, Henningsen *et al.* (2006) asserted that the process of developing the groupthink theory was subject to retrospective sensemaking, creating an illusion that the groupthink symptoms were correlated in various situations in which the outcome, a poor decision, was known. The significance of retrospective sensemaking was discussed in Section 2.3.3.1.2, structuring and connecting past events to form plausible, causal relationships. But the way in which individuals look back on those past events alters, depending upon what is happening at the time of looking back, and their goals and expectations. In this way, an event or situation can have different meaning for two different people who have experienced it, and knowledge of an outcome can influence retrospection, editing and bonding past events to create a false impression that the outcome was inevitable. Henningsen *et al.* (2006) found in their own research that the influence of retrospective sensemaking was stronger in when individuals were given feedback that they had made a poor decision. The authors suggest that as groupthink research was based upon decisions with known negative outcomes, the researchers would be susceptible to retrospective sensemaking.

If it is accepted that retrospection is part of the sensemaking process, then all researchers, analysts or enquirers must be subject to its influence as it is an integral element in how we understand things, and that is what they are intentionally trying to achieve; an understanding of what is happening in their research. In this respect, if the aim is to emphasize the importance of thoughtfully considered research evaluation techniques to guard against the extremes of retrospection coercing us towards a compelling yet illusory explanation of things (see Section 2.3.3.1.2), then Henningsen *et al.* (2006) are correct. However, the proposal the authors make that researchers might be overly influenced by retrospection when studying those who have made poor decisions than those who have made good decisions, is troubling and a matter for consideration outside this thesis.

6.3.4 Conclusions on groupthink

The primary factor contributing to cohesion within Group 2 might have been the presence of the influential leader rather than individual attractiveness between group members. While mindful of the influence of retrospective sensemaking, it has been shown that the antecedents for groupthink were present and that the group members shared the same level of seniority, a similar level of educational attainment, and medical school training. They were critical of some group members, but the views of those criticised supported the overall group decision to continue with the problematic style of handover. The HO holding the most extreme views on the handover was HO2M, identified as the group leader, and his influence was perhaps the driving force for cohesion. The research findings can offer no specific insights into the particular characteristics of the HO that his colleagues found compelling. In explaining his ideas concerning sensemaking as a social process, Weick (1995) argued that people do not need to have completely shared meaning in order to participate jointly in a situation. Their reasons may be many and varied but the action of participating in the shared experience enables them to address their identity needs and achieve particular goals (Blumer 1996; Czarniawska-Joerges 1992; Donnellon, Gray & Bougon, 1986) (see Section 2.3.3.1.4). This perhaps explains the sensemaking of the Group 2 subgroup HOs. The subgroup were seen to derive a different meaning from the late afternoon handover than that of the main group, but aligned their views with the other Group 2 HO as part of the process of affirming group identity and group cohesion, in wanting to maintain the handover style and developing reasons to explain why it could not be changed. That certain group members were criticised and joked about for their handover style might be considered a further symptom of groupthink, providing additional support for groupthink as an explanation for Group 2 maintaining their handover style.

6.4 Abductive reasoning

The Group 2 handover style might be explained as the outcome of a failure in abductive reasoning. Sensemaking is driven by plausibility rather than accuracy (Weick 1995), and Lundberg (2000) proposed that the mechanism by which this operates is abductive reasoning, a process which can arrive at an incorrect conclusion (see Section 2.3.3.1.7). Plausibility in sensemaking enables action to be taken and there are situations in which the immediacy of action can be more important than inertia while waiting for an optimal solution. It enables situations to be structured in ways that can be dealt with before a different meaning develops which cannot be as readily managed. The influence of identity construction is important in this process, as people derive meaning from situations they believe they can act upon, rejecting cues that they do not have the capability to deal with.

The handover incidents involving the subgroup HOs should have alerted their colleagues that there might be a problem with their handover process. However, only those who were confronted about them took action to alter their handovers. The discussion has considered groupthink as a possible explanation for Group 2 maintaining their handover style. Looking back to remarks made by two of the HOs not involved in the incidents, they appear to have restructured the problem rendering it less threatening to the group, becoming that of a hectic hospital environment, in which busy senior doctors with unrealistic expectations of HOs, dealt with them in public rather than privately. In terms of identity construction, the incidents caused a disruption to sensemaking, expectations and established meaning, representing a threat to the group. The response to this was to attempt to make sense of the ambiguous environmental cues, the incidents, in ways that would meet their identity needs, seeking a plausible story to support self-efficacy and self-esteem. Within a groupthink framework, the group's rejection of the cues or evidence that their handover process was flawed can be viewed as a groupthink symptom of failure to process information effectively. Their efforts were focused upon maintaining identity needs bound within a process of group cohesion. To achieve this they restructured the problem they were faced with and, in doing so, arrived at an incorrect conclusion. Their reasoning was that three of their group were confronted in public because the hospital was busy, rather than the result of an inadequate handover.

6.5 A preserved frame

A further explanation for Group 2's persistence with a problematic handover style might be that of preserving a frame. This one of the activities involved in intentional sensemaking to reach an understanding of an unusual event or situation. It is more

than simple persistence with a frame. An incorrect conclusion is reached about what is happening and is maintained, even though additional environmental cues are available, providing opportunities to revise the decision (see Section 2.3.4.3.4). The process involves the development of knowledge shields: reasons that explain away any environmental data that does not match the frame in use. Context awareness and the development of expertise enable the identification of even very subtle cues that might have a serious impact upon the situation in question (see Section 2.3.3.1.6), but in preserving frames, the importance of cues is minimized, they are distorted, and reasons are produced to ignore them. People are skilled at producing explanations for situations, as has been seen throughout Weick's (1995) description of sensemaking processes and the discussion here on the influence of retrospection, linking events in a narrative sequence to form plausible accounts. As Rudolph (2003) demonstrated, even highly salient data may be discarded in order to preserve a frame (see Section 2.3.4.3.4).

Applied to Group 2's situation, the frame in use was that their handover style was satisfactory. However, the research findings revealed a number of features of the handover including content, timeliness and completeness, showing that it was a risky process. The content of the reports was vague so that HOs might not know specifically why they were being asked to attend a patient, what the day shift HOs' specific concerns were or why they were being asked to carry out certain procedures; handover reports were sometimes received several hours after the day shift had ended, so that patients were not attended to in a timely manner; and the HOs coming on duty did not know when the handover was complete and therefore could not plan their work effectively.

The two incidents that occurred as a result of inadequate handovers were the cues that should have prompted the HOs to question the frame that their handover style was satisfactory and perhaps move on to reframing (see Figure 4). Reflecting upon the discussion in the previous section on how the HOs restructured the meaning of the incidents, these findings can also be interpreted as showing how the HOs responded by distorting the cues and developing knowledge shields.

Two HOs spoke of the incidents and neither acknowledged that they had resulted from inadequate handovers. The first suggested that the cause of the incidents was that the hospital was a very busy place in which HOs could not be expected to be aware of everything that was happening. The hospital was busy, but of an equivalent level to other hospitals of similar size and location. The HOs would be expected to be aware of patients of special concern and of specific information affecting the ongoing care of

those patients during the following shift. The second HO minimized the problem of poor handovers and emphasized the public confrontation of three colleagues. The development of these knowledge shields enabled the HOs to explain away the new data confronting them, the two incidents, and maintain their particular handover style.

When asked of their opinions of a Group 1 style of handover that might help avoid similar problems they developed unrealistic reasons for it to be unworkable, such as taking too much time, being unnecessary and requiring a lengthy overlap of shifts.

The response of two of the subgroup HOs who were involved in the incidents was to alter their individual handover style to one that was more instructive and questioning. However, they had found a way to manage that within the overall Group 2 format of a minimal, loosely structured handover, which they defended and supported. The third subgroup HO had difficulty in adopting such an instructive style but appeared to accept a working practice that she disagreed with, standing alongside her colleagues in supporting it. This is a notable representation of people engaging in group activity for reasons other than having shared meaning (Czarniawska-Joerges 1992; Blumer 1996; Tsoukas & Mylonopoulos 2004) (see Section 2.3.3.1.4). However, in this way, the group preserved an inadequate frame.

6.5.1 The role of identity construction in preserving the frame

The author does not consider dynamic affordance, groupthink, abductive reasoning and preserving a frame to be exclusive of each other, and their combined influence might explain how Group 2 understood their situation and came to maintain their late afternoon handover style. The underlying process linking them is that of identity construction, which is suggested as the mechanism that lead to different ways of engaging with and understanding the concept of the late afternoon handover, the efforts to preserve group cohesion in groupthink, restructuring a problem in a way that the group felt capable of dealing with it, and the development of knowledge shields in preserving a frame.

When reviewing the literature on preserving frames (see Section 2.3.4.3.4), the author remarked upon how knowledge shield development, in circumstances involving contradictory but highly salient cues, must surely be based upon a forceful mechanism. It is proposed that the mechanism is identity construction. Weick and Sutcliffe (2003) suggested that the reason that infant deaths at Bristol Royal Infirmary had been attributed to misfortune was that the paediatric surgeons had constructed a mindset , a group identity, of people developing pioneering surgery on patients with highly complex and unusual conditions. This identity was flawed. The surgeons did not

reflect sufficiently upon their activities and little learning took place, even in the presence of significant contradictory data. This may be considered as a case of preserving a frame, that of developing pioneering surgery, when in fact their learning and development efforts were extremely limited. Knowledge shields were produced to explain away the cue of the high mortality rate as deaths due to very complex, unusual cases that might not have been treated elsewhere and had very uncertain prospects, even before treatment. Due to the strength of identity construction within the group of cardiologists, they persisted with this mindset for fourteen years until external reports interrupted their procedures.

The argument for identity construction as the underlying force for the development of knowledge shields in explaining the behaviour of the surgeons might also be applied to Group 2. The Group 2 HOs were confronted with the highly salient cues of two instances in which their handover style had been inadequate, and it is proposed that the mechanism for the subsequent development of knowledge shields and preserving the frame of a satisfactory handover style was the influence of identity construction.

The proposed model is shown in Figure 11, which adapts the area of the data/frame model (Klein *et al.* 2007) to show the influence of identity on preserving frames.

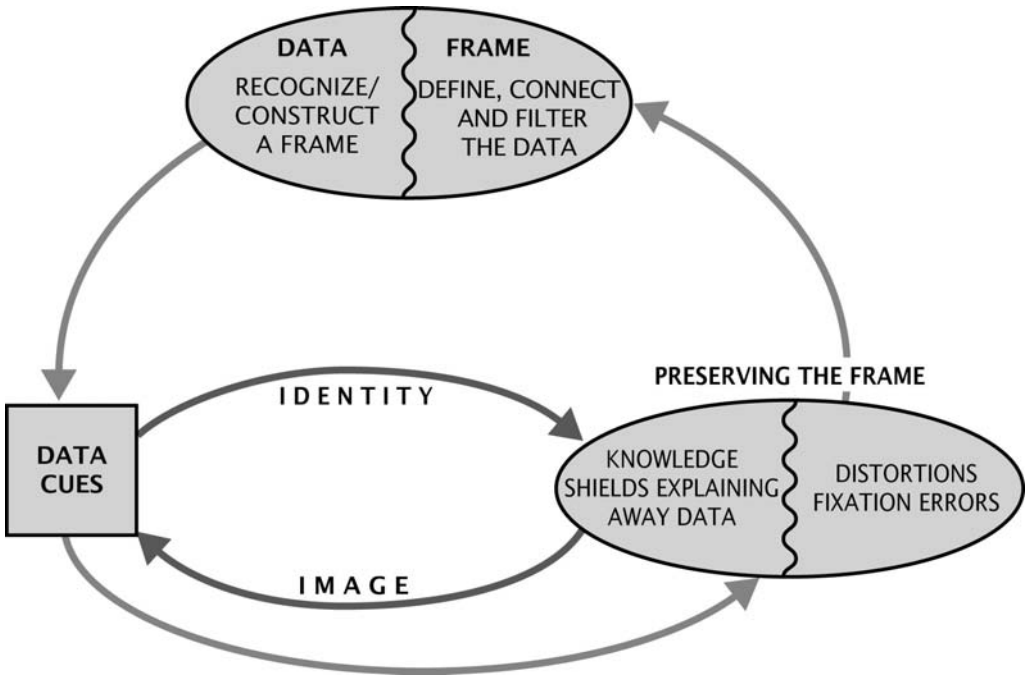

Figure 11: Preserving a frame

Identity construction was described in the literature review as central to sensemaking, the focus for all sensemaking processes and how we interact with others and our

environment (Weick, 1995; Mills, 2003). It is driven and maintained by three core needs: self-esteem, self-efficacy and self-consistency. Our identity needs direct our efforts to influence the image we convey, and the responses we receive impact upon our identity needs. It is a continual, influential flow between the self and the environment. Threats or disruptions to our expectations concerning these needs are represented by a failure to confirm the self. This results in deliberate efforts to make sense of the ambiguous or contradictory cues in ways that meet those core needs, reaffirming the individual or group identity (see Section 2.3.3.1.1).

Following the model in Figure 11, the process of identity construction influences sensemaking so that cue distortions are reinforced. Rather than engaging in further sensemaking activities, such as questioning the frame or comparing frames from the perspective of the cues, knowledge shields are produced and the frame is preserved.

It has been suggested that Group 2 was a cohesive group and that cohesion was the result of an influential leader rather than individual attractiveness of group members (see Section 6.2.4). The HO identified as the group leader was seen to be influential in various ways and also held perhaps the most extreme views within the group on the late afternoon handover. The two handover incidents, both being highly salient cues that all the HOs were aware of, represented a threat to the group's identity expectations by challenging the core need of self-efficacy. The presence of the cues and external criticism of group members that was carried out in public represented an inadequacy in their chosen handover style. The implication of this was that the group was not capable or competent, impacting negatively upon group self-esteem, and disrupting coherence and continuity. The group responded with knowledge shields. They failed to acknowledge the real problem, the inadequate handover style, restructuring the problem so that the fault lay within the high departmental workload and the attitude of more senior medical staff. In doing so, the group preserved cohesion and reaffirmed its identity.

Chapter 7 Conclusions

7.1 Identity, sensemaking and knowledge proliferation

Sensemaking activities and anticipatory thinking were observed in the data collected from Group 1 but to a much lesser extent in Group 2. This does not infer that Group 2 did not engage in these processes. It has been acknowledged that instances of intentional sensemaking and anticipatory thinking are dependent upon there being circumstances in which they are required. The Group 2 HOs might have been carrying out these activities at times other than the late afternoon handover. Also, their late afternoon handover style did not present opportunities for such activities to take place.

It has been demonstrated that the way the HOs made sense of the late afternoon handover as a concept influenced the ways in which they engaged with it and the subsequent knowledge outcomes. The knowledge outcomes related to what they learned of the handover concept when interacting with it and what they learned from the content of the handover. Identity construction was the underlying force in each case. The knowledge outcomes influenced the HOs' identity needs, the drivers for their sensemaking, which in turn influenced their interaction with the handover, further sensemaking, and the knowledge outcomes.

Similarities between notions of sensemaking and knowledge were noted throughout the literature review. Relating these processes emphasizes the importance of identity construction as it determines interpretation, a key feature of the processes. Interpretation, under the influence of identity, was seen to be of significance to both sensemaking and to knowledge sharing processes, in the selection and structuring of meaningful data or environmental cues according to individual or group capability. The work of Cook and Brown (1999), D'Eredita and Barreto (2006) and Ringberg and Reihlen (2008) was seen to be influential in associating interpretive, sensemaking processes with the production of differing knowledge transfer or sharing outcomes.

Tsoukas (2003) described the process of tacit knowledge proliferation as one in which a knowledgeable person extracts particular portions from countless experiences and uses them to direct attention in a way that new knowledge is developed, the outcome determining which further portions of experience to extract, to continue the process. D'Eredita and Barreto (2006) compared this to punctuation and bracketing (Weick 1995), in which strings of seemingly random environmental data are grouped into portions and structured until some sense is made, which then influences the data that is identified and the way it is structured to make sense (see Section 2.3.3.1.3). The

authors suggested that the same process was taking place within sensemaking and within knowledge proliferation.

Tuomi (1999) argued for the existence of a reverse knowledge hierarchy. Knowledge is necessary to recognizing and understanding information and data, from which the data-information-knowledge hierarchy develops (see Section 2.2.2). This too parallels Weick's (1995) process of punctuation and bracketing. Klein (2009) suggested that the two knowledge hierarchies might each have a different status: the sophistication of knowledge operating dynamically to assimilate information and data, and structural processing takes place to create knowledge. This may also be applied to the sensemaking process of data/frame matching (Klein *et al.* 2007). The frame selected from previous sensemaking events influences the identification and interpretation of environmental data, and structuring of that data influences the frame that is selected.

The way the HOs understood the concept of the late afternoon handover influenced the ways in which they interacted with it and the consequent knowledge transfer or sharing outcomes. For Group 1 the handover was a trusted and supportive network within which they used a narrative structure to share knowledge, learning from each other's experiences and confirming organizational knowledge. For Group 2 the handover represented an event with which they might engage if they wanted to direct attention towards particular patients. The features of the handover style supported the transfer of information or explicit knowledge, but provided few opportunities for sharing knowledge. The subgroup had engaged with the handover in the same way as their Group 2 colleagues but learned that the handover style could have a detrimental impact upon them. They adapted the way they engaged with it by developing a more tightly structured and instructive style, which again supported explicit knowledge transfer but not knowledge sharing. In each case, identity needs influenced their interpretation of the environment, determining their handover styles. The subgroup HOs had a need to be identified with their other Group 2 colleagues, but also a need to respond to a personal threat to identity. They preserved their group identity, as shown by their defence and support of the handover style generally, which maintained group cohesion, but found a way that was acceptable to their colleagues of adapting their handover style, as seen by them accommodating occasional jokes and comments about giving or asking for additional patient information.

The implication of this is that if the Group 2 HOs had been told at the beginning of their placement to conduct their handover at a face-to-face meeting, there is no guarantee that they would have developed a handover having the same characteristics as that of Group 1, with similar knowledge sharing potential. The groups of HOs came

together for six months then moved on, leaving no continuity of organizational knowledge or practice; each group began afresh with new members and identity needs. In this way, it might be said that there is no generic HO culture. Efforts might be made to encourage a handover more amenable to knowledge sharing by organizing the handover context so that the aims of the process are more clearly understood; providing cues or environmental data, or setting the scene in ways that are meaningful to the HOs, in much the same way that Boland & Tenkasi (1995) described perspective making (see Section 2.2.3.2). Group 2 explained away the salient environmental data of the handover incidents, but by that time were in the process of developing a highly cohesive group with its own specific identity. Providing appropriate cues at an early stage when the group is initially assembled that direct them towards a Group 1 handover style, might influence sensemaking so that the late afternoon handover is perceived as playing a more significant role in the work and development of the HOs and in patient care. There is no assurance that the trusting context in which the Group 1 HOs felt confident to share their individual reactions to situations, to admit that had not known what to do in certain circumstances, and to be actively looking out for each other, would develop. However, the advantages of the Group 1 handover in terms of timeliness, content and contribution to work planning can be supported, and might have the incidental advantage of providing a context in which an informal learning forum could develop. Addressing the late afternoon handover style would be an important and exciting initiative with potential benefits for HOs and for patients. A report produced for the host research organization made a number of initial suggestions to encourage knowledge sharing at the late afternoon handover and these are presented in Appendix G.

The difficulty in describing some sensemaking authors as taking either a cognitivist or a social-constructionist approach was noted in Section 2.3. The static, cognitivist notion of categorization, associated with shared mental maps and commonly accepted reality, is in direct opposition to the social-constructionist belief in a continuous, active process of creation and recreation to understand what is happening, driven by identity construction and therefore, never perfectly shared. However, the dividing line may be crossed, as seen in the example of Karl Weick, widely recognized as a social constructionist, yet whose work on close inspection might, in parts, be described as cognitivist in orientation. The explanation for this dilemma might lie within social-constructionist thinking itself. The continuously negotiable nature of sense from this position means that it cannot be labelled, but in order to consider it in any way whatsoever, labels must be applied. How can we discuss something if we cannot name it? The actual process of enactive sensemaking, interacting with the environment to punctuate and bracket the cues or data around us, is categorical in nature, and to

know the world, this is what we must do. Consequently, when attempting to understand sensemaking, it is necessary to label, to punctuate and bracket, to group in a sequential order and form a narrative, in order to achieve the plausibility that enables action, the discussion of sensemaking. This might suggest that no dividing line exists and that socially constructed sense must incorporate cognitivist elements, to a greater or lesser degree, dependent upon the situation.

Providing a further association between sensemaking and knowledge processes, the practice-based view of knowledge treats categorization in a similar way to this, seeing no complete separation between explicit and tacit knowledge, and arguing that all explicit knowledge must have tacit elements in order to be meaningful, again varying in degree according to the context (see Section 2.2.3.2).

7.2 Contributions

Due to a number of factors it was not possible to conduct the research in the manner originally intended. However, the methodology was carefully adapted and the research has successfully provided the following theoretical, methodological and practical contributions:

- The research has contributed to the current knowledge of processes involved in the transfer and sharing of domain-specific information and knowledge between professionals.
- The research was novel in studying handovers between HOs of the same level of seniority and involving no other professions.
- The individual, intentional sensemaking activities of the data/frame theory of sensemaking (Klein *et al.* 2007) were identified at group rather than individual level, suggesting that the theory might have applicability to analysis of a wider range of situations.
- The research has extended current knowledge of the processes involved when sensemaking reaches an inadequate conclusion. A section of the data/frame model of sensemaking (Klein *et al.* 2007) was adapted to illustrate the influence of identity construction in the process of preserving frames.
- The research studied groups with a fixed life span; HOs are together in groups for only six months. The findings might therefore have applicability to project teams, particularly those in which there is no continuity of membership.
- Similarities were identified between processes in the knowledge and sensemaking literature suggesting that the two fields might be more closely associated than previously acknowledged.

- A methodological contribution has been made concerning conducting qualitative research on healthcare processes, particularly with regard to taking opportunities in a sensitive manner and overcoming difficulties.
- A report has been produced for the host research organization on the handover process that will be used to inform local guidelines for a structured handover process. A summary of the report produced for the host organization is presented in Appendix G.
- Based upon the experience of accessing a sensitive healthcare context in order to carry out non-clinical research, recommendations for researchers embarking upon the NHS Research Ethics Approval process. Appendix D.

7.3 The impact of the research within healthcare

This research complements a larger study being carried out by the Dr Foster Unit at Imperial College London into the factors influencing an increase in mortality rates, particularly within Departments of Medicine, at the time when HOs begin their first clinical placement (see Section 1.1 and Section 2.3.6). Handovers involving HOs are one of the factors under consideration and the outcome may guide the development of future health policy. The research within this thesis is compatible in focussing upon first year HOs and is highly specific in having examined handovers in which only these HOs take part. The findings are therefore relevant to the NHS at a national level and may make some contribution towards national health policy with regard to guidance on handover procedures.

The research has had an impact upon local policy and clinical practice as it has been used to inform new guidelines on handover procedures in two hospital departments. In this way it has contributed to the quality of patient care. As was seen in the literature review, there is a danger that measures adopted to improve the quality of clinical handovers can come to be seen as an end in themselves with attention focussed upon trying to recall a mnemonic, signing a document, completing a checklist or other procedure, and losing sight of aim of the process. Unlike many other studies, this research has been more concerned with the cognitive conditions that influence handovers. The findings of the research have demonstrated that our understanding of a context for communicating knowledge or information is as important as the knowledge itself. This can either impede what is communicated, even limiting it to discrete data, or enhance it to develop deeper understanding, and support cognitive functions such as sensemaking and problem recognition, both of which will have an important impact upon clinical practice and ultimately, upon patient care. This has possible implications for other handovers and how they are conducted, both medical

and within other healthcare disciplines, and in this respect, the research has significance outside the scope of the HOs' late afternoon handover.

The progress of the research was discussed at intervals with the departmental consultant who received the findings with keen interest. It was useful to have the process of the late afternoon handover defined as only the HOs themselves knew how this was conducted. A report was presented to the organization that was considered to be most helpful and was used to inform a presentation by the consultant to the HOs of the importance of their late afternoon handover. This would later influence guidance to new HOs on the conduct of the late afternoon handover. In the consultant's opinion, the Group 1 handover style was more satisfactory than that of Group 2 and he doubted that Group 2 having six months more experience than Group 1 would compensate for what he termed their 'haphazard approach'.

In characterizing and providing possible reasons for the different handover styles, the research has demonstrated that the late afternoon handover can be more than an event at which information is transferred: social interaction between HOs enables knowledge sharing on clinical and organizational matters, and the affirmation of organizational knowledge, including its values and identity; it can be an educational opportunity at which learning takes place; and it can also be a context for problem solving. In raising awareness of this interactive style of handover, as conducted by Group 1, the research has identified to the host organization an area in which it can take action to improve its resilience to the likelihood of incidents arising from poor communication.

As detailed in the research methodology, the author made strenuous efforts to ensure anonymity. However, the descriptions of certain patients' conditions and other events given at the handovers contained details that would enable the HOs or the patients involved to recognize themselves. The transcripts of these handovers were important, indeed central, to the research and were therefore included in the thesis. In view of this, and concerns regarding the manner in which readers might perceive the style of some of the handovers and how this might reflect upon the hospital, particularly at a time when certain services are being evaluated and undergoing significant changes, the host organization requested that the thesis be embargoed for three years. The author intends to disseminate the research through papers and conference presentations. Maintaining the spirit of the request will present something of a challenge when preparing these papers, but this is not insurmountable, and the author is confident of being able to structure articles in a manner that will provide sufficient

evidence to support her position without incorporating the entire details that were necessary for the thesis.

7.4 Research limitations

The initial recruitment stage of informing potential participants about the research did not go according to plan. This was in a large part due to the lengthy process of completing the NRES application for ethical approval and the delay in waiting for agenda space at an REC meeting for the application to be reviewed. During that time the departmental consultant, the key player in communicating the research information to HOs, had many patient demands made upon his time and once approval was achieved, had to alter the agreed process. This was within the bounds of the approval agreement, but the outcome did delay the recruitment process. Also, due to the timing of the REC meeting, data collection commenced towards the end of the HOs' rotation to the department. It was therefore not possible to follow the group through their entire six month placement, and while participants were asked for their views on any changes in the handover process since joining the department, the data did not have the benefit of researcher observations and recordings taken over time. As a result of these factors, it was necessary for the author to devise an alternative recruitment plan, and to take a slightly different perspective on the study of sensemaking over time, by investigating one group with six months experience and another with twelve months experience, rather than following one group from the beginning of their first placement through their first six months of experience (see Section 3.9 and Appendix C). The NRES process has now been altered so that such lengthy delays should not occur. There is little that can be done on the part of healthcare researchers to minimise the impact that patient demands will have upon clinicians' time, other than to limit the amount of practical input required of clinicians within the research. However, as can be seen from the example of this research in which the consultant had agreed to make one short presentation, problems may still arise. Although initially unsettling, the above limitations had a beneficial outcome in challenging the author's research skills and also in delaying the research to a point at which it commenced with participants who had adopted a handover style completely different to that anticipated by the department's senior medical staff and the author.

Any generalizations concerning the research findings should be made with caution, as the study was limited to a single hospital. While it was considered to be representative of similar sized university teaching hospitals, there may have been organizational factors outside the scope of the research that influenced the findings. An example of this might be the criteria used by the hospital when selecting its HOs. Following on

from this, there might also be influential factors relating to the individuals that apply for HO posts within the particular hospital. The pool of potential research participants was also limited by the number of HOs accepted for training within the department.

It was acknowledged within the methodology that asking participants to comment upon their sensemaking processes necessarily interrupts those processes. Also, participants' accounts of those processes will themselves be subject to retrospective sensemaking and therefore susceptible to potential problems associated with characteristics such as plausibility and enactment, as discussed in the literature review. The resulting accounts may be influenced by the participants' ability to communicate them to the author, and by the author's understanding of what has been communicated. The accounts may also be influenced by identity so that individual participants might consciously or unconsciously offer a response that they prefer rather than one closer to actuality. In short, participants might not provide a complete account. However, it should be noted that all research that involves asking participants to comment on how they have arrived at a particular cognitive outcome would be subject to these limitations. These factors were taken into consideration in the planning and throughout the research, and it was judged that even though participants' accounts might be influenced in these ways, investigating participants' sensemaking process by inviting their views would be a valuable means of determining the nature of those processes.

As was seen in the analysis, the author noticed that there were a number of instances in which the participants used non-verbal communication in the process of sharing knowledge and confirming organizational knowledge. These instances played an important role in the Group 1 face-to-face, interactive style of handover, and also aided the author's sensemaking of what was unfolding within these processes. Their significance had not been anticipated at the beginning of the research. Whenever the author identified that non-verbal methods were being used as part of the communication process, these were noted in the field notes. However, there may have been additional instances not noticed by the author or indeed, events that the author did not recognize as non-verbal communication related to what was being communicated. The author's sensemaking of what was happening during the handovers developed after reflecting upon the transcripts of the audio recordings and field notes, and with increasing contextual knowledge of the research domain. It would therefore have been useful to be able to make visual recordings of the handovers in addition to the auditory recordings and observational notes, as these might have provided additional insights into the communication processes being used. However, there was insufficient time to adapt the research and apply for further NRES approval

to carry out filming. An alternative method might have been to devise a form of shorthand code to record the instances of non-verbal communication, but this would have necessitated the author being aware of the particular gestures or mannerisms used by the group members and their significance, perhaps necessitating a pilot study. Again, there was insufficient time to pursue this, and the author relied upon careful observation of the participants and handwritten field notes.

The findings demonstrated that there was some tension between a number of the Group 2 HOs and nursing staff, and that some of these HOs felt that nurses should take responsibility for ensuring that night duty HOs were informed of much of the late afternoon handover content, thereby limiting their handover to seriously ill patients needing attention. This view was taken further by some, who thought that many of the tasks carried out by HOs should become nursing duties. Had there been sufficient time, the research might have been extended to examine the role played by nurses in relation to the late afternoon handover, perhaps in monitoring outstanding tasks and reminding HOs, and the contribution they regularly make to the handover, for example in tasks such as preparing prescription charts that need updating. It would be interesting, although not directly relevant to this research, to invite comments from nurses on the HOs suggestions to expand the nursing role.

An interesting question that the research was unable to address was how HO2M came to be identified as the Group 2 ‘leader’, what characteristics enabled him to assume that position and the processes involved. The analysis demonstrated that HO2M was considered to be the group leader by his colleagues and by those external to the group. Even though his actions exacerbated situations that his colleagues found difficult, he was clearly regarded as somewhat charismatic by a number of them and influential within the group, and this the author found intriguing.

7.5 Future research

While the methodological adaptations resulted in a successful qualitative analysis of clinical handovers within a novel context, it would be extremely useful to be able to follow the original research plan to observe the late afternoon handovers between HOs during their entire first clinical placement and observe their working practice, and conduct periodic interviews with them. This would enable direct observation of the development of sensemaking skill over a greater period of time, in addition to gaining the participants’ accounts of that process. The study would be further enhanced by multi-site comparisons and monitoring patient outcomes.

Applying the research findings to restructuring the late afternoon handover in a hospital would assist in extending knowledge of how sensemaking and knowledge sharing contexts might be influenced.

The similarities between sensemaking and knowledge processes, the recent moves towards socio-cognitive theories of knowledge proliferation, and increasing interest in socio-constructionist sensemaking processes invite co-operation from authors across these fields to examine the similarities more closely. A particular area of interest, due to the identified similarities in processes, would be the relationship between knowledge, knowing and sense.

The field notes made during handover observations and while shadowing HOs proved invaluable in assisting the interpretation of data, particularly those relating to unspoken actions and reactions. This suggests that research into non-verbal communication during handovers might provide greater understanding of sensemaking and knowledge sharing within this context. The outcome of such research would be of interest across HROs.

Many studies emphasize the need for researchers to disconnect and step outside of that which is being researched in order to take an objective view of what is happening. However, from a social-constructionist perspective, sensemaking is a wholly subjective activity. The author is drawn towards the notion of re-engagement with sensemaking; rather than making efforts not to disrupt sensemaking, to deliberately interrupt, engage with and question what is happening. The author's own revision of sensemaking enabled consideration of the research findings from a different perspective than had been initiated. Looking back at how that revision developed, or making sense retrospectively while tying to avoid the pitfalls of retrospective sensemaking, was a curious process. The description that HO2F gave of how he mentally constructed a 3D image of the handover combined with a plan of the hospital was not only fascinating, but invites the question of what other representations people use for assimilating knowledge and for making sense. This might have implications for the ways in which information and knowledge is presented and communicated, particularly within HROs.

Appendices

Appendix A: Summary of recommendations from 'Safe handover: safe patients' BMA, 2004

The BMA guidance *Safe handover: safe patients* makes recommendations for all medical handovers, including multidisciplinary handovers and those that take place at various times of the day. The selected recommendations noted here are those that have relevance to the handover being studied, namely the late afternoon shift handover between junior doctors only.

Patients have suffered adverse consequences when handover goes wrong. An investigation into one case of a patient death identified a number of system failures, but it was also noted that there was no formal face-to-face handover between the doctors involved. Additionally, several recent coroners' cases have criticised systems where the failure to hand over information effectively was implicated in an adverse outcome. *Safe handover: safe patients* emphasizes that continuity of information is vital to the safety of patients and advocates that this should be conducted in a face-to-face setting.

- Handover should be at a fixed time and of sufficient length, protected from other duties.
- It should be carried out in a place free from distraction and not used by others at this time.
- Unique patient identification codes should be used to prevent confusion and patients should not be referred to by their location.
- Tasks not yet completed must be clearly understood by the incoming team.
- Tasks should be prioritized
- Plans for further care should be put into place
- Unstable patients should be reviewed.

The guidance makes the following statements:

Good handover benefits patients

- Safety is protected – lapses in information handover can, and do, lead to mistakes being made. This increases morbidity and mortality.

- Less discontinuity of care – poor handover can lead to fragmentation and inconsistency of care.
- Decreased repetition – patients dislike having to answer the same questions over and over again. Different individuals providing care will be accepted as long as existing team knowledge is retained.
- Increased service satisfaction – every doctor attending a patient can begin where the last left off. Patient perception of professionalism is reaffirmed and improved.

Good handover benefits doctors

- Educational – better handover will be of daily benefit to practice and helps the development and broadening of communication skills. A well-led handover session provides a useful setting for clinical education.
- Professional protection – accountability has become more prominent with the move towards a more litigious culture within healthcare. Clear and accountable communication can protect a doctor against blame for errors which occur.
- Reduction of stress – having the information and feeling informed allows doctors to feel less unsupported and more in control of a patient's care.
- Job satisfaction – providing the best possible quality of care is highly rewarding and is fundamental to a doctor's sense of job satisfaction.

BMA 2004, p. 9.

Appendix B: Flying Blind – An example of sensemaking

(From: Klein *et al*. 2007, p. 44-46)

This incident occurred during a solo cross-country flight (a required part of aviation training to become a private pilot) in a Cessna 172. The pilot's plan was for a 45-minute trip. The weather for this journey was somewhat perfect – sunny, warm, a few clouds, not much haze. He had several mile visibility, but not unlimited. He was navigating by landmarks.

The first thing he did was build a flight plan, including: heading, course, planned airspeed, planned altitude, way points in between each leg of the journey, destination (diagram of the airport), and a list of radio frequencies. His flight instructor okayed this flight plan. Then he went through his pre-flight routine. He got into the airplane, checked the fuel and the ignition (to make sure the engine was running properly), set the altitude (by calibrating the altimeter with the published elevation of the airport where he was located; this is pretty straightforward), and calibrated the directional gyro (DG).

He took off and turned in the direction he needed to go. During the initial several minutes of his flight, he would be flying over somewhat familiar terrain, because he had flown in this general direction several times during his training, including a dual cross-country (a cross-country flight with an instructor) to an airport in the vicinity of his intended course for that day.

About a half hour into the flight, the pilot started getting the feeling that he wasn't where he was supposed to be. Something didn't feel right. But he couldn't figure out where he was on the map – all the little towns looked similar.

What bothered him the most at this point was that his instruments had been telling him he was on course, so how did he get lost? He checked his DG against the compass (while flying as straight and level as he could get), and realized his DG was about 20-30 degrees off. That's a very significant inaccuracy. So he stopped trusting his DG, and he had a rough estimate of how far off he was at this point. He knew he'd been going in the right general direction (south), just drifted east more than he should have.

He decided to keep flying south because he knew he would be crossing the Ohio River. This is a very obvious landmark that he could use as an anchor to discover his true position. Sure enough, the arrangement of the factories on the banks of the river was different from what he was expecting. He abandoned his expectation and tried to

match the factory configuration on the river to his map. In this way, he was able to create a new hypothesis about his location. A particular bend in the river had power plants/factories with large smokestacks. The map he had showed whether a particular vertical obstruction (like a smokestack or radio antenna) is a single structure or multiple structures bunched together. He noted how these landmarks lined up, trying to establish a pattern to get him to the airport. He noticed a railroad crossing that was crossed by high-tension power lines. He noticed the lines first and thought, 'Is this one crossed by the railroad track that leads right into the airport?' Then he followed it straight to his destination.

In this example, we see several of the sensemaking activities. The pilot started with a good frame, in the form of a map and knowledge of how to use basic navigational equipment. Unknown to him, the equipment was malfunctioning. Nevertheless, he attempted to elaborate the frame as his journey progressed. He encountered data that made him question his frame – question his position on the map. But he explained these data away and preserved the frame. Eventually, he reached a point where the deviation was too great, and where the topology was too discrepant from his expectancies. He used some fragmentary knowledge to devise a strategy for recovering – he knew that he was heading south, and would eventually cross the Ohio River, and he prepared his maps to check his location at that time. The Ohio River was a major landmark, a dominating anchor, and he hoped he could discard all of his confused notions about location and start fresh, using the Ohio River and seeing what map features corresponded to the visual features he would spot. He also had a rough idea of how far he had drifted from his original course, so he could start his search from a likely point. He could not have successfully re-oriented earlier because he simply did not have a sufficient set of useful anchors to fix his position.

(This example) illustrates most of the sensemaking types. The example shows the initial data/frame match: the pilot started off with a firm belief that he knew where he was. As he proceeded, he elaborated on his frame by incorporating various landmarks. His elaboration also helped him preserve his frame, as he explained away some potential discrepancies. Eventually, he did not question his understanding. He did realize that he was lost. He also had no alternate frame ready as a replacement, and no easy way to construct a new frame. But he was able to devise a strategy that would let him use a few anchors (the Ohio River and the configuration of factories) to find his position on his map. He used this new frame to locate his destination airport.

All of the activities in this example are ways of making sense of events. The nature and combination of the sensemaking activities are different depending upon the demands of the task and the expertise of the sensemaker.

When we think about sensemaking, one source of confusion is to treat different activities as the same. We assert that each of the activities shown in (the data/frame model) has different strategies associated with it, and different obstacles that must be managed. Therefore we may need to be careful about treating all of these different activities as the same. For instance the support we might offer to someone who is tracking two opposite stories or frames might be very different from the support we would give to someone who needs to reach back to prior events to recall which data elements have been explained away and might now be relevant, and these might differ from the help we could offer someone who has become disoriented and is trying to detect one or two anchors from which to derive a new frame.

Appendix C: Discussion of the research ethics approval process

All human-related research conducted within the NHS in England is subject to formal ethical approval. Approval cannot be given in retrospect. It is a time-consuming process but is essential and protects both the participants and the researchers.

The honorary contract

It is essential that researchers organize honorary contracts between themselves and the NHS Trust at which it is proposed that the research be conducted. An honorary contract is an agreement between a researcher and an NHS Trust which names the researcher's sponsor, the person the researcher will be responsible to at the Trust and the department in which the research will be carried out. The contract outlines the role of the researcher and a timescale for the contract is agreed. The Trust's named person on the contract will often be the senior clinician responsible for the department and, as has already been noted, access to clinicians can be very difficult. It is therefore in the researcher's interest to put effort into developing a good working relationship from the very early stages of planning the research and to make arrangements for the honorary contract as soon as possible.

The researcher was already in possession of an honorary contract with the Trust and had been able to discuss the project with the consultant in the Department of Medicine, both of which saved a great deal of time.

University approval for sponsorship and insurance

At the University of Southampton, the University Research Governance Office (RGO) must approve the research proposal before an NHS Research Ethics Committee can submit it for review. This is a requirement of the University and is in addition to approvals that may be required by external agencies and research partners such as the NHS. The RGO does not make an ethical review of the proposal, but arranges for the University to act as the sponsor for eligible research and also organizes appropriate insurance cover.

'The RGO reviews research proposals/protocols in order to assess them in respect of:

1. Compliance with legislative frameworks such as the Data Protection Act, Human Tissue Act, Mental Capacity Act and Medicines for Human Use (Clinical Trials) Act, Good Clinical Practice Directive.
2. Compliance with guidelines that inform best research practice.

3. NHS Research Governance Framework
4. Compliance with University of Southampton policies

Following assessment of the proposal/protocol, the RGO will:

- Register research projects on the University database.
- Arrange research sponsorship and insurance as appropriate.
- Offer advice and guidance to researchers to ensure the appropriate approvals are obtained from all the regulatory authorities before the research commences.
- Monitor ongoing research and assist in investigations in case of complaint against any researcher.

The RGO does not review research proposals in respect of ethical issues, but will ensure that all research projects have ethical approval from an appropriate Research Ethics Committee.'

(http://www.resource1.soton.ac.uk/legalservices/rgo/index.html)
Accessed: 7 August 2008.

Letters confirming that the appropriate arrangements are in place are essential to the NHS ethical review process.

The National Health Service ethical review process

The process for ethical review is organized by the National Health Service Research Ethics Service (NRES), a directorate of the National Patient Safety Agency. The NRES became operational on 1 April 2007, and comprises the former Central Office for Research Ethics Committees (COREC) and the regional Research Ethics Committees (RECs) in England. It provides leadership to the RECs by the development and implementation of standards and operational systems, training for REC members and co-ordinators, liaison with the Department of Health and development of the infrastructure to support RECs, including establishment of regional management centres and information technology solutions to support procedural efficiency. The NRES works with similar bodies in Northern Ireland, Scotland and Wales to promote a consistent ethical review framework throughout the United Kingdom. The NRES Mission statement is:

'The National Research Ethics Service will protect the rights, safety, dignity and well being of research participants, whilst facilitating and promoting ethical research.

We do this by:

- Providing ethical guidance and management support to Research

- Ethics Committees in England
- Delivering a quality assurance framework for the Research Ethics Service
- Working with colleagues in the UK to maintain a UK-wide framework
- Working with colleagues in the wider regulatory environment to streamline the processes.'

(NRES Mission Statement, http://www.nres.npsa.nhs.uk/aboutus)

However, as will be seen, the ongoing discussion between researchers indicates that in practice the RECs are not working in a co-ordinated manner and many are critical of its level of operational efficiency.

The ethical review process begins with the researcher registering as an applicant on the NRES website. The application is made using an online form, together with other supporting documentation in hard copy. General guidance is given on the preparation of responses to questions and the supporting documents. Once completed and a satisfactory peer review has been received, the researcher contacts the REC office to obtain an application reference code and book a place at a committee meeting. The researcher then enters the code onto the online form and effectively locks the form so that no further changes may be made to it. The code appears on all pages of the form, including those requiring signatures. The form is printed, signed by the researcher, the academic supervisor, the Head of the Research Governance Office, the NHS Trust Directorate Manager and the Trust Directorate Finance Manager, and then submitted in hard copy to the REC office.

Once the application has been submitted the REC has a commitment to give a final decision on the outcome within 60 days. If the committee requires amendments or further information the 60-day clock stops and is resumed once the information has been received.

The ethical review process in practice

As previously discussed, the research ethics approval process is a source of increasing lively debate, largely concerning increasing perception of the process as a barrier to research. Since 2004 when the process was centralized, the British Medical Journal has carried many articles and letters on the matter and titles such as 'Bureaucracy of ethics applications', 'Frustrating bureaucracy in clinical research' and 'Research ethics paperwork: what is the plot we seem to have lost?' are typical of the tone. Gkioulekas (2008) made his view of the process quite clear: 'In 2008, we are sad to report that the situation has not improved since COREC was repackaged as NRES (National Research

Ethics Service) in April 2007, and the process for ethical approval continues to impede and delay just as it did in 2004' (Gkioulekas 2008, p.6).

He then went on to describe the complicated and time consuming process he and his team were contending with in order to pursue what he described as 'a small observational study' (Gkioulekas 2008, p 6). A search conducted by this researcher for articles supporting the process proved rather disappointing as even those challenging the opposition to take up positions on their local RECs acknowledged that the process was far from perfect (Addison 2006). However, despite all of the potential problems facing researchers, ethical approval is a formal requirement and research in health care settings cannot be conducted without it.

Once the research project had been agreed with the academic supervisors, the researcher began investigating the NHS Research Ethics approval process by registering on the appropriate website and contacting the Research and Development Office at the Trust (Trust R&D), the REC and the University RGO. The website appeared to be relatively straightforward and the offices were helpful, with the REC indicating that it would probably take around six months from the initial stage of preparing the application to achieving approval. It is a useful process in that elements of what is required would be included in a PhD thesis or other research project papers, for example, a detailed research protocol. But most importantly, the requirement to spend time considering the ethical issues associated with a project is essential to all healthcare related research.

Although the process flowchart on the NRES website had initially seemed to be quite straightforward, the difficulties lay within reaching the starting point of the flowchart, in preparing and agreeing the documentation and obtaining signatures ready for submission. Closer investigation of the website revealed a complex and unclear process. Several days and telephone calls later, it was confirmed that the project required completion of Part A of the application form and a specific list of supporting documentation. Part B of the form, the Site-Specific Assessment form (SSA), was not required as the research was to involve qualitative research methods only and this was defined by the NRES as an SSA-Exempt procedure. Confusingly, it was later discovered that although the research was SSA-Exempt, Part B, the SSA form, was the form used to apply for management approval from each Trust's R&D office, so was to be completed in any case. It was finally clear that the REC office required Part A, unless the research was not SSA-Exempt, in which case it required Part A and Part B, while the Trust's R&D office required Part A and Part B in all cases. A timesaving and less

confusing solution may be to combine the two forms and into one document and submit it to all those concerned.

Completing the application form took many hours of work and necessitated a great deal of repetition, with some sections including specific instructions to reword rather than to cut and paste text. Masterton, a long-serving research ethics committee member, describes it as follows: '... the application form remains alienating, despite face lifts and electronic titivation. Lord Warner's review of ethics committees in 2005 criticised it politely. I won't: it is a hybrid, chameleonic monstrosity' (Masterton 2006, p. 615).

During the application process the system changed, which was somewhat confusing, and 120 A4 pages of documentation were generated which needed to be copied four times. The application form was heavily orientated towards biomedical research projects so that responses relating to non-clinical research could seem awkward. The guidance given on the NRES website contained samples of the Participant Information Leaflet and consent form but no proforma was given for either of these documents and the examples given were for clinical research.

There is anecdotal evidence amongst researchers of Participant Information Leaflets and consent forms submitted after being adapted for use with non-clinical research, being returned on several occasions until they have been altered to the suggested clinical orientation. It is acknowledged that complete and truthful information must be given to potential participants to help them decide whether or not to take part in the research and it should be written in a form of language that they understand. But the danger of issuing lengthy and perhaps overly detailed Participant Information Leaflets is that prospective participants will not be inclined to read them and so will not take part in the research, or will skim through them and sign up while not being properly informed, which is quite unethical.

Addressing the many specific, detailed requirements of the process necessitated numerous meetings, emails and telephone calls. Access to healthcare organizations for research purposes is a privilege not a right and it was essential to discuss each stage of the process and the requirements with the consultant to ensure that he was fully informed and, more importantly, in agreement with what was to be done. All of this takes time as the people involved are handling many other applications and the consultant and other professionals involved have patient care and other priorities.

Once the documentation was completed the researcher contacted the local REC to arrange for the application to be submitted and began collecting the necessary signatures. The timescale allowed by the NRES to collect the signatures and submit the application form is 4 working days from the issue of the reference number. The researcher contacted the NRES to enquire why a limit of 4 working days had been set, but no reply had been received at the time of writing this thesis. Careful timing is necessary to ensure that all the above people will be available and can make time for the researcher, within the time allowed. Clearly, this also necessitates delivering hard copy documentation in person rather than by post.

The NRES has a commitment to turning around applications within 60 days. The 60 days starting point is the day that the application is reviewed by the REC not the date of submission, and the waiting time to be booked onto a free agenda space may be lengthy, particularly as the number of committee meetings has been reduced. 'This clock (the sixty day turnaround period) only starts once the form is booked in with an LREC (Local Research Ethics Committee) that has space to discuss the research at its next meeting. With the volume of research projects to be discussed, and the recent reshuffle and subsequent closure of LRECs in our area, this has lead to meetings filling up quickly and extra delays in starting the ethical application process despite the best efforts of everyone involved' (Newton 2007 p. 3). This additional delay to an already lengthy process can have a significant impact upon research projects, in particular, those that are subject to short time limitations. Shortly after collecting the data for this research, the REC dealing with this research proposal closed.

Trust Research and Development approval

Once approval has been received from an NHS REC, research projects are then submitted to the Research & Development group at the Trust where the proposed research will be carried out. No research work can be undertaken until this final approval is obtained. The submission includes all of the documentation provided to the REC, plus a copy of the REC approval letter and copies of letters confirming sponsorship and indemnity insurance from the University. In practice, establishing a good working relationship with the Research & Development group at the start of the application process helps to facilitate this final stage and the team members can offer valuable advice and guidance on the application process.

Achieving research ethics approval

The author had been given an estimated timescale of six months from beginning the application process to achieving approval. The actual time taken was fourteen months. At the time of submission a lengthy delay was anticipated until the application could

be booked onto an REC agenda. However, a cancellation provided a booking the following month and approval was given without delay.

It has become increasingly common to congratulate researchers once ethical approval has been achieved. This illustrates how the process has become a barrier, something to be overcome, rather than a supportive part of the research process.

The author offers a number of recommendations to others embarking upon the Research Ethics Approval process. These are given in Appendix F. The recommendations remain valid at the time of writing this thesis.

The continuing debate

The continuing debate on the ethical approval process has produced numerous suggestions for changes, largely concerned with reducing the time taken for the approval process. These include devolving responsibility for ethical approval involving research other than industry-funded projects to individual departments and Trusts (Natarajan 2007); separate systems for non-clinical research (Jamrozik 2008); and 'fast track' systems for junior doctors in 4 month academic training posts who wish to gain research experience (Newton 2007) and for undergraduates (Robinson 2007).

However, these proposals could in themselves lead to additional layers of bureaucracy and they should still involve a means of demonstrating that an appropriate level of ethical scrutiny has been applied to each project. This leads to the question of what an appropriate level of ethical scrutiny actually is and how it is applied by the RECs. Tully *et al*. (2000) submitted a multi-centre research application, made the requested changes and obtained approval. The proposal was then submitted to 125 local RECs for their individual approvals to begin the study and the responses were audited.

The RECs varied in their opinions on the application, with 42% granting immediate approval and the remainder requesting a wide range of amendments, with 18% requiring changes to the Participant Information Leaflets and 3% raising confidentiality issues, for example. This had a significant impact on the study, compounded by discovering that the centrally held list of REC contact details was out of date incurring lengthy delays in obtaining the correct information and submissions becoming lost. Seventeen potential participants who had been referred to the study were not recruited because ethical approval to commence had not been granted. Such a wide variation between REC responses begs the question of what criteria they each use to base their opinions upon. It would be interesting to conduct a further audit of a similarly sized

multi-centre study following the most recent changes to what seems to remain '...just about the least user-friendly document imaginable' (Oliver 2006, p. 2).

Further discussion on the ethical approval process is outside the scope of this thesis, but its significance within healthcare research is acknowledged. Whatever changes are made to the process, it is important that an appropriate system is in place so that researchers focus their efforts on consideration of the potential ethical implications of their work, rather than managing what is increasingly perceived by applicants as a complex administrative burden. As Ashcroft *et al*. (2005, p. 587) reminds us, '...ethical review is a matter of deliberation rather than the application of formal rules.'

Appendix D: Recommendations for researchers embarking upon the Research Ethics Approval process

- **Begin the process as early as possible**

It is a lengthy process and the time allowed should be double that anticipated. This can have a significant impact on research that has time restrictions. Even if some areas of the project are uncertain, the online form should be registered as soon as possible.

- **Contacts: meet them and stay in touch**

As early in the process as possible, contact should be made with consultant, Head of Department or other person who will be signatory to the honorary contract, the Trust R&D group, the appropriate Directorate Manager, the Directorate Finance Manager, someone at the University RGO and the REC co-ordinator. Wherever possible, contact should be maintained by email, telephone and more meetings if appropriate. It helps that these people know the researcher and they can give advice during the application process.

The University RGO and the Trust R&D office may even look at drafts of the application. It also helps that these people are familiar with the research when their signatures are required in a hurry. It is important to keep the consultant or person who is signatory to honorary contract informed at all stages; if this person is not happy with some part of the project, the researcher will not be allowed to do it. It is essential that researchers remember that they are in a healthcare setting by invitation, not by right.

- **Be flexible**

It is not suggested that researchers compromise their research to fit in with the demands of clinicians, but it should be recognized that there may be particular issues in healthcare settings, perhaps relating to confidentiality or the organisation of clinical procedures, which mean that the study cannot be conducted precisely as planned.

Researchers should also take a flexible approach to the timings for meetings and data collection, which may need to be organized around patient care.

- **Do not customize the documentation**

In the researcher's view, customizing the documentation is a waste of time. The NRES website gives examples of documents such as invitation letters, information leaflets and consent forms in its guidance notes. Use them as templates and make an entry at every section shown. The guidance does not formally require this but there is

anecdotal evidence amongst researchers showing that customized documents are returned until amended in keeping with the examples. The documents are oriented towards patients and clinical researchers so some sections may not seem relevant, but use them anyway. If not, the forms will be returned and the process will be slowed down.

- **Provide exactly what is asked for**

Accept that some of the form is repetitive and perhaps seems irrelevant to the particular research project. Look carefully at the questions asked at the start of each section and treat it almost as an exam question; look for the keywords and respond to them. There are opportunities on the website for researchers to make their views on the process known and that will be more effective than asking for an individual project to be treated differently, which will not happen.

- **Submit the application in person**

Do not trust the postal system. Once an application code has been issued by the REC, there are only four working days to collect signatures and deliver documentation, so the postal system will take too long and also risks the documents being lost. Delivering the documents in person also gives the researcher and the co-ordinator the opportunity to check together that everything has been provided.

- **Attend the committee meeting**

Once the application is submitted the REC will formally ask if the researcher will be attending the committee meeting. The researcher should definitely attend, preferably with the academic supervisor. In addition to being an expression of interest and concern for the project, attendance by both parties reassures the committee that the researcher is supported, and questions can be answered immediately without letters being exchanged and further meetings booked. It can be a daunting process and it helps the researcher to have the support of his or her supervisor at this meeting.

- **Keep a perspective**

It is a testing process but it is helpful to stand back and see it in the spirit in which it is intended, rather than as a barrier to be overcome. It is an important contribution to the ethical validity of research.

Appendix E: Themes for semi-structured interviews

The themes are intended as guidance for the interviews rather than as a questionnaire.

- Training or observational experience in preparation and presentation of handover.
- How is the late afternoon handover carried out? Style/Place/Protected time.
- Preparation to give the handover; planned/when that process starts/how to decide what to include/written down/same or different now to the way it was done at the start of the placement?
- Any changes at all from the way the handover was carried out at the beginning of the placement?
- When giving a handover, how to tell if the person receiving it has understood? Any concerns/how to emphasize urgent issues?
- When receiving the handover, planning for the evening/how to formulate the priorities from all those handing on information/how priorities are set from this?
- At what stage did you begin to get a 'feel' of what to include and how to do it well?
- In the evening, sense of the overall picture across the department? Is that sense important?
- Impact of patient emergencies during the night – how are they dealt with?
- How much of the evening's work is work that should have been handed over but was not? What sort of things? How are you alerted to it and by whom? Why do they get left out? What impact does it have on work/patients? More or less of this than at the start of the placement? Is there any 'opportunist' work picked up along the way?
- Views on the handover system and how well it works – Strengths? Concerns? Protected time? Suggestions on how to address them?

- What makes a ‘good’ handover?
- Any preparation or training that would have been useful?
- Any other comments?

Appendix F: Participant Information Leaflet

UNIVERSITY OF Southampton
School of Management

Ethics Committee reference number: 08/H0607/26
Information sheet, Version 2,21/04/08

Date: <Insert Date>

INFORMATION SHEET

Research title: 'A Study of Sensemaking and Anticipatory Thinking in House Officers.'

You are being invited to take part in a research project. Before you decide you need to understand why the research is being done and what it would involve. Please take time to read the following information and discuss it with others if you wish.

Please contact us if there is anything which is not clear or if you would like more information. Take time to decide whether or not you wish to take part.

What is the purpose of the study?
The research is part of a PhD project studying the handover between health professionals at shift changes. The study is concerned with 'sensemaking' and aims to identify the process by which 'anticipatory thinking' is developed. These concepts are central to how people make sense of their situation and how they anticipate and prepare for possible future events.

It is not a test of your ability in giving a handover and will not be used to make a judgement of your capability. The project is not linked in any way to staff appraisal and will not be used to measure or assess your performance. The researcher will be looking for any ways in which the handover changes and in house officers' views on the handover process, as they become more experienced.

Why have I been invited?
The study is looking at the handover between house officers during their rotation to Acute General Medicine. For the duration of the study, all house officers in the department will be invited to participate.

Do I have to take part?
No. It is up to you to decide whether or not to take part. A decision not to take part will have no impact on your role, position or duties; it will have no consequence whatsoever. If you do decide to take part, you will be given a copy of this information leaflet to keep and will be asked to sign a consent form.

What will happen if I decide to take part?
The research involves recording handovers and interviews, both of which will be anonymised so that you cannot be identified. On one day of each week a researcher will be present at the late afternoon handover (house officer to house officer) and will record the handover. If you are giving the handover before going off duty, you may be asked to arrange a convenient time within the following two working days to be

interviewed about the handover process. You will be invited to talk about your experiences, views and suggestions concerning the handover process. The interview will be recorded and should last around thirty minutes, depending upon what you have to say, but no more than one hour. If you are coming on duty and receiving the handover, the researcher will spend time with you during the evening and will record an interview with you at an appropriate time about the handover process. By recording the handover and interviews the researcher will be able to collect information more efficiently than by making handwritten notes.

Depending upon your duty rotas, you may be interviewed once, more than once during the study, or not at all. Interviews will be arranged at times which are convenient to you and which do not have a detrimental impact on patient care. If you are needed for any patient-related matter during the interview, the interview will be suspended immediately and resumed when appropriate. Patient care will take priority at all times.

Confidentiality

All information collected during the research will be kept strictly confidential. The procedures for handling, processing, storage and destruction of the data comply with the Data Protection Act, 1998. Consent forms and any contact details given to the researcher will be kept securely and separate from the information collected at handovers and interviews. The researcher will transcribe the recordings shortly after each handover or interview and will then destroy the recording. The transcripts will be stored in an anonymous form using a code for reference and not your name or anything else that could identify you. All names will be removed during transcription so that it will not be possible to identify any house officer, patient or any other person who is mentioned. The anonymized transcripts will be stored in a password protected computer file at the University of Southampton. In accordance with the University of Southampton policy on data storage, at the end of the study the transcripts will be kept for 10 years and will then be destroyed.

The researcher will from time to time allow her academic supervisor at the University of Southampton to compare portions of recorded data with anonymized transcripts. This will be for the purpose of PhD research supervision, to ensure accurate transcription and to ensure that the researcher's data analysis is applied fairly and without bias. This will only take place in the presence of the researcher and the academic supervisor will not have access to the computer password or other identifiable data. The data will not be available to any other person, either at the University of Southampton, the Oxford Radcliffe Hospitals NHS Trust, any other organization or any other individual.

What do I have to do?

If you think you might be interested in taking part or would like further information about the study you can let the researcher know in one of the following two ways:

(i) The researcher will be available at the Postgraduate Education Centre on some of the days when training sessions are being held. You will be able to speak to the researcher to discuss the study or to book an appointment to talk about it later. The dates are on the invitation letter in this information pack.
(ii) You can contact the researcher using the details at the end of this information leaflet to make an appointment at a convenient date and time.

Expressing an interest in the study does not commit you to taking part. Once you have confirmed that you want to take part you will be asked to sign a consent form, but you are free to withdraw at any time and for any reason without any consequence whatsoever.

What will happen if I don't want to carry on with the study?
If you decide that you do not want to carry on with the study you may withdraw at any time without giving a reason and without consequence. The data you have already given will be included in the study but as it is anonymised, it will not be possible to identify you or any patient or other person you have mentioned in any part of the study.

What are the possible disadvantages of taking part?
Interviews with the researcher will take up to one hour of your time.

What are the possible benefits of taking part?
It is not thought that the research will have a direct benefit to participants in the study. However, the research will help to develop an understanding of the handover process and may result in recommendations to improve the handover in Acute General Medicine and between other healthcare professionals. It will also extend the current academic knowledge in this area.

What happens if there is a problem or I have a complaint?
Any complaint about the way you have been dealt with during the study will be addressed. If you have a concern about any aspect of this study, you should contact the researcher who will try to answer your questions. If you remain unhappy and wish to complain formally, you can do this through the University Research Governance Office. Contact details are at the end of this information sheet.

What will happen to the results of the research?
A report on the results will be made and a copy will be made available in Acute General Medicine. The researcher will contact you when the report is ready and will send you a copy if you would like to receive it. The results will also be presented in a PhD thesis. A copy of the thesis will be made available within Acute General Medicine and the Cairns Library, John Radcliffe Hospital. The results may also be published in a peer-reviewed journal. It will not be possible to identify any participant, patient or any other person in the thesis, report or any article.

Who is organising the research?
The study is organised by the School of Management, University of Southampton.

Who is providing sponsorship and professional indemnity for the study?
Sponsorship and professional indemnity is being provided by the University of Southampton, Legal Services, Building 37, Highfield, Southampton SO17 1BJ.

Who has reviewed the study?
All research in the NHS is looked at by an independent group, the Research Ethics Committee, to protect your safety, rights, wellbeing and dignity. This study has been reviewed and given a favourable opinion by South Buckinghamshire Research Ethics Committee.

Contact details of researcher:
Melinda Taylor
<Insert contact details>

Contact details of Research Governance Office:
Research Governance Office
<Insert contact details>

Thank you very much for considering taking part in this research.

Appendix G: Recommendations to NHS Trust on the late afternoon handover

The following selected recommendations are taken from the report to the host research organization.

The research showed that previous handover experience and the way that HOs understood the idea of the handover and its purpose influenced the way that they handed over, in terms of both process and content. The Group 2 handover style relied significantly upon nurses and other medical staff to identify procedures that had not been carried out, which should have been communicated. The Group 2 handover style enabled efficient communication and also provided a learning context, valued by all members of that group. HOs cannot be forced to share knowledge, but setting the scene can influence communication and provide the cues that suggest a context conducive to knowledge sharing.

HOs must be made aware of the Trust's expectations regarding the late afternoon handover. The Trust supports the values of the BMA guidance *Safe handover: safe patients* (2004) and the value of face-to-face handovers. None of the HOs in the study knew of this or any other handover guidance. Key aspects of the BMA guidance and specific local guidance might be included in the HOs' handbooks. However, it is not sufficient for HOs to own or be aware of the existence of this and other related documents, the relevant messages must be identified to them. Induction day is the ideal time for this. The importance of the handover should be conveyed by the most senior member of medical staff.

The Group 1 HOs were invited to a major weekly handover and ward round, which influenced their own late afternoon handover style. There are practical reasons why this is not possible for HOs commencing placements in February, but all of these HOs attend an induction session. It is recommended that a similar message stating the importance of handovers to this Trust, including the late afternoon handover, be made at this induction. This would help in situating the late afternoon handover in this Trust as a significant work process, and differentiating it from that in some hospitals where there might often be little to hand over at that time of day.

Many of the departments involved in induction include a video presentation related to their work (Occupational Health, for example). A short recording of HOs engaged in a

fictional late afternoon handover could be made to give the new HOs an impression of what was expected.

Group 1 accommodated their handover style by those coming on duty arriving a little earlier, and those going off duty staying a little later. The average handover time was thirty minutes, which is considered adequate for most handovers (*Safe handover: safe patients,* BMA 2004), but there must be an element of flexibility to allow for occasions when lengthier discussion is necessary. Group 2 were also seen to arrive on duty before 4.30pm. Rather than reliance upon goodwill, the importance of the handover would be better acknowledged by the definition of a thirty-minute handover period, at a set time. This should be widely recognized to avoid interruptions.

The Group 1 handover was carried out at the mess. This was convenient for those going off duty and going to their lockers, and had the benefit of a large table with chairs for the HOs to meet at. However, during observations there were also other medical staff watching television in the room, which might have been distracting at times, and on one occasion, domestic staff used a vacuum cleaner for almost the duration of the handover. It would be preferable for the handover to be carried out in a different room, within that locality.

A further advantage of using the mess for handovers was that those coming on duty were able to confirm that some of their colleagues going off duty had nothing to hand over. While an alternate location might be less convenient for this, the handover time would be protected, and those with nothing to hand over should attend to inform their colleagues that they had nothing to report. All should be made aware of the importance of this, in providing a complete and timely handover and assisting their colleagues coming on duty in understanding what is happening and prioritizing their work.

Both groups of HOs identified the potential for losing information from late afternoon handovers on Fridays. Neither group could offer any feasible solutions, but the problem of maintaining continuity of information throughout weekends should be addressed.

The guidance document *Safe handover: safe patients* (BMA 2004) includes specific recommendations concerning the management of patient information during handovers, which should equally be applied to the late afternoon handover, to ensure correct patient identification and clarity of information, to assist an effective handover.

References

Addison, G.M. (2006), bmj Rapid Responses Re: We all need RECs [Online], Available: *http://www.bmj.com/cgi/eletters/332/7541/615* [Accessed: 8th May 2008].

Alavi, M. & Leidner, D.E. (1999), Knowledge Management Systems: Emerging Views and Practices from the Field, *32nd Hawaii International Conference on Systems Science,* Hawaii.

Alavi, M. & Leidner, D.E. (2001), Knowledge Management and Knowledge Management Systems: Conceptual Foundations and Research Issues, *MIS Quarterly*, Vol. 25, No. 1, pp. 107-137.

Albert, S. & Whetten, D.A. (1985), Organizational identity. *Research in Organizational Behaviour*, Vol. 7, pp. 263-295.

Albolino, S., Cook, R. & O'Connor, M. (2007), Sensemaking, Safety and Cooperative Work in the Intensive Care Unit, *Cognition, Technology & Work,* Vol. 9, No. 3, pp. 131-137.

Allard-Poesi, F. (2005), The paradox of sensemaking in organizational analysis, *Organization*, Vol. 12, No. 2, pp. 169-196.

Ambrosini, V. & Ambrosini, C.B. (2001), Tacit Knowledge: Some Suggestions for Operationalization, *Journal of Management Studies*, Vol. 38, No. 6, pp. 811-829.

Andrews, K. & Delahaye, B. (2000), Influences on knowledge processes in organizational learning: the psychological filter, *Journal of Management Studies*, Vol. 37, No. 6, pp. 797-810.

Arora, V.M., Johnson, J. & Lovinger, D. (2005), Communication failures in patient sign-out and suggestions for improvement: a critical incident analysis, *Quality and Safety in Health Care,* Vol. 14, pp. 401-7.

Ashcroft, R.E., Newson, A.J. & Benn, P. (2005), Reforming Research Ethics Committees, *BMJ*, Vol. 331, pp. 587-8.

Ashforth, B. (2001), *Role transitions in organizational life: An identity perspective*, Mahwah, NJ: Lawrence Erlbaum Associates.

Bandura, A. (1997), *Self-efficacy: The Exercise of Control*, New York, NY: Freeman.

Barry, D. & Elmes, M. (1997), Strategy retold: toward a narrative view of strategic discourse, *Academy of Management Review*, Vol. 22, No.2, pp. 429-52.

Bartol, K.M. & Srivastava, A. (2002), Encouraging Knowledge Sharing: the Role of Organizational Reward Systems, *Journal of Leadership and Organizational Studies*, Vol. 9, No. 1, p. 64.

Barrows, H.S., Feightner, J.W., Neufeld, V.R. & Norman, G.R. (1978), Analysis of the clinical methods of students and physicians, (Final Report to Ontario Ministry of Health), Hamilton, Ontario, Canada: McMaster University.

Bartlett, F.C. (1932), *Remembering: A Study in Experimental and Social Psychology*, Cambridge, England: Cambridge University Press.

Baxter, H., Harris-Thompson, D. & Phillips, J. (2004), Sensemaking: A cognitive approach to training situation awareness skills, *Interservice/Industry training, Simulation and Education Conference (I/ITS9/23/04EC) 2004.*

Beasley, R., Bernau, S., Aldington, S. & Robinson, G. (2006), From medical student to junior doctor: The medical handover – a good habit to cultivate, Student BMJ, Vol. 14, pp. 188-9.

Bhatt, G.D. (2001), Knowledge Management in Organisations: Examining the Interaction between Technologies, Techniques and People, *Journal of Knowledge Management*, Vol. 5, No. 1, pp. 68-75.

Blackler, F. (1993), Knowledge and the theory of organizations – organizations as activity systems and the reframing of management, *Journal of Management Studies*, Vol. 30, pp. 863-84.

Blumer, H. (1996), *Symbolic interactionism: Perspective and method,* Englewood Cliffs, NJ: Prentice Hall.

BMA, (2004), Safe Handover: safe patients. Guidance on clinical handover for clinicians and managers [Online].
Available: *http://www.bma.org.uk/ap.nsf/Content/Handover/$file/Handover.pdf*, [Accessed: 2nd November 2008].

Bock, G.W. & Kim, Y.G. (2002), Breaking the Myths of Rewards: An Exploratory Study of Attitudes about Knowledge Sharing, *Information Resources Management Journal*, Vol. 15, No. 2, pp. 14-21.

Boje, D. (1991), The Storytelling Organization: A Study of Story Performance in an Office Supply Firm, *Administrative Science Quarterly*, Vol. 36, pp. 106-126.

Boje, D. (1994), Organizational Storytelling – The struggles of Premodern, Modern and Postmodern Organizational Learning Discourses, *Management Learning*, Vol. 25, No. 3, pp. 433-461.

Boje, D., Rosile, G., Dennehy, R. & Summers, D. (1997), Restorying Reengineering: Some Deconstruction and Postmodern Alternatives, *Communication Research*, Vol. 24, No. 6, pp. 631-668.

Boland, R.J.Jr. (1984), Sense-making of accounting data as a technique of organizational diagnosis, *Management Science*, Vol. 30, pp. 868-882.

Boland, R. & Tenkasi, R. (1995), Perspective Making and Perspective Taking in Communities of Knowing, *Organization Science*, Vol. 6, No. 4, pp. 350-372.

Boreham, N., Shea, C. & Mackway-Jones, K. (2000), Clinical Risk and Collective Competence in the Hospital Emergency Department in the UK, *Social Science & Medicine*, Vol. 51, pp. 83-91.

Broekhuis, M. & Veldkamp, C. (2007), The Usefulness and Feasibility of a Reflexivity Method to Improve Clinical Handover, *Journal of Evaluation in Clinical Practice*, Vol. 13, pp. 109-115.

Brown, A. (2000), Making Sense of Inquiry Sensemaking, *Journal of Management Studies*, Vol. 37, No. 1, pp. 45-75.

Brown, J. & Duguid, P. (2001), Knowledge and organization: A social practice perspective, *Organization Science*, Vol. 12, No. 2, pp. 198-213.

Bruner, J. (1990), Culture and Human Development: A New Look, *Human Development*, Vol. 33, pp. 344-355.

Burgess, R.G. (1984), *In the Field: An Introduction to Field Research*, London: Allen and Unwin.

Cabrera, Á., Collins, C. & Saldago, J.F. (2006), Determinants of Individual Engagement in Knowledge Sharing, *International Journal of Human Resource Management*, Vol. 17, No. 2, pp. 245-264.

Chi, M., Feltovich, P. & Glaser, R. (1981), Categorization and representation of physics problems by experts and novices, *Cognitive Science*, Vol. 5, pp. 121-152.

Clark, H.H, & Clark, E.V. (1977), *Psychology and Language*, Harcourt Brace Jovanovitch.

Cleland, J.A., Ross, S. & Miller (2009), 'There is a chain of Chinese whispers...': empirical data support the call to formally teach handover to pre-qualification doctors, *Quality and Safety in Health Care,* Vol. 18, pp. 267-71.

Collinson, D. (1992), *Managing the shop floor: Subjectivity, masculinity and workplace culture*, New York: Walter de Gruyter.

Compeau, D.R. & Higgins, C.A. (1995a), Computer Self-efficacy: Development of a Measure and Initial Test, *MIS Quarterly*, Vol. 19, No.2, pp. 189-211.

Connell, N.A.D., Klein, J.H. & Meyer, E. (2004), Narrative Approaches to the Transfer of Organisational Knowledge, *Knowledge Management Research & Practice*, Vol. 2, pp. 184-193.

Cook, S.D.N. & Brown, J.S. (1999), Bridging Epistemologies: The Generative Dance between Organizational Knowledge and Organizational Knowing. *Organization Science*, Vol. 10, No. 4, pp. 381-400.

Cowan, D.A. (1986), Developing a process model of problem recognition, *Academy of Management Review*, No. 11, pp. 763-776.

Craig-Lees, M. (2001), Sense Making: Trojan Horse? Pandora's Box? *Psychology and Marketing*, Vol. 18, No. 5, pp. 513-526.

Crandall, B. & Getchell-Reiter, K. (1993), Critical decision method: A technique for eliciting concrete assessment indicators from the 'intuition' of NICU nurses, *Advances in Nursing Sciences*, Vol. 16, No. 1, pp. 42-51.

Czarniawska, B. (1998), *A Narrative Approach to Organisation Studies.* London: Sage.

Czarniawska-Joerges, B. (1992), *Exploring complex organizations: A cultural perspective*, Newbury Park, CA: Sage.

Daft, R.L. & Weick, K.E. (1984), Toward a model of organizations as interpretation systems, *Academy of Management Review*, Vol. 9, pp. 284-295.

Davenport, T.H., De Long, D.W. & Beers, M.C. (1998a.), Successful Knowledge Management Projects, *Sloan Management Review*, Vol. 39, No. 2, pp. 43-57.

DeGroot, A.D. (1965), *Thought and choice in chess*, The Hague, Netherlands: Mouton (Original published 1946).

De Keyser, V. and Woods, D. (1990) Fixation errors: Failures to revise situation assessment in dynamic and risky systems. IN, Colombo A. G. and Saiz De Bustamente, A. (eds), *Systems Reliability Assessment*, Kluwer academic Publishers, pp. 231-251.

Denning, S. (2000), *The Springboard: How Storytelling Ignites Action in Knowledge-Era Organizations.* Boston: Butterworth Heinemann.

Denzin, N.K. (1998), The New Ethnography, *Journal of Contemporary Ethnography*, Vol. 27, No. 3, pp. 405-415.

D'Eredita, M. & Barreto, C. (2006), How Does Tacit Knowledge Proliferate? An Episode-Based Perspective, *Organization Studies*, Vol. 27, No. 12, pp. 1821-1841.

Dervin, B. (2003), Chaos, Order and Sense-Making: A Proposed Theory for Information Design, IN, Dervin, B. & Foreman-Wernet, L. (with Lauterbach, E.) (eds), *Sense-Making Methodology Reader: Selected Writings of Brenda Dervin*, Cresskill, NJ: Hampton Press, pp. 325-340.

Donaldson, L. (2005), NHS blame culture is still a killer, *Public Servant* 25 March, p. 11.

Donnellon, A., Gray, B. & Bougon, M.G. (1986), Communication, meaning and organized action, *Administrative Science Quarterly*, Vol. 31, pp. 43-55.

Dougherty**,** D. (1992), Interpretative Barriers to Successful Product Innovation in Large Firms, *Organization Science*, Vol. 3, No.2, pp.179-202.

Dunker, K. (1945), On problem solving, *Psychological Monographs*, Vol. 5, No. 270, pp. 1-113.

Dutton, J.E. & Dukerich, J.M. (1991), Keeping an Eye on the Mirror: Image and identity in Organizational Adaptation, *Academy of Management Journal*, Vol. 34, pp.517-554.

Dylan, R. (1995) A midnight chat with Bob Dylan, *Fort Lauderdale Sun Sentinel*, 29 September 1995, Available: *http://www.interferenza.com/bcs/interw/florida.htm*, [Accessed: 4th February 2008].

Endsley, M.R. (1995b), Toward a theory of situation awareness in dynamic systems, *Human Factors*, Vol. 37, No. 1, pp. 32-64.

Erez, M. & Earley, P.C. (1993), *Culture, Self-identity and Work*, New York: Oxford University Press.

Fairclough, N. (1989), *Language and Power*. Essex: Longman.

Feltovich, P.J., Johnson, P.E., Moller, J.H. & Swanson, D.B. (1984), LCS: The role and development of medical knowledge in diagnostic expertise. IN, Clancey, W.J. & Shortliffe, E.H. (eds), *Readings in medical Artificial Intelligence: The first decade*, Reading, MA: Addison-Wesley, pp. 275-319.

Feltovich, P.J., Coulson, R.L. & Spiro, R.J. (2001), Learners' (mis)understanding of important and difficult concepts: A challenge to smart machines in education, IN, Forbus, K. D. & Feltovich P.J. (eds), *Smart machines in education*. Menlo Park, CA: AAAI/MIT Press.

Foucault, M. (1977), *The Archaeology of Knowledge*. London: Tavistock.

Fernie, S., Green, S., Weller, S. and Newcombe, R. (2003), Knowledge sharing: context, confusion and controversy, *International Journal of Project Management*, Vol. 21, pp. 177-187.

Fischoff, B. (1975), Hindsight is not equal to foresight: the effect of outcome knowledge on judgement under certainty, *Journal of Experimental Psychology, Human Perception and Performance*, Vol. 1, pp. 288-299.

Flanagan, M.E., Patterson, E.S. & Frankel, R.M. (2009), Evaluation of a physician informatics tool to improve patient handoffs, *Journal of the American Medical Informatics Association,* Vol. 16, pp. 509-15.

Gaver, W.W. (1991), Technology Affordances, *Proceedings of CHI '91*, New Orleans, ACM Press, pp. 79-84.

Geen, R.G. (1991), Social motivation, *Annual Review of Psychology*, Vol. 42, pp. 377-399.

Gentner D. & Stevens, A. (1983), *Mental Models*, Lawrence Erlbaum Associates.

Gephart, R.P., Jr. (1992), Sensemaking, communicative distortion and the logic of public inquiry legitimation, *Industrial Crisis Quarterly,* Vol. 6, pp. 115-135.

Gephart, R.P. (1993), The Textual Approach: Risk and Blame in Disaster Sensemaking, *Academy of Management Review*, Vol. 36, pp. 1465-1515.

Gherardi, S. (2000), Practice based theorizing on learning and knowing in organizations, *Organization*, Vol. 7, No. 2, pp. 211-233.

Gherardi, S. (2001), From Organizational Learning to Practice-based Knowing, *Human Relations*, Vol. 54, pp. 131-9.

Gibson, J. (1966), *The Senses Considered as Perceptual Systems*, Boston: Houghton Mifflin.

Gibson, J. (1979), *The Ecological Approach to Visual Perception*, New York, Houghton Mifflin.

Gioia, D. & Chittipeddi, K. (1991), Sensemaking and Sensegiving in Strategic Change Initiation, *Strategic Management Journal*, Vol. 12, No. 6, pp. 433-448.

Gioia, D.A. & Thomas, J.B. (1996), Identity, image and issue interpretation: Sensemaking during strategic change in academia, *Administrative Science Quarterly*, Vol. 41, pp. 370-403.

Gililand, S.W. & Day, D.V. (2000), Business Management, IN, Durso, F.T. (ed), *Handbook of Applied Cognition*, Wiley, New York, pp. 315-342.

Ginsberg, A. (1994), Minding the competition: from mapping to mastery, *Strategic Management Journal*, Vol. 15, Special Issue, pp. 154-74.

Gkioulekas, N. (2007) bmj.com Rapid Responses Re: Bureaucracy is still killing research in the NHS [Online]. Available: *http://www.bmj.com/cgi/eletters/335/7609/6*, [Accessed: 8th May 2008].

Glasziou, P. & Chalmers, I. (2004) Ethics review roulette: what can we learn? That ethics review has costs and one size doesn't fit all. *BMJ*, Vol. 328, pp. 121-122.

Glenberg, A.M. & Robertson, D.A. (1999), Indexical Understanding of Instructions, *Discourse Processes*, Vol. 28, No. 1, pp. 1-26.

Glisby, M. & Holden, N. (2003), Contextual Constraints in Knowledge Management Theory: The Cultural Embeddedness of Nonaka's Knowledge-creating Company, *Knowledge and Process Management*, Vol. 10, No. 1, pp. 29-36.

Granovetter, M.S. (1973), The Strength of Weak Ties. *American Journal of Sociology*, Vol. 78, No. 6, pp. 1360-1380.

Granovetter, M.S. (1985), Economic Action and Social Structure: the Problem of Embeddedness, *American Journal of Sociology*, Vol. 91, No. 3, pp. 481-510.

Haig, K.M., Sutton, S. & Whittington, J. (2006), SBAR: a shared mental model for improving communication between clinicians, *Joint Commision Journal on Quality and Patient Safety,* Vol. 32, pp. 167-75.

Hartshorne, C. (1962), Mind as memory and creative love. IN, SCHER, J.M. (ed), *Theories of the mind*, New York: Free Press, pp. 440-463.

Hawkins, S.A. & Hastie, R. (1990), Hindsight: Biased judgements of past events after the outcomes are known. *Psychological Bulletin,* 107, 311-327.

Hayes, J. & Allison, C.W. (1998), Cognitive Style and the Theory and Practice of Individual and Collective Learning in Orgnaizations, *Human Relations*, Vol. 51, pp. 847-872.

Henningsen, D., Henningsen, M., Eden, J. and Cruz, M. (2006), Examining the Symptoms of Groupthink and Retrospective Sensemaking, *Small Group Research*, Vol. 37, No. 1, pp. 36-64.

Hewison, J. & Haines, A. (2006), Overcoming Barriers to Recruitment in Health research, *BMJ*, Vol. 333 pp. 300-302.

Heuer, R.J. Jr. (1999), *Psychology of Intelligence Analysis*. Washington, D.C.: Centre for the study of Intelligence, Central Intelligence Agency.

Hill, R. & Levenhagen, M. (1995), Metaphors and Mental Models: Sensemaking and Sensegiving in Innovative and Entrepreneurial Activities. *Journal of Management*, Vol. 21, No. 6, pp. 1057-1074.

Hislop, D. 2005, *Knowledge management in Organizations.* Oxford: Oxford University Press.

Hopkinson, G. (2001), Influence in Marketing Channels. *Psychology and Marketing*, Vol. 18, No. 5, pp. 423-444.

Horowitz, L.I., Moin, T. & Green, M.L. (2007), Development and implementation of an oral sign-out skills curriculum, *Journal of General Internal Medicine,* Vol. 22, pp. 1470-4.

Hsu, M.H., Ju, T.L., Yen, C.H. & Chang, C.M. (2007), Knowledge Sharing Behaviour in Virtual Communities: The Relationship between Trust, Self-efficacy, and Outcome Expectations, *International Journal of Human-Computer Studies*, Vol. 65, pp. 153-169.

Hughes, D. (1988), When nurse knows best: some aspects of nurse/doctor interaction in a casualty department, *Sociology of Health and Illness*, Vol. 10, No. 1, pp. 1-22.

Hughes, D. (1989), Paper and people: the work of the casualty department reception clerk, *Sociology of Health and Illness*, Vol. 11, No. 4, pp. 382-408.

Hutchins, E. (1990), The technology of team navigation, IN, Galegher, J., Kraut, R.E. & Egido, C. (eds), *Intellectual Teamwork*, Hillsdale, NJ: Erlbaum. pp. 191–220.

Iglehart, K. (2008), Revisiting duty-hour limits – IOM recommendations for patient safety and resident education, *New England Journal of Medicine,* Vol. 359, pp. 2633-5.

Jamrozik, K. (2004), Research ethics paperwork: what is the plot we seem to have lost? *BMJ*, Vol. 329, pp. 286-287.

Janis, I.L. (1972) *Victims of Groupthink: A Psychological Study of Foreign Policy Decisions and Fiascoes.* Boston: Houghton, Mifflin.

Jasimuddin, S., Klein, J.H. & Connell, C. (2005), The paradox of using tacit and explicit knowledge: Strategies to face dilemmas, *Management Decision*, Vol. 43, No. 1, pp. 102-112.

Jen M.H., Bottle, A., Majeed, A., Bell, D. & Aylin, P. (2009), Early In-Hospital Mortality following Trainee Doctors' First Day at Work. PLoS ONE 4(9): e7103. doi:10.1371/journal.pone.0007103

Jeffcott, S.A., Ibrahim, J.E. & Cameron, P.A. (2009), Resilience in healthcare and clinical handover, *Quality and Safety in Health Care,* Vol. 18, pp. 256-60.

Kankanhalli, A., Tan, C.Y.B. & Wei, K.K. (2005), Contributing Knowledge to Electronic Knowledge Repositories: An Empirical Investigation, *MIS Quarterly*, Vol. 68, No. 1, pp. 94-101.

King, W. (2006), Knowledge sharing, IN, Schwartz, D.G. (ed.), *The Encyclopedia of Knowledge Management.* USA: Idea Publishing Ltd, pp. 493-498.

Klein, G., Moon, B. & Hoffman, R. (2006a), Making Sense of Sensemaking 1: Alternative Perspectives, *IEEE Intelligent Systems,* July/August 2006, pp. 70-73.

Klein, G., Phillips, J.K., Rall, E.L. & Peluso, D.A. (2007), A Data-Frame Theory of Sensemaking, IN, Hoffman, R.R. (ed) Expertise *Out of Context: Proceedings of the Sixth International Conference on Naturalistic Decision Making*, New York, NY: Lawrence Erlbaum Associates, pp. 113-155.

Klein, G., Pliske, R., Crandall, B. and Woods, D. (2005), Problem detection, *Cognition, Technology and Work,* Vol. 7, pp. 14-28.

Klein, G., Ross, K., Moon, B., Klein, D., Hoffman, R. & Hollnagel, E. (2003), Macrocognition, *IEEE Intelligent Systems,* May/June 2003, pp. 81-84.

Klein, G., Snowden, D. & Pin, C. (2007), Anticipatory Thinking. IN, K. MOSIER and U. FISHER (eds), *Proceedings of the eighth international NDM Conference*, June 2007. Pacific Grove, CA.

Klein, J.H. (2009), Personal email to M. Taylor, 14th May 2009.

Klein, J.H. (2008), Some directions for research in knowledge sharing, *Knowledge Management Research and Practice*, Vol. 6, pp. 41-46.

Kreijns, K. & Kirschner, P.A. (2001), *The social affordances of computer-supported collaborative learning environments*. Paper presented at the Frontiers in Education: The Future-Impact on Engineering and Science Education, Reno, Nevada, October 10-13 2001.

Langer, E. (2009), *Counter-Clockwise: Mindful Health and the Power of Possibility*, Ballantine Books: New York.

Lanir, Z. (1991), The Reasonable Choice of Disaster, IN, Rasmussen, J. (ed), *Distributed Decision Making: Cognitive Models for Cooperative Work*, Oxford, England: Wiley, pp. 215-230.

Lanzara G.F. & Patriotta, G. (2001), Technology and the Courtroom: an Inquiry into Knowledge Making Organisations, *Journal of Management Studies, Special Issue: Knowledge Management: Concepts and Controversies*, Vol. 38, No. 7, pp. 943-972.

Lawler, S. (2002), Narrative in Social Research. IN, MAY, T. (ed). *Qualitative Research in Action*, London: Sage, pp. 242-258.

Laxmisan, A., Hakimzada, F. & Sayan, O. (2007), The multitasking clinician: decision-making and cognitive demand during and after team hand-offs in emergency care, *International Journal of Medical Informatics*, Vol. 76, pp. 801-11.

Leedom, D. (2001), Final Report Sensemaking Symposium 2001, Command and Control Research Program, *http://www.dodccrp.org/events/2001_sensemaking_symposium/docs/FinalReport*, [Accessed: 6th May 2010].

Linde, C. (2001), Narrative and Social Tacit Knowledge, *Journal of Knowledge Management*, Vol. 5, No. 2, pp. 160-170.

Lundberg, C. (2000), Made sense and remembered sense: Sensemaking through abduction, *Journal of Economic Psychology*, Vol. 21, pp. 691-709.

Lundberg, C. & Frost, D. (1990), Exploring the dynamics of Strategy shifts: Experimental evidence from futures trading. Paper prepared for Annual Meeting of Southern Finance Association, Savannah, GA.

Maclean, N. (1992), *Young Men and Fire*, University of Chicago Press, Chicago, IL.

Mack, A. (2003), Inattentional blindness: looking without seeing, *Current Directions in Psychological Science*, Vol. 12, No. 5, pp. 180-184.

Mack, A., Pappas, Z., Silverman, M. & Gay, R. (2002), What we see: Inattention and the capture of attention by meaning, *Consciousness and Cognition*, Vol. 11, pp. 488-506.

Mandler, G. (1982), *Mind and body: Psychology of emotion and stress*, Norton: New York.

Mason, D. & Herman, J. (2003), Scenarios and strategies: making the scenario about the business, *Strategy & Leadership*, Vol. 31, No. 1, pp. 23-31.

Mason, J. (2004), *Qualitative Researching*, 2nd Edition, London: Sage Publications.

Masterton, G. (2006), Two decades on an ethics committee, *BMJ* Vol. 332, p. 615.

McCauley, C. (1998), Group Dynamics in Janis' Theory of Groupthink: Backward and Forward. *Organizational Behaviour and Human Decision Processes*, Vol. 73, Nos. 2/3, pp. 142-162.

McCann, L., McHardy, K. & Child, S. (2007), Passing the buck: clinical handovers in a New Zealand tertiary hospital, *New Zealand Medical Journal,* Vol. 120, pp. 56-65.

McDermott, R.P. & Church, J. (1976), Making Sense and Feeling Good: The Ethnography of Communication and Identity Work, *Communication*, Vol. 2, p. 121.

McKinlay, A. (1996), Philosophers in overalls?: Craft and class on Clydeside, *c*. 1900-1914, IN, Kenefick, W and McIvor, A. (eds), *Roots of Red Clydeside? Labour Unrest and Industrial Relations in West Scotland*, Edinburgh: John Donald, pp. 86-106.

Miller, A., Scheinkestel, C., Limpus, A., Joseph, M., Karnik, A. & Venkatesh, B. (2009), Uni- and interdisciplinary effects on round and handover content in intensive care units, *Human Factors,* Vol. 51, pp. 339-353.

Mills, J.H. (2003) *Making sense of organizational change*, London, UK: Routledge.

Minsky, M. (1975), A framework for representing knowledge, IN, Winston, P. (ed), *The Psychology of Computer Vision*, New York: McGraw-Hill, pp. 211-277.

Natarajan, A. (2007), bmj.com Rapid Responses Re: Can clinicians not be trusted with ethical responsibilities of research? [Online]. Available: *http://www.bmj.com/cgi/eletters/335/7609/6*, [Accessed: 8th May 2008].

Nathan, M. (2004), How past becomes a prologue: a sensemaking interpretation of the hindsight-foresight relationship given the circumstances of a crisis. *Futures*, Vol. 36, pp. 181-199.

Neisser, U. (1976), *Cognition and reality: Principles and implications of cognitive psychology*, San Francisco: Freeman.

Newell, A. & Simon, H.A. (1972), *Human Problem Solving*, Prentice Hall.

Newton, L.R. (2007), bmj.com Rapid Responses Re: Impact of MMC on Post Graduate Research [Online]. Available: *http://www.bmj.com/cgi/eletters/335/7609/6*, [Accessed: 8th May 2008].

Nonaka, I. (1994), A Dynamic Theory of Organizational Knowledge Creation, *Organization Science*, Vol. 5, No. 1, pp. 14-37.

Nonaka, I. and Takeuchi, H. (1995), *The Knowledge Creating Company*, Oxford: Oxford University Press.

Norman, D.A. (1999), Affordances, Conventions and Design, *Interactions*, Vol. 6, No. 3, pp. 38-43.

NRES, [n.d.] *Mission Statement*, [Online] Available: *http://www.nres.npsa.nhs.uk/aboutus*, [Accessed: 8th October 2007].

Oliver, D. (2006), bmj.com Rapid Responses Re: We all need RECs [Online]. Available: *http://www.bmj.com/cgi/eletters/332/7541/615*, [Accessed: 8th May 2008].

Orbuch, T.L. (1997), People's Accounts Count: The Sociology of Accounts, *Annual Review of Sociology*, Vol. 23, pp. 455-479.

Orlikowski, W. (2002), Knowing in Practice: Enacting a Collective Capability in Distributed Organizing, *Organization Science*, Vol. 13, No. 3, pp. 249-273.

Parry, J. (2003), Making Sense of Executive Sensemaking, *Journal of Health Organization and Management*, Vol. 17, No. 4, pp. 240-263.

Ortega y Gasset, J. (1961a) (orig. 1941), *History as a System*, New York: W.W. Norton.

Oskamp, S. (1965), Overconfidence in Case-study Judgements, *Journal of Consulting Psychology*, Vol. 29, No. 3, pp. 261-265.

Paget, M.A. (1988), *The Unity of Mistakes*, Temple University Press, Philadelphia, PA.

Park, W. (2000), A comprehensive empirical investigation of the relationships among variables in the groupthink model, *Journal of Organizational Behaviour*, Vol. 21, pp. 873-887.

Pennington, N. & Hastie, R. (1993), A theory of explanation-based decision making, IN, Klein, G., Orasanu, J., Calderwood, R. & Zsambok, C.E. (eds), *Decision making in action: Models and methods*, Norwood, NJ: Ablex, pp. 188-201.

Pentland, B.T. (1999), Building Process Theory with Narrative: From Description to Explanation, *Academy of Management Review*, Vol. 24, No. 4, pp. 711-724.

Perry, S. J., Wears, R.L. & Patterson, E.S. (2008), High-hanging fruit: Improving transitions in health care, *Advances in Patient Safety: New Directions and alternative approaches,* Vol. 1-4, Agency for Healthcare Research and Quality, Rockville, MD.

Philibert, I. (2009), Use of strategies from high-reliability organisations to the patient hand-off by resident physicians: practical implications, *Quality and Safety in Health Care,* Vol. 18, pp. 261-6.

Phillips, J.K. & Battaglia, D.A. (2003), Instructional methods for training sensemaking skills, *Interservice/Industry Training, Simulation and Education Conference (I/ITSEC) 2003.*

Polanyi, M. (1958), *Personal Knowledge.* London: Routledge & Keegan Paul.

Polanyi, M. (1967), *The Tacit Dimension.* London: Routledge & Keegan Paul.

Porac, J.F., Thomas, H. & Baden-fuller, C. (1989), Competitive Groups as Cognitive Communities: The Case of Scottish Knitwear Manufacturers, *Journal of Management Studies*, Vol. 26, pp. 397-416.

Pradhan, A.K., Hammel, K.R., DeRamus, R., Pollatsek, A., Noyce, D.A. & Fisher, D.L. (2005). The use of eye movements to evaluate the effects of driver age on risk perception in an advanced driving simulator, *Human Factors*, Vol. 47, No. 4, pp. 840-852.

Quigley, N.R., Tesluk, P.E., Locke, E.A. & Bartol, K.M. (2007), A Multilevel Investigation of the Motivational Mechanisms Underlying Knowledge Sharing and Performance, *Organization Science*, Vol. 18, No. 1, pp. 71-88.

Raduma-Tomas, M.A., Flin, R., Yule, S. & Williams, D. (2011), *BMJ Quality and Safety,* Vol. 20, pp. 128-133.

Randall, D. (2001), 'Memories are made of this': Explicating organisational knowledge and memory, *European Journal of Information Systems*, Vol. 10, pp. 113-121.

Research Governance Office, University of Southampton, [n.d.] *Mission Statement* [Online], Available: *http://resource1.soton.ac.uk/legislativeservices/rgo/index.htm*, [Accessed: 7th August 2008].

Ringberg, T. & Reihlen, M. (2008), Towards a Socio-Cognitive Approach to Knowledge Transfer, *Journal of Management Studies*, Vol. 45, No. 5, pp. 912-935.

Robinson, A. (2007), bmj.com Rapid Responses Re: NHS Research ethics committees [Online]. Available:*http://www.bmj.com/cgi/eletters/335/7609/6*, [Accessed: 8th May 2008].

Rudolph, J.W. (2003), *Into the big muddy and out again*. Unpublished doctoral dissertation, Boston College.

Sandelands, L.E. & Stabelin, R.E. (1987), The concept of organization mind, IN, Bacharach, S. & DiTimaso, N. (eds), *Research in the Sociology of Organizations*, Greenwich, CT: JAI, Vol. 5, pp. 135-161.

Scarborough, H. (1999), Knowledge as Work: Conflicts in the Management of Knowledge Workers, *Technology Analysts and Strategic Management*, Vol. 11, No. 1, pp. 5-16.

Scheff, T.J. (1965), Decision rules, types of error, and their consequences in medical diagnosis, IN, Massarik, F. & Ratoosh, P. (eds), *Mathematical Explorations in Behavioural Science*, Homewood. Ill.: Dorsey, pp. 66-83.

Schutz, a. (1967), *The Phenomenology of the Social World*, Evanston, IL,: Northwestern University Press.

Scholes, R. (1981), Language, narrative and anti-narrative, IN, Mitchell, W.J.Y. (ed), *On Narrativity*, Chicago: University of Chicago Press, pp. 200-208.

Scholte, H.S., Spekreijse, H. & Lamme, V.A. (2001), Neural correlates of global scene segmentation are present during inattentional blindness, *Journal of Vision*, Vol. 1, No. 3, Article 346.

Sharit, J., McCane, L. & Thevenin, D.M. (2008), Examining links between sign-out reporting duringshift changeovers and patient management risks, *Risk Analysis,* Vol. 28, pp. 969-81.

Shrivastava, P. (1987), *Bhopal: Anatomy of a Crisis*, Ballinger, Cambridge, MA.

Skeggs, B. (2001), Feminist Ethnography, IN, Atkinson, P. *et al*. (eds), *Handbook of Ethnography*, London: Sage.

Smith, P.A.C. (1998), Systemic knowledge management: Managing organisational assets for competitive advantage. *Journal of Systemic Knowledge Management*, Vol. 1, April 1998.

Snowden, D. (2006), Perspectives Around Emergent Connectivity, Sense-Making and Asymmetric Threat Management, *Public Money & Management,* Vol. 26, No. 5, pp. 275-277.

Snyder, M. & White, P. (1982), Moods and memories: elation, depression and remembering the events of one's life, *Journal of Personality*, Vol. 50, pp. 149-167.

Spender, J.C. (1996b), Organizational knowledge, learning and memory: Three concepts in search of a theory, *Journal of Organizational Change Management*, Vol. 9, No. 1, pp. 63-78.

Starbuck, W.H. & Milliken, F.J. (1988), Executives' perceptual filters: What they notice and how they make sense. IN, HAMBRICK, D.C. (ed), *The executive effect: Concepts and methods for studying top managers*, Greenwich, CT: JAI, pp. 35-65.

Staw, B.M. (1975), Attribution of the 'causes' of performance: A general alternative interpretation of cross-sectional research on organizations, *Organizational Behaviour and Human Performance*, Vol. 13, pp. 414-432.

Sutcliffe, K.M. (1994), What Executives Notice: Accurate Perceptions in Top Management Teams, *Academy of Management Journal*, Vol. 37, pp. 1360-1378.

Sveiby K.E. (1997), *The New Organizational Wealth.* San Francisco: Berrett-Koehler Publishers, Inc.

Szulanski, G. (1999), Exploring Internal Stickiness: Impediments to the Transfer of Best Practice within the Firm, *Strategic Management Journal*, Vol. 7, Special Issue: Knowledge and the Firm, pp. 27-43.

Tokode, M., Barthelmes, L. & O'Riordan, B. (2008), Near-misses and missed opportunities: poor patient handover in general surgery, *Bulletin of the Royal College of Surgeons in England,* Vol. 90, pp. 96-8.

Tsoukas, H. (1996). The firm as a distributed knowledge system: A constructionist approach, *Strategic Management Journal, Special Issue*, Vol. 17, pp. 11-25.

Tsoukas, H. (2003), Do we Really Understand Tacit Knowledge? IN, Easterby-Smith, M & Lyles, M. A. (eds), *The Blackwell Handbook of Organizational Learning and Knowledge Management*. Oxford: Blackwell, pp. 411-427.

Tsoukas, H. (2005), *Complex Knowledge: Studies in Organizational Epistemology*. Oxford: Oxford University Press.

Tsoukas, H. & Mylonopoulos, N. (2004), Introduction: Knowledge Construction and Creation in Organizations. *British Journal of Management, Special Issue*, Vol. 15, S1-S8.

Tully, J., Ninis, N., Booy, R., & Viner, R. (2000), The new system of review by multicentre research ethics committees: prospective study, *BMJ*, Vol. 320, pp. 1179-1182.

Tuomi, I. (1999), Implications of the Reversed Knowledge Hierarchy for Knowledge Management and Organizational Memory, 32nd *Hawaii International Conference on Systems Science,* Hawaii.

Tversky, A. & Kahneman, D. (1974), Judgement under uncertainty: Heuristics and biases, *Science*, Vol. 185, pp. 1124-1131.

Tysome, T. (2007), Red tape ties up health service studies [Online]. Available: *http://www.thes.co.uk/search/story.aspx?story_id=2036828&window_type=print*, [Accessed: 22nd August 2008].

Vaughan, D. (1996), *The Challenger launch decision: Risky technology, culture, and deviance at NASA*, Chicago: University of Chicago Press.

Wack, P. (1985a), Scenarios: Unchartered waters ahead, *Harvard Business Review*, September/October, pp. 73-89.

Ward, T.B. & Saunders, K.N. (2003), Creativity, IN, Nadel, L. (ed.), *Encyclopedia of Cognitive Science*, Nature Publishing Group, pp. 862-869.

Watson, T.J. (1995), Rhetoric, Discourse and Argument in organizational Sensemaking, *Organization Studies*, Vol. 16, pp. 805-821.

Wears, R.L., Perry, S.J. & McFauks, A. (2007), Dynamic changes in reliability and resilience in the emergency department, *proceedings of the Human Factors and Ergonomics Society, 51st Annual Meeting, Baltomore,* pp. 612-16.

Wegner, D. M., Giuliano, T., & Hertel, P. (1985), Cognitive interdependence in close relationships, IN, Ickes, W.J. (ed), *Compatible and incompatible relationships*, New York: Springer-Verlag, pp. 253-276.

Weick, K. and Roberts, K. (1993), Collective Mind in Organizations: Heedful Interrelating on Flight Decks, *Administrative Science Quarterly*, Vol. 38, pp. 357-381.

Weick, K. (1995), *Sensemaking in Organizations.* Thousand Oaks, CA: Sage Publications Inc.

Weick, K. (2006), *Making Sense of the Organization*, Blackwell Publishing.

Weick, K., Sutcliffe, K. & Obstfeld, D. (2000), High reliability: The power of mindfulness, *Leader to Leader*, Vol. 17, pp. 33-38.

Weick, K.E., Sutcliffe, K.M. & Obstfeld, D. (2005), Organizing and the process of sensemaking. *Organization Science*, Vol. 16, No. 4, pp. 409-421.

Weisberg, R.W. (2006), Modes of Expertise in Creative Thinking: Evidence from Case Studies, IN, Ericsson, K.A. (ed), *Cambridge Handbook of Expertise and Expert Performance*, Cambridge University Press.

Wellman, B. & Hogan, B. (2004), The Immanent Internet, IN, McKay, J. (ed), *Netting Citizens: Exploring Citizenship in a Digital Age*, Edinburgh: St. Andrew Press, pp. 54-80.

Werr, A. & Stjernberg, T. (2003), Exploring Management Consulting Firms as Knowledge Systems, *Organization Studies*, Vol. 8, No. 2, pp. 125-47.

Whyte, G. (1989), Groupthink Reconsidered, *The academy of Management Review*, Vol. 14, No. 1, pp. 40-56.

Wilson, T.D. (2002), The nonsense of 'knowledge management', *Information Research*, Vol. 8, No. 1, paper no. 144. Available: http://InformationR.net/ir/8-1/paper144.html, [Accessed: 17th May 2009].

Wilson, S., Galliers, J. & Fone, J. (2007), Cognitive artifacts in support of medical handover: an in use, in situ evaluation, *International Journal of Human Computer Interaction,* Vol. 22, pp. 59-80.

Wolfe, J. (1999), Inattentional amnesia, IN, Coltheart, V. (ed), *Fleeting Memories*, Cambridge, MA: MIT Press, pp. 71-94.

Woloshynowych, M., Davis, R., Brown, R., Wears, R., Vincent, C. & Lyons, M. (2006), Enhancing Safety in Accident and Emergency Care, The Clinical Safety Research Unit.

Woods, D.D. & Hollnagel, E. (2006), *Joint cognitive systems: Patterns in cognitive systems engineering,* Taylor& Francis: New York.

Woods, D.D. & Patterson, E.E. (2004), Behind human error: Taming complexity to improve safety, IN, Carayon, P. (ed), *Handbook of Human Factors & Ergonomics in Healthcare & Safety*, Lawrence Erlbaum Mahwah Associates, New Jersey, Vol. 29, pp. 459-476.

Wright, A. (2005), The role of scenarios as sensemaking devices, *Management Decision*, Vol. 43, No. 1, pp. 86-101.

Wright, C., Manning, M., Farmer, B. & Gilbreath, B. (2000), Resourceful Sensemaking in Product Development Teams. *Organization Studies*, Vol. 21, No. 4, pp. 807-825.

Ye, K., Taylor, D. & Knott, J. (2007), Handover in the emergency department: deficiencies and adverse effects, *Emergency Medicine Australasia,* Vol. 19, pp. 422-41.

Zack, M.H., 1999. Managing Codified Knowledge. *Sloan Management Review*, Vol. 40, No. 4, p. 45.

Zaheer, A., McEvily, B. & Perrone, V. (1998), Does trust matter? Exploring the effects of interorganizational and interpersonal trust on performance, *Organizational Science*, Vol. 9, No. 2, pp. 141-159.

Zhuge, H. (2002), A Knowledge Flow Model for Peer-to-peer Team Knowledge, *Expert Systems with Applications*, Vol. 23, pp. 23-30.