Requirements Dilemma

A Thesis Submitted for the Degree of Doctor of Philosophy

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Abstract

Knowing 'what' to build is an integral part of an Information System Development, and it is generally understood that this, which is known as Requirements, is achievable through a process of understanding, communication and management. It is currently maintained by the Requirements theorists that successful system design clarifies the interrelations between information and its representations. However, this belief can be shown to be based on flawed assumptions, as there are persistent reports of failures, indicating that there is a gap between the theory and the practice, and that this gap needs to be bridged.

A year long in-depth case study of a project group, starting with their strategy announcement and ending with the commissioning system hand-over meeting, followed the group in their 'doing' of the Requirements. These mundane meetings were recorded and transcribed, forming a detailed data set of 'what-is-done' and 'how-it-is-done'. The developed research approach adhesively maintained the practical situation, aiming to investigate and make sense of the here-and-now actions of the scoping and defining processes that were at work. The results of the investigation led the researcher to question previous beliefs and assumptions in Requirements, because of ambiguities that were uncovered, also because there was no sufficiently distinct process found that could assuredly be labelled as Requirements. This phenomenon evoked further questioning of "how strange?" which triggered the testing of the validity of the Requirements theory.

The second stage adapted an analysis framework on decision-making in order to reveal a causal connection between the actions found in the 'doing' and in the stocks of knowledge that form the Requirements theory. This phase analysed the operationalization of the theory to examine its commensurate, incommensurate and defective activities. The analysis revealed the existence of other dominant processes that affect the Requirements theory, leaving it underdetermined, with no true causal connections that can be established. This led to the inevitable conclusion that the current Information Systems thinking on Requirements is on the horns of a dilemma without any prospective resolution, because of the elliptical misalignment between the theoretical and the empirical worlds.

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Chapter 1

What is a Requirement: a journey of discovery 'Requirements dilemma'

Estragon: What do we do now?
Vladimir: I don't know.
Estragon: Let's go.
Vladimir: We can't
Estragon: Why not?
Vladimir: We're waiting for Godot
Estragon: [Despairingly.] Ah!
[Pause]
Waiting for Godot: A tragic-comedy in two acts Act 1 Samuel Beckett 1952

1.1 Introduction

The purpose of this thesis is to explore and examine the elusive nature of Requirements elicitation. The concept of Requirements has an extensive body of knowledge spanning several decades, with contributions from both practice and supported by academic domains that cross many disciplines, including Human-Computer Interaction, business studies, engineering science and the social sciences.

The Requirements literature advocates many different processes of design elicitation, all of which are underpinned by a set of common beliefs in alignment with the basic premises; that of the practical application of computer science, together with management and other sciences, will produce a representation, or an image that can reflect and produce the Requirements that originate in the life-world. The output of the process is contained in a specification document that displays the detailed information necessary to make decisions about an Information System.

In addition to the interdisciplinary and many design processes on offer, is the challenge to understand the span of both professional practice and academic demands. This has presented a formidable problem, characterised in the literature as a Requirements 'gap'; between theory and practice (Rittel and Webber, 1984; Harvey and Myers, 1995; Siddiqi and Shekaran, 1996; Berry and Lawrence, 1998). There are also other interrelated Requirements following issues;

- Requirements statements are typically incomplete (Canning, 1977)
- Original Requirements specifications differ from the eventual delivery of the software (Ackerman, 1996; Davies, 2001; Kettunen, 2003)
- The intended design use and the actual implemented system use are different (Davis, Bersoff et al., 1988; Checkland, 1993; Suchman, 2002)
- The existing situation is different from the desired situation (Beynon-Davies, 1995; 1999)
- There are cultural inconsistencies between IT and the rest of the business (Taylor-Commings, 1998; Peppard, 2001)
- The problems that exist because of the different domain understandings between the users and IS (Land and Hirschheim, 1983; Wood-Harper and Corder, 1989; Hirschheim and Klein, 1992)
- There are difficulties in communicating Requirements (Land and Hirschheim, 1983; Hirschheim and Klein, 1992)
- The problem of gaps in the scope of methodologies (Avison and Fitzgerald, 1999)

Solving these Requirements problems have been identified in the work of many theories, techniques, tools, methods and methodologies advocated in the design approaches that set out to answer Requirements elicitation, yet, the understanding of a Requirement and finding the techniques that will help to overcome the problem of how-to-get-the-Requirements, still appears to be elusive. There are still many Requirements failures (see appendix 1c for some of the reasons given for Requirement failures).

The motivation for the work of this thesis is to challenge the assumed Requirements belief, taking a sceptical position at the theoretical level about the perceived ability of the design process to elicit Requirements. This stems from a suspicion that there may be a deeper conceptual problem that begs the question about the nature of the relationship that exists between the theory and practice.

What is required is the exposition of the logical connection between practice and the theoretical positions, without taking the theoretical assumptions and underpinnings for granted. Consequently, the research approach adopts a presuppositional position from which to identify some of the basic issues of the Requirements phenomenon that are at work. The thesis does not look for an answer, a method, or a framework, as a guide to exposing the problem that exists in the process of doing Requirements. Nor does it look to solve the problem, which is generally considered, in formal Requirements approaches, to be the adoption of a method that objectively verifies a definition of a need. Instead, the research asks a fundamental question, a priori to the adoption of the Requirements elicitation process, about the nature of the beliefs in Requirements; about the justifications that are used to support these beliefs, and the claims made by the body of knowledge in the use of this current understanding.

The roadmap of this chapter traces the map of the thesis, focusing on the research design that enquires into the phenomenon of Requirements. At the very heart is the questioning of the concept of the Requirements and that of the processes that are involved in elicitation. Consequently, the focus of the research approach throughout is upon gaining understanding, and displaying the 'What-is-done' and 'How-it-is-done' achievement. So the research design starts the next section with a critical assessment of the accepted facts, and that which is readily taken as known, which is then followed on in sections as follows:-

1.2 Discusses the current status of Requirements
1.3 Establishes the research questions that investigate the ambiguity of Requirements
1.4 Sets out the research design
1.5 Lists the contributions
1.6 Sets out the organisation of the thesis and the chapter synopsis
1.7 Summarises this chapter and points towards the exposition of the Requirements theory

1.2 The current status of Requirements

The scholastic discipline of IS-IT perceives Requirements as a defining of an understanding of a problem in a domain, this is crucial to successful software development (Macaulay, 1996). However, there are, and have been difficulties; IS-IT is fraught with recurrent problems caused by poor, undisciplined, and incomplete development practices (Lyytinen, 1987), which continue to persist, and this attracts a general wider concern about IT development and adoption, such as the recent governmental report (Work and Pensions Committee, 2004). The problems start from ‘inept, inadequate, or inefficient Requirements engineering which makes for expensive mistakes and plagues most software systems’ (Sawyer, Sommerville et al., 1999).

The ‘Requirements problem’ is seldom out of the national press, as numerous commentators and pundits find pleasure in dwelling and reflecting upon yet another computer disaster. But establishing the exact nature of the problem has been somewhat elusive. Some, reflecting upon the failure to deliver and implement information systems in organisations, have noted that the Requirements failure is an old phenomenon (Doherty and King, 1998) that continues to persist; that the concept of a design elicitation process has not stood the test of time, which can be traced back to the NATO conference of 1968 (Ewusi-Mensah, 2003). Defining IT-IS failure has itself mirrored the same problems that are found in the defining of the Requirements in the first place. Yourdon (1997) points out that projects fail because they are over ambitious, a consequence of which leads to a ‘death march’. Glass’s (1998) studies on the lessons of computer failures, suggests that runaway projects can be often traced back to mistakes during the initial planning. Requirements for IS-IT has always carried the label ‘problematic’ (Fitzgerald, 1992; Myers, 1995; Fitzgerald, Philippides et al., 1999).

Conversely, determining the success, or taking a measurement of IS-IT success, is equally problematic, as Orlikowski (1992) notes; despite years of investigative effort there is little agreement on the definition and measurement of technology, and no compelling evidence on the precise role of technology in organizational affairs. The Requirements literature confirms this state of affairs; the Requirements problem remains an unresolved issue (See Appendix 1c Failure of IS-IT). The literature also offers possible explanations and solutions, mostly aimed at solving the so-called “*Requirements problem*” (See Appendix 1d Solutions to Requirements problem).

Nevertheless, there are strong reasons why the domain should not summarily reject the foundations of the ‘traditional’ approaches, which are based upon the foundations of design principles; indeed *Software Engineering* is the application of scientific principles to: (1) the orderly transformation of a problem into a working software solution, and (2) the subsequent maintenance of that software through to the end of it’s useful life. The basis of this relies on a corpus of science, which has created a model of human action, one that appears to be self-contained, consistent and rational. However, on digging deeper the ambiguities surface; and for some, the ‘traditional approaches’ cannot be automatically validated with scientific proof (Fitzgerald, 1991).

Another issue emerges from the nature of software itself; The software product, or artefact, is fundamentally different from manufactured physical products of engineering, and with software being synthetic it is subject to the vagaries of human imaginations, which can lead to the outcomes of software productions taking many different forms. Yet another type of ambiguity emerges between the many choices available for the design process of Requirements realization. The IT-IS domain presents a fragmented and confusing array of techniques. For Requirements elicitation there is a range of different methods and approaches, from the highly structured methods and techniques, using case tools, to using the more light-weight approaches of Agile, XP, and post-it-notes, based in contextual design and craftsmanship. The history of the IT-IS literature has presented many different perspectives, giving an eclectic collection of Requirement approaches. One of the earliest taxonomies produced was complied by Davis and Bersoff, et al. (1988), who analyzed the similarities and differences of five alternatives to the classical life cycle model that still continues to provide roots to many approaches that can be found today.

- Rapid throwaway prototyping approach
- Evolutionary prototyping
- Incremental development
- Reusable software
- Automated software synthesis

(Davis, Bersoff et al., 1988)

Many of the modern-day reincarnations that advocate the alternative methods approach; Agile, XP, contextual design, soft-systems etc, still echo the same position as Thayer and Royce (1990) when they first discussed alternative approaches in comparison to the traditional life cycle model; noting that ‘activities and tasks are generally the same; only the emphases and arrangements are different’.

The ambiguities that occur in the validation, in the production of synthetic software, and those found in the variety of design approaches, all manifest themselves as issues found in the so called Requirements problem, which underscores the status of Requirements as a confused problem needing a solution; “if only we can get the Requirements right”. Unpicking this confusion is the work of this thesis, which is not to see if we can get the design process correct, but to see if we can understand the problem.

1.3 Research questions

Three issues have been identified that have shaped the research direction. The first issue is to examine the concepts of Requirements. This thesis starts with the body of knowledge as found in the IS-IT literature, presenting the theoretical proposition, proceeding to then peel the layers back, challenging what-is-known and how-it-is-known. A good theory gives access to the way that the world actually is, giving the investigator guidance for conducting research. But, Requirements and the proposed solutions to the problem, as they are currently outlined, have no clear theoretical underpinning, there is also a lack of any adequate theory to explain the empirical phenomena of Requirements Engineering (Jirotka and Goguen, 1994). Certainly, since Brooks' (1995) classical studies into the specification 'problem', the main issue that has bedevilled software revolves around the 'conceptual component' of the task, which occupies most of the time spent on it. But all of this could reflect a deeper problem; Goguen (1997) remarked that it is an open scandal that there is no theory, nor even definition, of information that is both broad and precise enough to make such an assertion meaningful in an "Age of Information". As there is no clearly stated theory of Requirements, instead, there is a mindset or a belief in using relevant and rigorous methods, while claiming acceptability and legitimacy for use in the 'context'. Therefore, this thesis has formulated a working theory of Requirements with which to test its validity.

The second issue is; how-it-is-known, and how do the research approaches attempt to bridge the gap between the pluralistic theoretical positions that are found in Requirements research with the way the world actually is. There is an urgent need for more studies of the Requirements process itself (Woolgar, 1994), the need is to do empirical studies of practice in natural settings (Beynon-Davies, Tudhope et al., 1999). This line of enquiry investigates the capability and validity of the research methods to accurately capture the phenomenon of Requirements, as they are found in the life world. Because of the lack of a known direct connection between the Requirements philosophical underpinning and the Requirements practice, the thesis approach adopts a pre-suppositional approach to investigate and capture the details of mundane activities, such as that found in the naturally occurring conversations taking place in the meetings of a case study in a group that was seeking to organize and accomplish the scoping and defining of the Requirements of an IT system.

The third issue is the problem of how to test Requirements; of setting the Requirements laws against the actions that were uncovered in the doing of the scoping and defining within the project group case study.

The thesis is an investigation into the phenomenon of Requirements. Given that there is lack of adequate understanding of the Requirements Engineering process as a whole (Finkelstein, 1994) it can be summarised that people work with the belief and the common understanding of a Requirement, and it follows that there is a need to grapple systematically with the following real and pressing issues in the form of the research questions:-

1. What are the phenomena of Requirements for IS-IT?
2. How do Requirements become operationalized?

Research questions

In order to answer these two research questions, each one has been broken down into two sub-questions, giving in total four steps to take in order to facilitate the investigation into the phenomenon.

- **How do we study Requirements?**

  The answer to this question can be divided into two objectives; the first is to formulate a review of Requirements from the perspective of the commonly accepted 'stocks of knowledge', and the second objective concerns the development of an appropriate research approach for the understanding of Requirements.

- **What is the current understanding of Requirements?**

  The purpose of this question is to examine the belief in Requirements. The need here is to develop a theory of Requirements and locate the theoretical underpinning, and the belief structures that support it. This examination is taken from various perspectives; such as those of the experience of practitioners and the body of knowledge as reported upon in trade publications, from the body of knowledge of professional organisations setting down best practice, and from the academic literature, text books, and research papers.

- **How do Requirements get to be Requirements?**

To answer this question means that it is necessary to examine the work of Requirements. However, in order to avoid falling into a recursive trap of seeking the very heart of the phenomenon of Requirements that is under investigation, the research approach must be without any presuppositions, which means that the activities that need to be studied are the seemingly mundane details of ‘what-is-done’ and ‘how-it-is-done’ of an IS-IT project group doing Requirements. This task is undertaken with a research approach that seeks to analyse and describe the methods used in a case study undertaking Requirements elicitation.

- **What are the implications for IS-IT Requirements?**

To answer this question means that the case study findings have had to be generalized so that implications can be made and compared with the existing Requirements literature.

To do this, the case study is used to illustrate an example of Requirement elicitation, as a test instrument of the general laws of Requirements, in which to observe and investigate the interactions that exist in the operationalization of Requirements. This is achieved by using an analytical framework.

This research approach does not automatically seek rapprochement between the theoretical and empirical, rather it is an examination of the structuralizations of Requirements. The differences found in the interplay between the theoretical positions and the empirical operationalization, display the theoretical position that is subsumed in the belief.

The claim made in case study research does not usually go beyond inferences of synthesized concepts and ideas that have been developed from specific circumstances. Although Lee and Baskerville (2003) have suggested in their framework that generalizability can be either empirical cases, or theoretical statements, or a combination of these. This allows the use of the theory of Requirements to test the Requirements understanding, and the generalisations that we hold as a belief.

1.4 Research design

The research framework enabled the examination the phenomenon of Requirements.

This thesis is indifferent, even sceptical, towards the solving of the problem of how-to-do-Requirements; and is indifferent to the normative theory of an ideal rationality that is prevalent in much ISD thinking (Hirschheim, Klein et al., 1995). The work is emergent, is without prejudice, and is impartial to any particular method or approach, or to the application of any particular Requirements methodology, while assuming all to be equally valid in their respective claims. The purpose here is to uncover the underlying belief concept and then to examine the legitimacy for its use in the 'context of discovery' (the 'context of' is defined in appendix 1b).

Logical design of the research framework:-
There are three distinct phases (0, 1 and 2), and within each phase are various intermediate steps. Phase 0 and 1 address the 1st research question, and phase 2 examines the operationalization of Requirements.

Phase 0 **The domain knowledge of Requirements – the theory and the support**

Step 1 - Issues and understanding of "what is a Requirement"
Step 2 - The 'problem of Requirements' the ambiguity of the definitions
Step 3 - A theory of Requirements
Step 4 - The support and justification for the theory of Requirements

Phase 1 **'What-is-it-that-people-are-doing-when-doing-Requirements'**

Step 1: Research approach – and research support underpinnings
Step 2: Methodical approach and presentation of the case study
Step 3: The preparation of the data material and research discussion
Step 4: Phenomenon of the key sequences processes

Phase 2 **The operationalization of the Requirement-ing theory**

Step 1 - Requirements Analysis framework
Step 2 - The testing of the theory of Requirements
Step 3 - Reconciling theory and practice, 'what-is-the-difference'

The three phases are illustrated in figure 1.1 below as a logical flow diagram. At the outset lies the research questions (Ch1). This frames the Research approach in differentiating between what is a Requirement and How-to-do Requirements. Phase 0 follows, starting with step 1, the current understanding and step 2, an examination of the problem of Requirements which is often expressed in the literature as a gap (Ch2) between theory and practice. Step 3, examines the theoretical perspective, and builds a theoretical position. This is then supported in step 4 (Ch3), in examining the links that purport that Requirements is a science of software engineering.

Phase 1. Step 1 (Ch4) discusses and implements the research approach through the examination of an in-depth case study, focusing upon; 'what-is-done' and 'how-it-is-done' in the scoping and defining of the Requirements project (Ch 5). Step 2 and step 3 implements the phase 1 research approach. The data set material was analysed using a developed research method, [Bracket] workbooks (See appendix 1b for the definitional use of [Bracket]), forming an audited account (Ch 6), and step 4 reports on the key operational process phenomenon.

Phase 2: has 3 steps; step 1 (Ch7), develops an analytical framework, step 2, Uses token examples taken from the case study and tests the Requirements theory. This is followed by Step 3 which reviews the analysis (Ch 8) and exposes the dilemma for IS and IT.

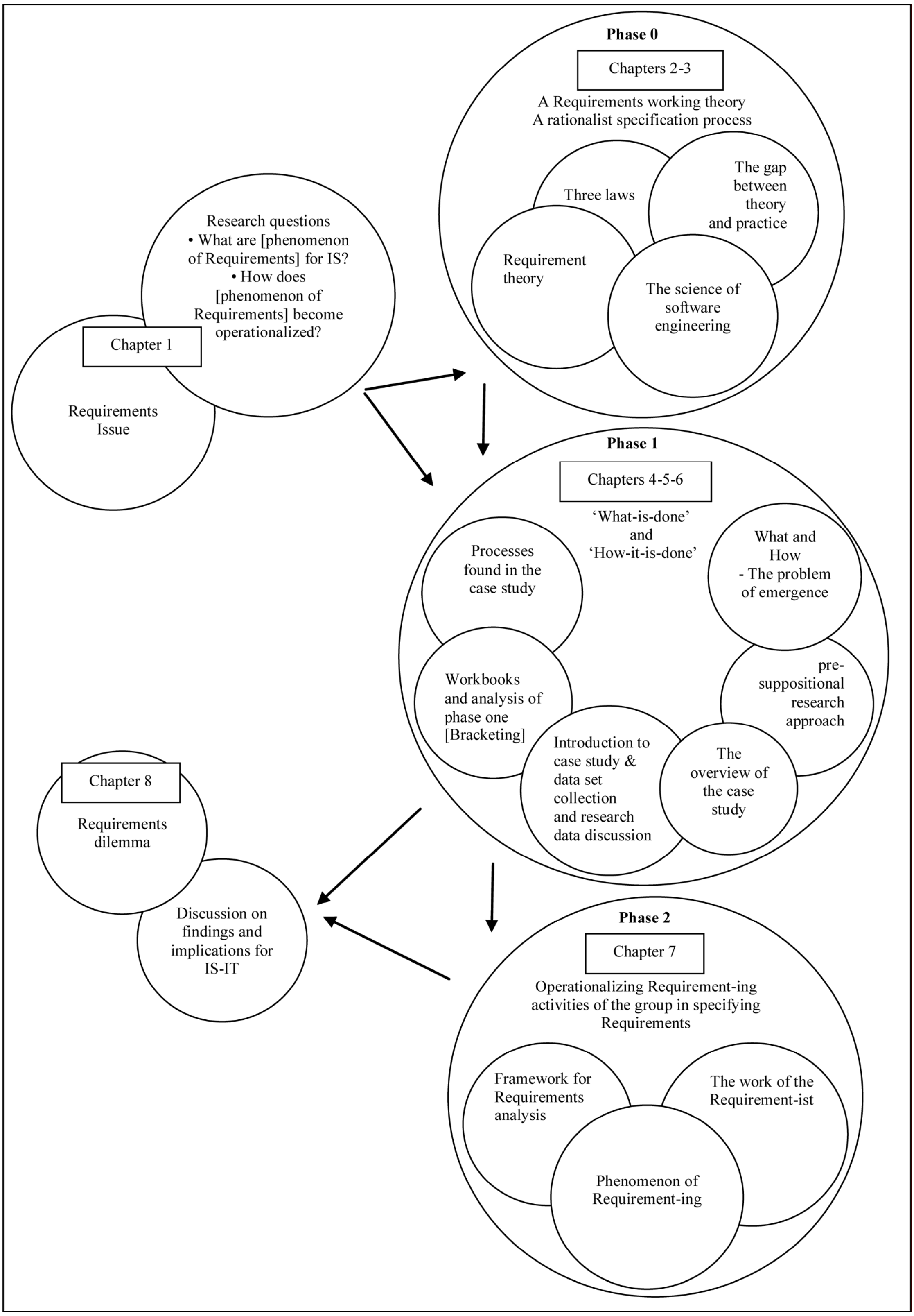

Figure 1.1: Research logical flow diagram

1.5 Contributions

The aims and contributions of this thesis are to:

- **Formulate a working theory of Requirements**

  The approach collates the body of knowledge, from textbooks, academic literature, best working-practices and professional standards; The Requirements theory laws are:

  - We can solve the problem with a product
  - We can get the requirements right
  - We can get the stakeholders to agree

- **The Development of a research approach – 'Workbook' ([Bracket], about-ness)**
  - The thesis develops a systematic approach to investigate the 'what-is-done' and 'how-it-is-done' from a pre-suppositional position.
  - The situated work examined the scoping and defining of Requirements that was undertaken by a project management board.

- **To Modify a research analysis framework for testing the Requirements theory**

  An analytical framework was utilized to examine the causal connection of the actions in context.

- **To uncover the five key processes involved in scoping and defining an IT project**
  - Governing phenomena
  - Decision making process phenomena
  - Designing phenomena
  - Sense making process phenomena
  - Specialised process tools, labelled as the 'left over bits'

1.5.1 Research implications

The investigation of this thesis focuses on the ‘what-how’ of the IS-IT Requirements scheme; the organisation of Requirements as a concept and it’s operationalization.

The systemization of Requirements from the IS-IT domain perspective is an intervening dialogue, setting out to design ‘what-is-done’ and ‘how-it-is-done’. The thesis holds that there are two presumptive perspectives, both of which appear to rest upon justified positions; the theoretical position and a practice perspective. The interest of the investigation is in the inter-connecting of these two perspectives and in their operationalization. The thesis will show that the explanatory disposition of the theory is critically lacking in practice. Conversely, the practice of Requirements uses the theory only as a justification for taking actions.

This work does not necessarily herald positions that claim Requirements are only found embedded in the context, environment or situation, for if that is the case it follows that there is no such thing as a universal Requirement concept, as a need can be invariant, and this is a necessary condition. Nor does the thesis say that that a Requirement cannot be discovered or captured, as a Requirement can be stated and understood.

The key implication emerging from the thesis builds upon the findings of the mismatch between theory and practice, which is due to the theoretical causal disconnection, and this results in the dilemma. This is an uncomfortable conclusion because it lends weight to the argument that maintains that Requirements elicitation is efficacious, that Requirements elicitation can, and is, achievable, but only when the design process is imposed and as a consequence of taking a particular world viewpoint; with the result of the design process of Requirements elicitation being a political act rather than a scientific endeavour.

1.6 Organisation of the thesis

Chapter 2: Within the domain of Requirements, this chapter examines the stock of knowledge of Requirements as expounded in the IS-IT literature on Requirements. From this, this chapter produces a, 'working theory' of Requirements for both academics and practitioners.

From the overview on the current IS-IT Requirements literature, the chapter notes that many of the authors are engaged in a debate that is seeking to solve the ‘Requirements problem’ that has existed for the last thirty years. The literature highlights a gap between the theory and the practice, which is occupied by a myriad of methods and approaches, all of which suggest solutions that are variations of the waterfall or the iterative design approaches. Most of these approaches claim underpinning by the ‘science of software engineering’ and that they conform to scientific principles.

The chapter also briefly discusses the role of theories, and of how some basic Requirements issues can be used in the building of a Requirements theory, how classifications, standards and definitions support in the framing of Requirements, and assist in the formulation of a theory of Requirements which has three laws; a1) we can solve the problem with a product, a2) we can get the Requirements right, a3) we can get the stakeholders to agree.

Finally, the chapter highlights the places where the Requirements theoretical position shows signs that the IS-IT domain could be and probably is, making some unsubstantiated claims.

Chapter 3: Examining the belief held on the Requirement theory. For Requirements practice to be true to a belief, it should be scientific, rational, and based upon legitimate science. The practice of science follows governing standards, ensuring that legitimacy is acquired by using reliable methods, which lay down ‘how’ to judge which theories can be discarded, which can be accepted and proved, and which are facts of knowledge and therefore acceptable to the domain of the discipline.

The Requirements domain has scientific confidence by inference, both in the methods for Requirements approaches and for the advancement of scientific knowledge through the use of these methods. However, there is a significant general IS observation reported on by Klein (1987), which is that it is widely believed that the powers of science and technology are limited in scope, and this may help to explain some of the failures and ambiguities of Requirements. Also, there are no empirical studies showing a correlation between software projects and the development process model used (Ewusi-Mensah, 2003), reiterating the point that Requirements empirical work is often driven by theoretical concerns (Easterbrook, Beck et al., 1993). This chapter helps to focus the main interest of the thesis, as it is centred upon questioning the assertions that support the concept framework which claims that the process captures the 'What' of the life-world accurately. The difficulty appears when the approach presupposes that the 'contexts of meaning' (see appendix 1b for glossary of terms) and the 'context of justification' are one and the same thing, also with the claim that for Requirements, the rationalist specification process, underpinned by the requirement-ing-science domain approach, can be used in the 'context of discovery'.

Chapter 4: Phase One: Mapping the Research Approach. This chapter's objective is to critically assess the Requirements belief from the perspective of adopting an appropriate research approach with which to study the phenomenon.

In professional practice, as in academic studies, the strength as advocated by the breadth and weight of publications of the Requirements belief, makes it seductive. The belief also uses the justification of having profound scientific underpinnings, which at base has a causal relationship, and the ability to explain the relationship. The proof of any theory lies in the ability to make predictive explanations a phenomenon. For Requirements, this has meant that it is a practice based theory, constructed for the use in a context domain; or that the Requirement design process is a tool for use in the 'context of discovery'.

But, in examining this issue, it is noted that there is an additional problem, which is that the life-world readily exhibits ambiguity in its emergent characteristics and where no ending or closure is apparent. A world of dynamic systems defies the endeavour of capturing a slice of reality in a frozen moment of living, however small it may be. Furthermore, it does not matter where research looks, at work, at ideas, at concepts and even at research itself; it will always find 'the work' of the human, engaged in the endeavour of making sense of the world. These 'emergent' things are sometimes born as accidental arrangements, made from mundane activities, but become noticed somehow as "how strange", yet they remain as 'accidental' transactions unless they become captured by some interpretational system of meaning.

Chapter 5: Phase one - the case study analysis using workbooks, introduces the case study and critically discusses the collection and formation of the data set and continues to amplify the details about the research approach.

The objective of the case study project, at Springfield local council authority (pseudo-name) is to give the reader a brief insight into the convoluted, difficult background picture that frames the discussion about the emergent Requirements phenomenon. The case setting here is of a local government organisation that is putting together an IT project, responding to central national government's strategy target of electronic service delivery (ESD). A vision statement by the chief executive initiated the project brief, which was to engender a 'Web based system' for the council members in their casework management, in order to 'propel' the 'councillor's work' into the 21st century. The brief had an immovable deadline, set by the local elections, of just over one year. The project sponsor, the chief executive, also created the project board to oversee the project, with the remit of control of the project, the finances and overall project management.

This chapter also further builds upon the conceptual underpinnings of the previous chapters, elaborating upon the thesis research approach by laying out the research implementation framework. This splits the approach into two main phases, phases one and two.

Phase one takes a pre-theoretical, presuppositionless state, and does not automatically assume background theoretical assumptions. The research approach of understanding seeks to engage with the 'what-is-done' and 'how-it-is-done', as it-is-done in the making of a course-of-action.

The aim of phase one is to provide a body of reference material of understanding, by the formation of the data set, which is aiming to produce an audit trail and is about the actions undertaken during the making of an IT-IS project, "getting the Requirements"; achieving this by examining seemingly mundane events, showing the way in which the unfamiliar becomes familiar, by the artful, creative, intentional interpretations that are continually being applied in the life-world, by the people involved in the IT system. The problem that the research approach addresses is to find that which is needed to locate the original haecceity ('just thisness'), the discovery of practices (Lynch, 2003).

The third aspect of this chapter adopts a critical research discussion about the issues involved in establishing a comprehensive dataset, through the discussion focusing upon four primary data sources; ethnographic; documents and artifacts; semi structured interviews and, of main importance, the recordings of naturally occurring conversations of meetings.

Chapter 6: Workbooks and analysis of phase one concentrates on how the people in the project group went about producing an IT project; this being where the-doing-of-Requirements-is-said-to-be taking place. The research approach sought understanding of this, and was undertaken from a pre-suppositional viewpoint, with the aim to find "the meaning" or the 'about-ness' of the phenomenon of Requirements; while also providing a clear audit trail for the subsequent stages.

The emphasis at this stage was not on categorisation but on exposing any noticeable repeated, recurring themes, group events and recognisable typifying processes, whilst giving details of the origins and formations of these structuralizations. This stage of the research focused on the 'readily visible orderliness', and was divided into two structured stages; Stage 1 firstly formats and prepares the data for presentation, which consequently leads on to the analysis, where the thesis develops the concept of [Bracket-ing]. Stage 2 takes the analysis of 'sense making' a step further by viewing the [Bracket] sequence through five perspectives; the triggering events, actions, method, structures and resources, and consequence; with each perspective revealing a different viewpoint.

This research approach involved many iterations, with the origins of the data being continually displayed and carried forward so as to produce an understanding of the unfolding process of the emergent project, thus facilitating an approach to pinpointing the assumptions that are made about the extemporaneous intersubjective activities which occur in temporaneous moments. The output resulted in recognising certain generic processes, which were; Governing, Decision making, (defective and proactive), Designing processes, Sense making, and 'left over bits'. These emergent actions revealed a rich pattern of dynamic factors, with a diverse set of interrelated research topics that presumably could influence or were influenced by the Requirements process. At this stage the results led to still more ambiguities being revealed.

Chapter 7: Phase Two: Findings of the Requirement-ist adapted an analytical causal research framework to analyse the moments of action found in the case study from the perspective of the Requirements theory. The framework design set out to solve a clear problem, that of how a directed theory can launder the brute-facts, and it also aimed to empirically test the theory of Requirements in an attempt to expose the phenomenon of Requirements.

The phase two framework starts with the assumption that it is possible to identify that there are causal 'inferences', drawing upon the previous analysis work of [Bracket-ing] of the Workbooks, and goes on to ask what kind of occurrences in the Requirements practice would count as commensurate, or incommensurate, in the claims that the theory makes, in terms of its laws, and how these might be identified.

Three propositions were examined, which were

- That the whole case study encompassed the context of the phenomenon of Requirements.
- That Requirements exist only as a functional part that can also be found in other major processes.
- That the Requirements concept exists as a distinct process within the phenomenon but it is still hidden in the results, and submerged in the morass of detail.

Chapter 8: Implications and findings for IS-IT, recaps and reviews the previous chapters and draws together the conclusions of the thesis work. The findings start from the position that the process of Requirements elicitation, for a system in an organisation, is dependent upon the implementation context, and that this constraint bounds the elicitation process. But this does not answer the research problem of 'what is a Requirement?'.

Chapter eight also addresses the implications for IS-IT, terminating in the dilemma of the choices and leading on to the identification of the reasons why IS-IT systems continue to fail. The significant choice is between IS and IT; for 'IT' it is the process 'of' Requirements focusing upon the engineering approach of producing and developing products that are designed to a specification. Alternatively, IS is left with the problem to re-conceptualize the Requirements process 'in' Requirements. But this option requires a fundamental shift in conceptual philosophic positioning.

1.7 Summary

The chapter began with the overview of Requirements, and almost immediately found ambiguities emerging; these could go some way to explaining some of the reported problems found in the Requirements domain literature. Consequently, there is a need to take a step back, and critically assess the perspective currently taken in IS-IT.

This thesis is an inquiry into the beliefs and characteristics of Requirements, as they are currently understood and used in Information Systems Development. The undertaking is to recognise, describe and discuss the role of Requirements; that is, it's participation, involvement and it's influence in the making of an Information System.

There is an urgent need for a radical re-appraisal; a need to question some of the beliefs and understanding involved in the doing of Requirements elicitation. The findings of using a test case itself has far wider implications, not just for Information Technology, but has significance for all the organisations in which IS thinking is used.

In closely examining the practical actions of 'what-is-done' and 'how-it-is-done', and how the Requirements process produces a Requirement, it is hoped that this work is a small step towards finding a more satisfactory answer to the understanding of the problem that is the perennial problem, of why do Information Systems Development disappoint (Paul, 1993)

Chapter 2

The nomenclature of Requirements

"A man may fish with the worm that hath eat of a king, and eat of the fish that hath fed of that worm"
William Shakespeare (1564-1616)

2.1 Introduction

This chapter has the aim of producing a rudimentary, introductory 'working theory' of Requirements. The criterion for its acceptance being that it is sufficiently complete and comprehensive in its coverage to have commonsensical appeal to both academics and practitioners.

There is no shortage of places in which 'to start' looking for a theory of Requirements; they abound in textbooks, academic journals, training materials, standards committees and practitioners' accounts, and any of them should yield a neat succinct proposition that serves to explain the phenomenon of Requirements itself, but the problem is that there is no single theoretical statement; apparently it does not exist, and the question is; why should we try to find one.

Starting with that which does currently exist, there is a long list of definitions of Requirements. For every author there is a definition; every author starts out with an introductory exposition of a provisional statement that encapsulates the responsibility of their thesis upon Requirements, and this then proceeds to present models and frameworks built upon exemplars of how the mechanics of their own version of Requirements work, and to form representations that advocate or proscribe a method, a tool, an approach or a best practice.

But, do any of these models of Requirements built so carefully upon exemplars actually work? No, the equations are simply not true. This negative conclusion might well be premature, in the same way as the many claims that are made extolling the positive virtues of the Requirements methods that currently exist. The argument is this; the case, for or against, simply has not been made, there is a need to provide the evidence, to produce an accurate account of the phenomenon, so that a judgement call can be made as to whether or not our current understanding is thorough, sufficient, and complete. This also calls for an examination of the supporting foundational assumptions that have been accepted and used to justify usage of the models and approaches in the context of discovery. This starts with the Requirements research and how and why the Requirements problem is addressed in IS-IT.

A snapshot overview of the IS-IT literature, focusing especially upon Requirements, distils into a general observation that the opening exposition of most authors encompasses an argument that has the proposition; ‘there is a gap’. Typically, such a gap is between theory and practice, although there is an equally long causal list that points to a discontinuity of things, like the lack of communication or the failure of adherence to standards and so on. Consequently, researchers work in this ‘gap’ to explain, understand, and produce definitions and models in order to contribute to solving the ‘Requirements problem’. But, often there is also a post research sub-clause that accompanies these models, found in the ceteris paribus conclusion, which is, ‘all other things being equal’, so forming the get out clause. This is used to simplify the explanation that the model fits, more or less, in accordance both with other theories and in the understanding of Requirements in a given IS-IT domain.

At the very least, it is wise to look at the simplest explanation (Okham’s razor), to clarify and help fill the gap, but, there are accompanying worrying aspects, not the least of them is that many of these models feign anaesthesia. The call for simplicity in the model has extracted out the practice implementation responsibility, so that it has not been included into the working definition, or rather it has, as long as the practitioners follow the proscribed model of the ideal method. This is unsatisfactory, as the definitions that have been developed and used in Requirements, relate to models rather than the real world. The models, which are supported by exemplars, are abstractions of the real world. The abstractions and their model representations always need more parts and further details, and extensions to the boundary conditions, with additional functionality, in order to accurately reflect on the real world. The considering of a thing as being independent by determining its boundaries with an act of definition is to simplify for simplicity’s sake. The real task of IS science is to uncover, empirically, how all of the complicated elements fit together. The need is not to produce a universal generalization, but an encompassing picture of a family of models that are apposite or germane to the domain, which would be explained by an encompassing domain specific theory. For the purposes of the thesis, it is sufficient to use the available literature, as the eventual aim is to assess whether the current understanding is comprehensive, and this can only be done if we have an accurate picture that encompasses and reflects the current domain knowledge. Consequently, the aim of this chapter is to organise the literature on Requirements into an introductory theoretical proposition capable of explaining the phenomenon of Requirements as currently known.

The roadmap of this chapter is divided into two parts. The first part discusses the concept and the domain of Requirements, expanding the issue, as just outlined, and examines the problems that ensue from the solving of the Requirements problem. The second half of the chapter constructs the working theory.

2.2 The literature argues - there is a gap (the theory and the practice do not go together)

There is a common conception that IT is not delivering to business what it needs (Canning, 1977; Lyytinen and Hirschheim, 1987; Fuller, 1996; Lyytinen and Robey, 1999), the IT-Business divide can cause projects to often fail or fail to yield expected levels of benefit for the business (Sauer, Yetton et al., 1997; The British Computer Society, 2004).

Various research articles have identified and put forward ideas to explain and understand the issues of the gap that exists; the technical-to-social gap (Nuseibeh and Easterbrook, 2000; Flynn, 2002) the two-culture gap (Boehm, Abi-Antoun et al., 1999), misalignment between CEOs and IT managers (Khandelwal, 2001) in IS and business (Peppard, 2001), IS professionals and users (Keable, Landry et al., 1998), between the expectations of different stakeholder groups (Lyytinen and Hirschheim, 1987), the gap between the informal world of stakeholder needs and the formal world of software behaviour (Nuseibeh and Easterbrook, 2000), politics and the power of vested interest groups (Corbitt, 2000), the time gap between the first formulation of goals and the eventual implementation of the system (Mumford and Pettigrew, 1975), the different social Requirements (Ackerman, 2000), gender differences (Teo and Lim, 2000), the gap of communication and understanding (Wood-Harper and Corder, 1989), not understanding the same language (Cockburn, 1999), not understanding the difference between abstraction and detail (Mackay, Ratzer et al., 2000) between work and technology (Suchman and Trigg, 1991). This lead on to a dynamic continuum of the 'user-developer' culture gap (Flynn and Jazi, 1998), user-IS gap (Taylor-Commings, 1998) in addressing the cultural differences (Ward and Peppard, 1996) found in a culture gap (Grindley, 199l; Grindley, 1992). All of this only further stresses the importance of Requirements and of the control of user expectations that are held at the end of the 'definition stage' which was originally noted by Ginzberg (1981) as early warning indicators of IS implementation outcomes.

Despite the literature volume there is little guidance provided as to how this gap might be bridged (Peppard, 2001). The disappointment, disillusionment, and even frustration with the technology is increasingly evident (Brynjolfsson, 1993), and with the unfulfilling of expectations (Ginzberg, 1981), the gap problem suggests that it leads to the worst case scenario, that the most generous observation about current IS development is that most, if not all, systems disappoint (Paul, 1994).

Having established that there is a perception in the literature about a much talked about 'gap' and that the reasons given for its existence is an open debate that points to fundamental unresolved issues, known as the 'Requirements problem', and that this is the problem that the domain of IS-IT Requirements seeks to solve. The work of the domain has concentrated upon the perceived need to find a way to bridge this gap, usually by seeking to introduce 'new' or improved methods. This typically starts from the endeavour to understand the differences between scholarship and practice (Harvey and Myers, 1995), software research and practice (Davis and Hsia, 1994) theory and practice (Lichter, Schneider-Hufschmidt et al., 1993) and to find the academic research relevance to practitioners (Benbasat and Zmud, 1999). For example, qualitative researchers Avison and Lau, et al. (1999) describe the failure to include human factors which may explain some of the dissatisfaction with conventional information systems development methodologies and their results.

Solving the 'gap' with best practice

The Requirements domain objective is to make the methods context independent while being congruent with the rigours demanded by of an academic Requirements of engineering science. This is supported by standards and codes of practice 'setting down' 'how-Requirements-should-be' documented, and 'how-the-process-should-be' organised' (Finkelstein, 1994). A lack of these standards and codes of practice is now considered as a variable for a potential source of risk (Ould, 1999) and thus a contributing factor to project failure. In a recent submission to the Work and Pensions Committee (2004) the British Computer Society (BCS) reported that there is a "lack" of best practice which “appears to be lamentable”; the reasons given to the politicos for this include; a lack of attention to training and education, or an inability of project teams in software organisations to apply the necessary rigour.

Underlying the concept of ‘best practice’ is the organizational imperatives to develop a clinical approach to understand, address and correct the roots of underperformance and failure, to form a consensus to make a core, a body of knowledge (Bourque, Dupuis et al., 1998) and to make Requirements a legitimate engineering discipline and a recognized profession. The IEEE Computer Society and the ACM have been actively promoting software engineering as a profession, and as a legitimate engineering discipline, notably through its involvement in the Joint IEEE Computer Society and the “ACM Steering Committee for the Establishment of Software Engineering as a Profession”. As Dewey (1910) would say, these bastions have become the acceptable guardians and instructors of established doctrines and to question the belief is to question their authority. However, if it were not for the existence of the ‘gap’ and consequently the quest to construct a method to solve the Requirements problem, then this belief would indeed go unquestioned. But because there is a gap, it is a ‘gap’ in knowledge that is indicated rather than a ‘gap’ that needs a method to fill it.

Consequently, the question for this chapter is; what is the nature of this Requirements belief that inspires so many people to respectfully follow the belief with conviction to make Requirements into a well oiled machine; “essentially the belief that there is an objective world that can be modelled by building a consistent body of knowledge grounded in empirical observation” (Nuseibeh and Easterbrook, 2000). But does this belief stand up to scientific scrutiny, when empirical judgements can so easily be led astray, or lulled into a lazy unjustifiable conservatism where the mental processes that people use to express themselves are dulled in their daily mundane work.

Unfortunately, merely accepting the existing approach of finding, or just using a given method approach, as outlined by the domain of Requirements, appears to follow and support the model of “a solution looking for problems” which, as Angell and Straub (1993) noted, is ‘driving much of applied computing’, where ‘design is seen as a matter of intent’, and found in their methodologies, a ‘wish to impose on the user community’, their ‘sophisticated expectations and their ideological need for tidiness’ (Angell and Straub, 1993). The form of process where the ends justify the means, with the successful realization of certain ends by the use of certain means. But that returns to the problem of the concept of whether there exists an achievable precise end, and if so, whether it can be made explicit. At the base, for the moment, is the perceived 'gap' issue of technology which could lead to expectations being unfulfilled.

2.3 The 'Requirement problem'

The Requirements problem is a 'Gordian knot', wheels within wheels, a can of worms, a tar pit invoking a quest for the silver bullet (Brooks jr, 1995). This requires some untangling before proceeding, there is also a need to avoid confusion with this and the research thesis question.

Starting with the process involved with control over the 'doing' of Requirements, the 'what is a Requirement' question is asking that the problem should firstly, be correctly identified and secondly, be solved. This problem is assumed to exist as a problem to-be found in the context of discovery, during the enquiry made by the Requirements analyst. The analysts' task is to ascertain the relations of terms or qualities among things or facts. It is about the process of identifying, sorting and representing terms, objects and qualities of facts into an understanding, in order to solve a problem for the stakeholder. Although the connections between the Requirement and the problem domains are complex (Jackson, 2001), this is all considered part of the process of design, and is assisted by available methods, tools or approaches in the 'doing' of Requirements.

The variety of methods, approaches and tools, are largely developed by academics (Chatzoglou and Macaulay, 1996; Mumford, 1997; Avison and Fitzgerald, 2003) for practitioners, to assist in solving the operationalization of the 'Requirements problem' and to address the various perceived gaps, as previously highlighted, presenting the Requirements domain problem of filling in the gap. The process of control, of using method, implicitly implies the bounding of the 'Requirements problem', but this was originally brought about to correct problems of the 'software crisis', which had very different historical roots and reasons for bounding than that which applies today, and this may help to explain some of the current predicament of gap problems.

The original problem arose from the reports of sloppy, ad hoc and irrational approaches of systems developers in practice (Fitzgerald, 1996). It emerged formally conceptualized as the term 'software crisis' (Thayer and Royce, 1990; Yeh, 1990).

This reflected a mismatch between the ‘explosive growth’ of Requirements, compared to the limitations of available hardware (Curtis, Krasner et al., 1988). The term 'software crisis' originated in a 1969 conference where it was first recognised that software projects were being delivered far behind schedule (Ramamoorthy, Prakash et al., 1984). Although Glass’s (1998) later historical re-assessment was that only 10 per cent of projects at this time actually failed, he reasoned that; “most often projects that spin out of control were never in control in the first place” (Glass, 2003). The Fitzgerald (1996) assessment of the issue was that “many researchers saw the solution to the software crisis in terms of increased control, and more widespread adoption of rigorous and formalized system development methodologies” (Fitzgerald, 1996). This was reiterating a widespread feeling at the time which supported the extemporary work of Frederick P. Brooks in the Mythical Man-Month where he identified that projects fail because of “project creep” (expanding Requirements) and the false assumptions about schedules, and his solution was that “the specification must be handed to an outside testing group to be scrutinized for completeness and clarity” (Brooks jr, 1995). So the current idea of control of the process essentially builds from a management problem of schedules, because of the demand that is placed upon hardware from the growth of Requirements.

However, this historical perspective, focusing upon the excessive demand upon hardware, also sits within the social historical context concerning the use that this technology has been put to (See Appendix 2 Historical Development of Requirements). This technological imperative has lead to the need for IS to make sense of the context into which Technology is placed, and to form a boundary that places the demand of Requirements originating from outside the scope of the current domain, or from a business need. The main problem in Requirements elicitation concerned the ‘boundary’. This well known difficult problem of what should be included and what should not (Ross, 1977; Turner, 1987; Jackson, 1995; Mumford, 1997; Boehm, Egyed et al., 1998; Leffingwell and Widrig, 2000), was sometimes referred to as framing the Requirements (Ross and Schoman, 1977; Merwin, 1978; Yeh, 1990; Pohl, 1993; Finkelstein, 1994; Nuseibeh, Kramer et al., 1994; Boehm and H, 1996; Chung, Nixon et al., 2000; Hall, Jackson et al., 2002). For business, the drawing of this boundary/frame for IS understanding is particularly difficult, for instance; the system's boundary symbolises that of the company, so that access to the inner workings of the system is access to the inner workings of the company (Woolgar, 1994). Within the Requirements domain there is a ‘lively debate about the definition and scope of Requirements’ (Jirotka and Goguen, 1994), however, the problem of drawing a boundary is deeply problematic, but, wherever the boundary line is drawn, it will still remain true that there is a need to be able to connect theoretical statements with the observational ones that are taken from practice, and this also means that the process of control has to encompass the problem found in the context of discovery.

The Requirements problem needs to seek its solution through using rigorous principles, with complete explicitness, in order to deal with the uncertainty that can be found in the context of the discovery of what the system is supposed to do. The basic need of the process of Requirements, is to be explicit in describing the problem, before specifying a solution (Alexander, 2004). The basic component characteristics of software Requirements documentation are; that it has to be complete; that all constraints and assumptions are explicitly stated, with a set of precisely stated properties or constraints that a software system must satisfy (Yeh and Zave, 1980). The system boundaries have to be defined (Davis, 1990), and the inter-actions between the system and its environment have to be explicitly stated (Yeh, 1990). And where the systems are to be used, in the business or social environment, there is the additional stipulation that the user viewpoints need to be made explicit (Kotonya and Sommerville, 1996).

The about-ness of Requirements can now be characterised as the process involved with the control over the 'doing' of Requirements, which is asking that the problem is firstly, correctly identified, and secondly, that it will be solved. The problem to be solved is to-be found within the context of discovery by the Requirements analyst, who seeks to bound the 'Requirements problem' that needs to be solved by the adoption of rigorous and formalized system development methodologies that manage problems of schedules, in order to stop excessive demand being placed upon hardware from the growth of Requirements. These are basic property attributes that form the bounded abstraction of a Requirements theoretical construction that is setting out to solve the Requirements problem, thus providing the definitions of Requirements. However, it should be also noted that the definition that this Requirements process provides, does not, necessarily solve the problem that the process ‘found’ in the context of discovery.

2.3.1 The foundational aspects of a science of software engineering

The objectives analysis phase begins with determining the preliminary scope of the development effort (Yeh, 1990), in the elicitation of the scope of Requirements, and this includes the suggested goals, viewpoints, data, operations, agents, and resources as potential elements of an 'ontology' (Ross, 1977). The purpose or aim; "Requirements are the properties that should hold in the real world that which we want the information artefact to help bring about, not the properties of the information artefact itself" (Potts, 2001). Of particular note is the outward facing aspect, which is towards the wider Information system, where the interest is in solving a real world problem; and this is expanded upon in a later section. The second IS definition now assists in locating the process of Requirements; "An information system in its simplest form can be defined as a technological system that manipulates, stores, and disseminates symbols (representations) that have, or are expected to have, relevance and an impact on socially organized human behaviour" (Hirschheim, Klein et al., 1996). The definitions are principles offering certain rules for an intended normative activity, encapsulated by the ideals of the domain, and reflected in the objectives of the domain; "Software Engineering is the application of scientific principles to; the orderly transformation of a problem into a working software solution (Davis, 1988).

Meaning, the using of rigorous principles, and the commitment to those principles in practice, are united under the banner of software engineering, and further underpinned and supported by the reflected establishments of academia and professional practice institutions. Together these promote and supply the codes and guidelines of 'best-practice', such as the ACM Codes of practice, which are an example of valuable contribution to practice (Walsham, 1996). Typically in a recent report to a government select committee, investigating IT failure, The British Computer Society (2004) advocated; "There is an urgent need to promote the adoption of best practice amongst IT practitioners and their customers". The report goes on to champion that "Government, with the Department of Trade and Industry (DTI) taking the lead, should therefore work jointly with Industry to establish a UK Software Engineering Institute for research, advice and training to promote best practice in software engineering and IT project management" (The British Computer Society, 2004).

The rigorous principles are supplied by the academics, the majority of which stake their allegiance to the purity of 'computer science' in it's mathematical modelling and it's objectivity. This foundation seeks to develop a science of software engineering, in the image of the established sciences, and this is reflected by the viewpoints held by the majority of computer scientists, industrial engineers and academics of today (Hirschheim, Klein et al., 1995). In theory, the community of research academics seek scientific consensus, with the aim of achieving some strictly formulated rules by which valid general propositions can be derived from available empirical observations (Polanyi, 1958). The scientific process has two motives: one is to understand the natural world; the other is to control it (Snow, 1969 pg, 67). The normal discourse found in scientific Requirements practice has the aim to produce universals, definitions, and laws that are fundamental to the principles of ‘law of nature’, with theories prescribing the operations that are involved in those laws. The theories express universal statements as working propositions, subject to revision of concepts and principles; an event is considered to be explained if it can be shown to be a logical consequence of the theoretical statements, conforming to generalizations within a ‘domain’ of the relevant science. Such as the statement, ‘water boils at 100”c at standard pressure’. For science, knowledge can only be true or false, while practical action can only be successful or unsuccessful, right or wrong. Consequently, Software Engineering is the ‘application of computer science’, management, and other sciences, with the explicit objective of the systematic application of methods, tools, and techniques to achieve a stated Requirement or objective for an effective and efficient software system (Thayer and Royce, 1990). Although, the domain of academia is by no means as cohesive as just outlined above; there is a significant cohort within the academic theoretical literature of the reference disciplines of IS which still appears to agree with Banville and Landry (1989), who originally labelled MIS as a ‘fragmented adhocracy’; claiming that the “field is perpetually subject to change” (Banville and Landry, 1989), which warrants additional attention, and is taken up in the next chapter.

Having reviewed the foundational aspects that seek to develop a science of software engineering and the practice arrangements of software engineering which define the Requirements role, the in-order-to actualize pattern, the next stage is to discuss how this is brought about, or operationalized.

2.3.2 The Waterfall & Iterative design approaches

The heterogeneity found in the domain of Requirements was built upon a base of system engineering, with engineering principles, and the application of scientific approaches and practice experience. It presumes that there is a concept, an idea, of Requirements that emerges in the analysis phase, which precedes the design phase. The Requirements purpose is to achieve a documented system description using a design process, one that will produce a definition of a system through analysis, synthesis and design. The assumption is that through specifications, definitions and the regulative forces (engineering) it will guide the processes in the direction of the predetermined end. The rational and mechanical functioning of such a structure is analogous to that of a machine (Borgmann, 1992). This section gives an overview to the two fundamental approaches towards process control and contingency, with the approach of selecting the best tool for the situation.

Traditionally, the domain of Requirements has adopted two key approaches, from which a variety of variations have been propagated in the forms of methods, tools and sub-approaches.

The first one, traditionally known as the waterfall approach, specifies a design, up front, which attempts to find a complete solution. Conventional literature referencing of IS-IT Requirements can be clearly traced back to it's origins as a concept that is found in the 'analysis step' in the life cycle model. The acknowledged founding paper, advocating the waterfall model of the software lifecycle prescribes; "first an analysis step, followed secondly by a coding step" (Royce, 1970), which was based upon the experiences of Royce (1970), "Managing the development of large software systems: Concepts and techniques". This portential original concept was a believed ideal, based upon the reflective experience of nine years concerned with the development of software packages for spacecraft mission planning; "I am going to describe my personal views about managing large software developments" (Royce, 1970). The need for the analysis was to convert software development from an art into an applied science. "This can only be accomplished by giving increased attention to the research and development of software tools and formal methods, such as those that characterize the engineering fields" (De Roze and Nyman, 1978).

The second approach, often seen as an alternative approach to the above, encompassed a family tree of phylogenic iterative design approach. Various strategies employ methods such as; piecemeal, to divide and conquer, or advances by component building, or by just the adding of parts. The often cited foundational model, the spiral model, similarly emerged from the experience of large US government software projects (Boehm, 1987). The iterative part of the process approach sub-divides into either successively refining lower-level components until the entire system is specified, (Boehm, 1976), or advocating advancement by prototyping (De Roze and Nyman, 1978; Davis, 1982; Dearnley and Mayhew, 1983; Boehm, 1987; Gomaa, 1990) ('prototyping' in the American version translates into the paradigm of concurrent engineering). The original concept of the spiral model of software development is driven by a risk-driven approach to the software process (Boehm, 1987), which seeks to ameliorate the Requirements demands, by controlling the total amount of up-front specification design. The basic concept is just simply build the product, make assessments, and then improve on it. The prototype approach is about enunciation or expression of a Requirement (Bahill and Dean, 1999) and from this initial effort, a second later build, with the aim of improving the design. Thus, iterative design using prototyping can be evolutionary or exploratory.

The evolutionary approach sometimes additionally claims to be innovative, adaptive or emergent, looking towards fixing, or deferring (Canning, 1977) the complete specification Requirement at some point in the future. Found in a modern reincarnation of the spiral approach in the Agile and XP movements. The advantages of evolution is a progressive, staged requirements analysis, breaking down the life cycle into short cycle development (Baskerville and Pries-Heje). Or even extending the position by suggesting post-modern development environment of 'systems without method' (Baskerville, Travis et al., 1992). However, Agile methods rely fundamentally on the use of validation (testing) (Eberlein and Leite, 2002), which intrinsically relies upon an incremental delivery of functionalities, the first problem is selection of function; which function should be added and which errors from previous iterations should be fixed until a complete system is in operation (Pinheiro, 2002). Secondly, this also requires knowledge of expected behaviour or result for testers to test against , which implies that a Requirement has already been previously realized. The third problem has been highlighted by Kaasbøll's (1997) case studies, pointing out that the cumulative effect of small improvements made during adaptive maintenance resulted in dysfunctional systems, producing spaghetti code which no one dared to change, with an increase of the problem of maintaining and integrating with other systems and within the application itself.

Finally then, there are a myriad of methods and approaches, mostly using variations on the above two themes, culminating in the contingent approach, which is that of a selection of the tool that best-fits the task. Fitzgerald (1996) surmised that estimates vary as to the number of different published methodologies that exist, with some putting the figure at 300, while a more recent estimate suggests that there may be more than 1000. Avison and Fitzgerald (1999) report that a number of surveys suggest that SSADM is the most frequently used methodology in the UK, with over 250 organisations represented in the SSADM User Group (Avison and Fitzgerald, 1999). These authors have also suggested that the domain is entering a 'post-methodology era' (Avison and Fitzgerald, 1999; Avison and Fitzgerald, 2003), characterized by a serious reappraisal by researchers and practitioners alike, of the concepts and usefulness of the earlier methodologies, and supporting the common viewpoint that is leading to a general acceptance of a contingency approach, "a variety of approaches judiciously mix techniques" (Siddiqi and Shekaran, 1996). A contingent methodology or framework allows for different approaches depending on situations (Avison and Fitzgerald, 1999). The choice is to take a tool box method to the context of discovery; Multiview is such an example of a flexible framework which provides an alternative to choosing between different methodologies (Baskerville and Wood-Harper, 1998), or of selecting the appropriate tool for the context that Avison and Taylor (1997) suggest, using different development methodologies according to the problem situation.

However, it is generally difficult to reject the findings of an in-depth survey of current practice, associated with the Requirements stage, in which it was found that methodological approaches are often not followed assiduously, with nearly half of the projects in the survey (47%) using no methodology (Chatzoglou and Macaulay, 1996). Other studies have pointed out that the major characteristics of the practice are rooted in organizational, behavioural and political issues and, to a lesser extent, in economic and technical issues (Ewusi-Mensah, 2003). There is also no clear evidence that IS researchers understand IS failure. Lyytinen and Hirschheim's (1987) original comprehensive study of IS failure, found an inadequate conceptual clarity of the IS failure notion, and reported on the lack of any detailed treatment of the failure notion: and of what precisely is meant by 'failure' and what is meant by 'success' (Lyytinen and Hirschheim, 1987). Twelve years later, this prompted Lyytinen and Robey (1999) to aptly point out that IS has not learnt its own history; "failure to learn is shown to lead to recurrent failure".

The cracks, exposing gaps that began appearing in the early 1990's (Glass, 1998) are still with us today. Boland (1987) suggested that some of these basic assumptions about information systems are founded on false metaphors, "In fact, they are pretentious and self-deluding" (Boland, 1987). Tom DeMarco, had originally recognised that "freezing the specification" during the analysis stage was 'sublime fiction' (DeMarco, 1978). Twenty years later, the life cycle model, which has been absorbed into nearly every structured IS method propounded, has been criticised as being a prescription that does not 'work' in practice (Probert, 1997). Sadly, echoing the original apposite remark of Fred Brooks that; as we look to the horizon of a decade hence, we see no silver bullet (Brooks, 1987). Paul (1993) pointed out that the alternative approaches fail because palliative remedies tinker with the fixing of the point at which the explicit statement is made. Weizenbaum suggested that human decisions are made through ‘choice’ and not, as in a mathematical nodal branch chain of calculations, terminating in a decisive parameter (Weizenbaum, 1976). Weick (1974) conservatively observed that rational models of decision making have their limitations. Today, Mintzberg, Ahlstrand, et al. (1998) lament that decision making is not rational but a vain effort to be rational. Earlier on Robey and Markus (1984) pointed out that failures are attributable to a lack of user involvement throughout the life cycle. There are still echoes in reports of today, Taylor-Commings (1998) reported recently that there is the need to reinforce the environment in which there would be improved results in improved effectiveness of user-IS relationships in bridging the gap, also that the findings were that the so called ‘gap’ is nothing more than an excuse for ineffective working relationships.

The synthesis between social and technical concerns of systems design, have fared no better; as Jones (1999) concludes, the social-technical approaches have been ignored by the 40 highly respected academics who contributed papers to the ‘Handbook of systems engineering and management’, edited by Sage and Rouse in 1999. The nearest and only reference refers in passing to Socio-cultural and organisational perspectives as “aspects of human error analysis” (Jones, 1999). Even when the socio-technical approaches and methods are proposed, these too, seem to borrow from functionalism, and presume that order and regulation will prevail over fundamental change (Hirschheim, Klein et al., 1995), this has, for some, resulted in the conclusion that the idea of a true socio-technical design remains a myth (Clegg, 1984). Resulting in, for some leading authors as a crisis in the IS field (Hirschheim and Klein, 2003) which remains the same now as it originally did when Banville and Landry (1989) first asked if the MIS discipline field could be disciplined. The basic lessons and the problems clearly have not been resolved or learnt from, with research gaps being perpetuated, driving some to even suggest a radical approach.

A few are turning to seek resolution through insurgency upon a perceived established perspective, advocating increasing reliance upon the 'just do it' approach, (Martin, 2003), and, reflecting a wider adoption process, based upon a pragmatic viewpoint on the relationship between methods and practice (Mathiassen and Pedersen, 2002); with some it has been noted, with even suggesting rejection of the idea of formalized methodologies (Introna and Whitley, 1997; Fitzgerald, 1998). This would appear to be backed up with an examination of the literature which reveals irrational approaches of systems development in practice (Fitzgerald, 1996). Particularly, in Requirement practice, analysts use their own methods rather than the given methodology (Vessey and Conger, 1994), or use an adapted one to be more appropriate for their own set of circumstances (Avison and Fitzgerald, 1995), suggesting an extreme contingency approach.

> *But, nothing has removed the basic problem of elucidating the Requirements in the context of discovery. Further, nothing suggested as an alternative does suggest a break with the two dominant design approaches when considering the specific point of Requirements elicitation.*

A few seek a parallel denotative aspect of attempting to break out of an old paradigm (Pettigrew, 1987), yet the suggestions on offer still could 'fit' into either the waterfall or iterative design approaches. Consequently, suffering the problem of up-front collection and freezing the design or lightweight 'Just-in-time' additional building by adding parts on to the existing system, or, Requirements by a thousand cuts approach. But neither is rejection a real solution, as the 'shot in the dark' without method is a wasted effort, leading to chaos, confusion and a sense of insolubility as to how to deal with the problem as it becomes more and more clouded (Mumford, 1998).

2.4 The Requirement problem remains

From the preceding exposition, it is seen that both practitioners and academics have a theory of Requirements, but neither have made it explicit; and this intuitive understanding is insufficient. The need is to have an explicit grasp, as knowledge requires belief and truth (Dewey, 1942; Kaufmann, 1944; Weick, 1979; Everitt and Fisher, 1995). The appeal of having a Requirements scheme is that of acquiring the characteristics of a discipline (Yeh and Zave, 1980; Boehm, 1987; Lamsweerde, 2000), echoing the discipline of programming (Boehm, 1979), and other disciplines of academic research into problem solving (Nguyen and Swatman, 2001). However, in many respects the current discipline of software Requirements in its practicable application, and in the many forms of theoretical concept, reflects the same problems as it did nearly thirty years ago, then, as now; "software engineering is in a very primitive state as compared to hardware engineering…with the most pressing software development problems in the area of Requirements analysis design" (Boehm, 1976). The same theme is often repeated today, Requirements is the common source of errors that continues to resonate in debates on the IS-IT failures (Bourque and Dupuis, 2000; Boehm, 2002; The British Computer Society, 2004). This was demonstrated in the Simons and Parmee, et al. (2003) Requirements review, which found that the issues surrounding Requirements production that were identified 35 years ago remain largely unresolved today.

If temporarily, the enquiry precedes with the assumption 'theories are theories regardless of their origin' (Argyris and Schon, 1992), there is still the issue of the need of an explicit theory of Requirements, because acting without a theory would be an acceptance of intuitive understanding, and would be glossing over the tacitly accepted knowledge that exists within the domain of Requirements. Having implied assumptions, demands a rigorous examination (to be scientific), as it is also reasonable to assume that the knowledge that exists in IS-IT upon Requirements is shrouding an unsatisfactory anomaly or ambiguity that may be causing the problem that leads, so often, to the consequence of failure shown so readily in the 'gap' problem.

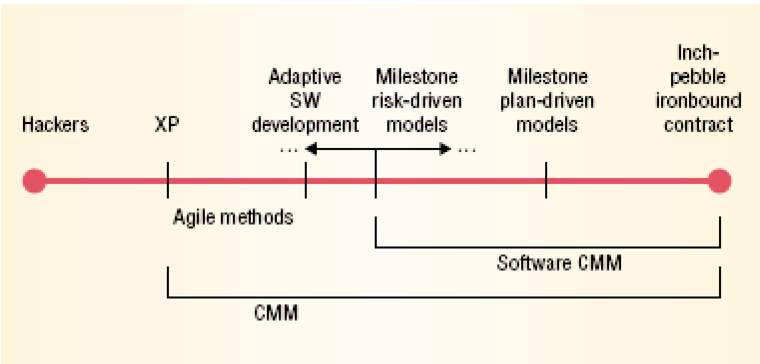

Figure 2.1: Boehm (2002) development spectrum

Therefore as a provisional proposition; this thesis proceeds around this impasse by suggesting that the Requirements domain knowledge is to be found encapsulated in the methods, tools and approaches, which are best viewed as ranges of tools, methods and approaches along the same continuum, divided into categories, say with plan-driven methods and structured methods at one end and 'XP' and hackers approaches at the other (see Figure 2.1). The Boehm's (2002) comprehensive spectrum of tools and options finds a communality of a responsible centre between both agile and plan-driven approaches and although it over-interprets the more radical fringes, it encompasses the planning spectrum, using the central concept of risk management from the Software Engineering Institute's Capability Maturity Model (CMM), as it addresses Requirements management as one of the first steps in improving software quality (Davis and Leffingwell, 1999).

Hirschheim and Klein (1992) proposed that the ‘bewildering variety of methodologies’ and assessments of the philosophical foundations, originated largely from self imposed conceptual ideas from within the academic community itself, who postulated that the variety can be reduced to a few major types by relating them to paradigms (Hirschheim and Klein, 1992). The main discussion of the underlying epistemological justification for these foundations will be addressed in the next chapter. The proposition of the thesis here is that the Requirements domain literature, based upon the rational science of engineering principles, is conceptualised as a family of approaches along a single continuum.

2.4.1 Building a theory based on amalgamation of practice and academia

Developing the concept of a spectrum of tools, a synthesis from the literature can now be formed that addresses the ‘Requirement problem’. Three approaches can be characterised; the first discards the formulized planned project approach. A second approach is to seek to ‘resolve’ the ‘system domain problem’. And a third remains faithful to the academic roots of the ‘traditional’ formulation of systems engineering.

1. Discarding the formulized planned project approach

Generalizing, the first group seeks to discard the formulized project planned approach, adopting instead the methods and terminology of ‘agile’ (http://www.agileAlliance.org), along with the cohort approaches of Extreme, Lean and Scrum, typically they make claims that; “XP has rejuvenated the notion of evolutionary design with practices that allow evolution to become a viable design strategy” (Fowler, 2004). The underlying concept is to release, ‘deliver the software’ incrementally, and through several iterations (Pinheiro, 2002) sometimes suggesting a research base of amethodical post-modern (Truex, Baskerville et al., 2000), or an improvisation approach (Mathiassen and Pedersen, 2002; Bansler and Havn, 2003). But just because it claims to be amethodological does not mean that it lacks a theoretical base. Despite the portent warnings, and including all of the present day methods that ‘claim to’ repudiate the term Requirements, such as Agile, the process still requires sufficient ‘tacit knowledge’ from their ‘customers’ for the full span of the application

(Boehm, 2002). XP relies on code and test cases only, that “as soon as you have defined a couple of weeks’ worth of user stories, development can start” (Grenning, 2001). Despite the denial of ‘doing Requirements’ the Requirements phenomenon is still present in the form of initial step of attaining ‘User’ defined stories, establishing the ‘What’ to be built, moreover, XP assumes that there is only one customer representative (Nawrocki, Jasihski et al., 2002). Consequently, the concept of ‘agile’ becomes more-or-less synonymous with short cycle time development (Baskerville and Pries-Heje), or “Just-in-Time Requirements Analysis” (Lee, 2002).

The intention of these ‘modern’ approaches is to move the development process towards getting-close-to-the-customer, working on developing a practice that will create an effective relationship between designers and customers (Beyer and Holtzblatt, 1995). All of which still ‘requires’ some sort of elicitation process, as every software application or software-containing system has users, consequently ‘every project has Requirements’ (Wiegers, 2003). However, the downside to this is that this may lack the wider perspective of the ‘context’ understanding into which the system is to be placed, accepting that the As-Is as a given with any change to working practice being achieved through the mechanisation of existing processes.

2. Seeking to ‘resolve’ the ‘system domain problem’

The second adjunct approach rejects the notion of immediately jumping into building a product. Instead, this group seeks to - ‘resolve’ - the ‘system domain problem’ by firstly reaching consensus, thus rectifying a perceived problem of using systems thinking in the real-world (Checkland, 1999). To briefly review the often quoted archetypal example, although there are a myriad of methods with the same basic approach in Checkland’s; ‘Systems Thinking, Systems Practice’ (1993) the process begins with questioning the assumption that the problem to address is 'hard' and therefore malleable to ‘systems thinking’, rather than the Soft Systems Methodology (SSM) which places emphasis upon the ‘problem to solve’ that exists in the ‘problem domain’. It is thus, originally a ‘soft’ problem (Checkland, 1986), consequently, it is a human activity, and must be therefore considered at a ‘higher level’, thus, the aim through using methods and tools is to reach a ‘root definition’ (Checkland, 1993) with the gathering in of a consensus of the problem to solve.

The historical perspectives of the ‘soft’ approaches have a long pedigree. Soft Systems Methodology emerged from an action research program, characterized by human beings taking purposeful action (Checkland, 1993). Indicatively, ‘action research' grew out from experience of the Tavistock Institute of Human Relations and the 'experimental action-programmes' in personnel selection, treatment and rehabilitation of wartime neurosis casualties and of returning prisoners of World War II (Rapoport, 1970). The relationship is inherently practicable, as action research combines theory and practice (Avison, Lau et al., 1999), and has been utilised for the Requirements issue (Checkland, 1993; Nguyen, Armarego et al., 2002), influencing systems development generally. Avison, Lau, et al. (1999) lists among the many influences as:-

1. The Multiview contingent systems development framework;
2. The Soft Systems Methodology;
3. The Tavistock School's socio-technical design;
4. Scandinavian research efforts, intended to empowering trade unions;
5. The Effective Technical and Human Implementation of Computer-based Systems (ETHICS), the participative and ethical approach to information systems development (Avison, Lau et al., 1999)

In Checkland's action research framework (Checkland, 1991 pg, 402), the claim is that SSM validity represents a set of 'coherent' and potentially transferable results, achieved by an 'explicit' methodological framework. However, Probert (1997) is one of few, but growing in numbers of writers, that have recently questioned the metaphysical assumptions of the SSM approach, in that they "should seek to establish their epistemological principles in a more definite manner than has hitherto been the case" (Probert, 1997). Iivari and Hirschheim (1996) identified that the priority of the human activity system analysis reflects a mechanistic procedure of identifying information as a system that is perceived to be an isolated technical artefact.

3. The 'traditional' formulation of systems engineering

The third group and the collection of methods is, perhaps, the easiest to define since it has remained faithful to it's roots, usually associated with earlier approaches to system design, formulating strategic IS plans published in late 1980s and early 1990 (Salmela and Spil, 2002), and also founding the approach of Operations Research (OR). In the format of 'traditional' formulation of systems engineering, formal methods use theoretical knowledge to make the development of a program more systematic (Berry, 1999).

This approach's rebuttal to the research-practice gap is to seek to close it by using standardization (Sage and Rouse, 1999) and improve state of software engineering practice through the mission of Education (Berry, 1992). The definition comes from the IEEE Standard Glossary of Software Engineering Terminology (IEEE, 1991). This definition is based on a definition of engineering itself, "engineering is the application of a systematic, disciplined, quantifiable approach to structures, machines, products, systems, or processes". Specifically; "software engineering. (1) The application of a systematic, disciplined, quantifiable approach to the development, operation, and maintenance of software that is; the application of engineering to software. (2) The study of approaches is as in (1) above". The basic premise is 'do-what-you-do', but better'.

Formal methods attempt to define a set of "precisely stated properties or constraints that a software system must satisfy" (Yeh and Zave, 1980). Requirements are constraints in the value of attributes and are thought about as 'embedded' in system design meeting functional specifications. Requirements are 'not out there' to be discovered, rather they complement the world in simulation models; they are a model constructed by a mind of a human, that is, a model or a theory of that world of functions.

Implicit in the approach of formal methods, is that the requirements process is merely a matter of making a priori properties explicit (Goguen, 1993), consequently in Software Development specification and design approaches such as VDM and Z-Formal methods (Bourque and Dupuis, 2000), they are supported by mathematically based precision and formal language notation with the aim at producing quality software (Avison, 1997) incorporating rigour (Avison and Fitzgerald, 1999). The justification use for these methods is the claim that they help to uncover constructs for correct language use and possible inconsistencies (Hirschheim, Klein et al., 1995). This is also used in the wide acceptance of XP concepts as "formal methods preserve correctness and help to shorten the testing phase" (Pinheiro, 2002). Hence, the accuracy is with the coherency of the model and its representation and not the life-world setting. However, it is noted that formal methods do not necessarily help to suppress Requirements conflicts even though they are intended to prevent ambiguity and inconsistency (Easterbrook, 1994). Further, 90% of Requirements are expressed 'solely' in natural language, less than 10% use both formal methods and natural language and less than 1% use just formal methods (Osborne and MacNish, 1996).

Formal methods purport to verify software requirements Hall's (1990) 'Seven Myths of Formal Methods' claim is that formal need to be better understood.

1. Formal methods are very helpful at finding errors early on and can nearly eliminate certain classes of error.
2. They work largely by making you think very hard about the system you propose to build.
3. They are useful for almost any application.
4. They are based on mathematical specifications, which are much easier to understand than programs.
5. They can decrease the cost of development.
6. They can help clients understand what they are buying.
7. They are being used successfully on practical projects in industry.

The underpinning assumption of the development of formal methods or the Operational Research (OR) approaches into a body of methods, techniques, and tools, firstly makes, possible teachable knowledge that is underpinned by the knowledge of mathematics and statistics which are deemed necessary for effective practice. Secondly, it gives an advantage of being able to offer a 'tool-box' approach of design patterns that stresses the use of proven solutions. This approach has long historical roots, dating back to the industrial revolution, see appendix 2 for a fuller discussion.

2.5 Requirement theory building

Yin (2003) insists that theory development is part of the research design phase, being 'essential', whether or not the ensuing case study's purpose is to develop or test theory (Yin, 2003). But, a theory can also be used as part of an investigation to help in the framing of the mechanics working in the domain of interest, in opening up questions about the construction about "what makes the social world *tick*" (Zaner, 1961).

However, some academics think that having a theory is unnecessary to explain intelligent behaviour (Dreyfus and Dreyfus, 1990); that we behave intelligently in the world without having a theory of that world and that people in the world act pragmatically (Habermas, 1998); extending this further reflects a viewpoint that theories are ‘inseparable from a situation’, from their origins, practice and consequences. That is, scientific theories are ‘work’, not disembodied ideas (Star, 1993). Resulting in a position that theories are grounded from within the presuppositions that shape and guide human life, the “epistemological, methodological, metaphysical concepts we typically use in the course of our daily lives, theoretical or practical” (Zaner), act as guides; part of the baggage of experience that is carried around (Schutz, 1967). Indeed, theories are for use in particular situations, inasmuch as they can be applied directly, to certain limited areas. They do not prescribe as predictions and explanations, but are a function of the model in use at the time as a part of common sense; which tells us that we are obliged to take some assumptions on board, and that we need to do so, in order to raise sceptical doubts about the very beliefs that we hold.

Already in the above discussion, it has been established that a theory is needed, so that it can be verified or confirmed against a set of propositions, and the research task as such, is to test the theory by comparing findings from observed reality (the collected data) with the expected outcome (theoretical propositions) (Cavaye, 1996). A theory is a descriptive adequacy (Garfinkel and Sacks, 1970; Garfinkel, 2002) of phenomena. This reflects the dictionary definition; “A scheme or system of ideas or statements held as an explanation or account of a group of facts or phenomena” (OED). Using a theory for the research purpose, helps to identify and make explicit the cause-and-effect relationships between objectives, measures, and the performance drivers associated with the corresponding objectives, consequently there is a continuing need to establish the reasons why we need to develop a theory of Requirements, and to confirm what would be the purpose of this theory.

For Lyytinen (1989) the task for IS researchers is to provide explanatory laws of social control and decision making based upon measurement founded on empirical laws. Law-like relations (generalisations) are derived from experience and are independent of the investigator, his/her methods and the object of study (Myers, 1997). Kling and McKim (1999) the key principle for good scientific theories of systems developments is that they should be conceptually rich enough to understand or predict variations in behaviour and structures, whether they are failures or successes. Knowledge then, can be treated as causal regularities, expressed by causal laws. A causal law states that whenever an event (cause) of type C happens, another event (effect) of type E follows (Kaasbøll, 1997). These make facts which are assumed to fit together in a determinate order. The world is assumed to be highly systematic and thus essentially predictable, following laws of interrelationship that are at least probabilistic in nature (Boland and Greenberg, 1988). The underpinning assumption is of an objective reality, the basis for generalisable knowledge, often represented in mathematical models, that can predict patterns of behaviour, independent of time and context (Avison, 1997). Consequently, this is generally associated with positivism, and with research methods of the natural sciences that produce statistically generalizable data. Forming what Hirschheim (2003) called ‘A Body of Knowledge’ reflecting that the field of IS is an applied discipline; like law, medicine and engineering and identifying the core competencies of IS specialists. However, Fitzgerald’s (1991) concern is the way in which a hypothesis in IS has often been readily accepted as a theory which has then unquestionably become universally applicable as a scientific law. Giddens argues that universal laws in the social sciences are “the idea that with further research such laws will be eventually be uncovered is at best markedly implausible” (Giddens, 1984 pg 345). Bowker (1999) observes that there is no natural law that the best standard shall win, quoting that; QWERTY, Lotus 123, DOS, and VHS are often cited as examples in this context. Standards are often controlled by a community of gatekeepers, or dominate due to an outright conspiracy. Hirschheim (1995) makes a similar point on law making which is subject to much politicking.

Laws are also historical; the manufacturing process, with its trend towards centralization, economies of scale, specialization of function, with the imposition of effective work discipline and introduction of efficient communication and transport, resonates down the ages, perhaps the apex being exemplified by Frederick Winslow Taylor and the “The Principles of Scientific Management” (1911), which extols the unification of manufacturing and scientific management into systemised factory production. The goal of which was ‘change from rule-of-thumb management to scientific management’, involving, not only ”what is the ‘proper speed for doing the work’, and ‘remodelling the tools’ but also a ‘complete change in the mental attitude of all the men in the shop towards their work” (Taylor, 1998). Quoting Taylor; “old knowledge so collected, analyzed, grouped, and classified into laws and rules so that it constitutes a science” (Taylor, 1998 pg, 73). Of note is Taylor’s concept of separating out the management and the work functions, of making a formal division of labour, duties and responsibilities, with the scientific management approach of time and motion. Taylor-ism is closely echoed in the parallel studies upon bureaucracy by Max Weber investigating the "laws" – “which we are able to perceive in the infinitely manifold stream of events … contain the scientifically ‘essential’ aspect of reality” (Weber, 1949 pg, 73).

2.5.1 Work of Theory: What the theory should do

The aim of a theory is a descriptive adequacy of the operationalization, or the method, that distinguishes general truths from accidental patterns, summarized in that; the use of a theory enables us to predict the behaviour (Rorty, 1994). Foucault (1970) expresses ‘theory use’ as a construction, which requires only words applied, without an intermediary. The 'success' of a theory is in the fulfilment of its predictions, regardless of whether the predicted events are desirable (Kaufmann, 1944). Another use for a theory is for ‘invoking’; for academics to construct theories to promote disagreements with known facts (Feyerabend, 1978) to compare two statements about what supposedly exists, because it is an objective statement about a phenomenon. The discourse of a theory, as Boland (1991) explains, is a vocabulary of a ‘world hypothesis’, produced to engage in a dialogue: questions can be posed and answered, and arguments can be resolved” (Boland, 1991).

Although ‘theory’ is difficult to define in IS usage (Lee, 2004), some use it to support definitions, others bring into the domain ‘other’ theories from other disciplines in referencing, to ‘justify’, using them as authoritative sources and to legitimise statements that support a provisional statement of research and research methods. This thesis starts with a basic understanding about what a theory is; “it is a set of propositions that might or might not be true, set within a context of justification” (Appiah, 2003). The notion of the ‘context-of’ will be further developed elsewhere; however, essentially this thesis adopts three differing positions of interrelation, that are of justification, discovery and the contexts of meaning. This prepares distinctive separation of concerns in order to aid clarity and discussion. The first is a "reliabilist" account of knowledge; that a true belief has been produced in a certain way (Everitt and Fisher, 1995). The context-of-discovery is where the interactions between the theoretical constructions take place, and in the practicable organisation of experience by the common-sense thinking of people living their daily lives and connected in manifold relations of interaction. Taking a Schutzian understanding this starts from the outset given that, “we, the actors on the social scene, experience the world we live in as a world both of nature and of culture”, in a world common to all of us, potentially accessible to everyone involving intercommunication from an inter-subjective perspective and not as a private world (Schutz, 1962). The contexts of meaning is the interplay between the two, which also contains the research question of “how strange”, the research approach investigating the phenomenon of Requirements is taken up chapter four.

The interest for the thesis is in the practical activities of the phenomenon of Requirements, which are, themselves practical accomplishments, become accounted for, in making them explicit, and of how the actions become attributed with objective meaning and certain ideal objectives. Starting with Weber's (1949) description of an 'ideal type' as:-

"*formed by the one-sided accentuation of one or more points of view and by the synthesis of a great many diffuse, discrete, more or less present and occasionally absent concrete individual phenomena, which are arranged according to those one-sidedly emphasized viewpoints into a unified analytical construct*" (Weber, 1949).

The shorter version is simply, 'the ideal type has contained within it all that is necessary, all the constituent elements of the phenomenon' (Psathas, 2003), However, it is Weber's wider holistic viewpoint and description of 'unified analytical construct' that gives an insight into the formulations of 'ideal', that are so relevant upon Requirements as in use today. Two issues emerge from this;

- The first concerns an issue about drawing boundaries, how, where, and when do these boundaries become demarcations that make the point at which it is possible to say that this is now the domain of Requirements.
- The second issue is the need to distinguish and establish the relationship, and the different types of causal links, between theoretical laws and the accompanying logical relations on the one hand, and on the other (hand), the causal links that are found, which have been established from reflection upon the actions and as a part of experience.

The base discussion is about whether or not Requirements theories are scientific, how it became scientific, and where science would draw it's boundaries of interest.

The description of the characteristic components of an 'ideal theory' has been discussed by Flyvbjerg (2001) who assembled and assessed the literature sources of an 'ideal theory' into six constituent parts;

(1) explicit
(2) universal
(3) abstract
(4) discrete

(5) systematic and

(6) complete and predictive (Flyvbjerg, 2001)

Thus enabling a necessary checklist, useful to check the completeness of the coverage of a theory of Requirements, although it now lacks detail of how this becomes a set of guidelines for it's application. The theory not only has to be able to encompass and explain the phenomena, with regard to a furnishing of the overall world views, but also has to facilitate sets of instructions for the production of the phenomenon of Requirements. For this, Sharrock and Anderson (1986) have usefully synthesized and encapsulated the work of Felix Kaufmann, 'The Methodology of the Social Sciences', which codifies the rules into a set of three maxims.

1. When employing a theory, use only those terms defined in the theory.
2. Use only coherent, consistent and rigorous theories.
3. Use only theories which yield studies of real phenomena.

Together, these three maxims and the six characteristic components of an 'ideal theory' furnish what Kaufmann (1944) would call the 'theoretical goal of inquiry', which would be able to assist in distinguishing between the operationalization of the procedures, with the laws put to use in practice, and the underlying theoretical constructs. The former define correct scientific decisions made in a given situation, the latter supply the logic of the fundamental system of rules of the invariables. The interest of the thesis is to draw this interrelationship out, the task is to make the affiliation explicit. The work during the journey is to expose the phenomenon of Requirements, facilitating an answer to the question as to whether or not there is sufficient knowledge about what a Requirement is.

This outlines the aim and the work of a theory, and indicates that there is a 'domain', area of scientific practice, an IS-IT practice domain of understanding, that constructs theoretical propositions, and that this theoretical work has informed practice, and vice-versa. And this 'work' is for the reason or purpose of holding a proposition, for promoting a discourse, to settle or re-examine, or to open up and examine an old argument about worldly phenomenon. The next section examines the constituent parts necessary for a theory of Requirements.

2.5.2 Basis of a Requirements theory

As stated in the introductory remarks, the regulative forces of the system engineering principles serve as a scheme of interpretation, guiding the actions of the Requirements procedure. The guidelines set out certain 'objective standards', with the common aim of building IS-IT projects. The standards used in Requirements are themselves a function of certain accepted commonalities within the particular group of people who build IS-IT. Such standards may be matters of habitual conduct, of traditional attitude, of belief in the validity of some order or norm, and they may be not only taken for granted but obeyed (Schutz, 1967). This acts as a scheme of interpretation, representing an ideal, that is synthesized from practice, into which many authors present synthetic propositions which; firstly, restrict the 'given' (presupposed) frame of possibilities, secondly upon closer analysis prove to be analytic based, and thirdly, can be subjected to empirical analysis (Kaufmann, 1944).

The outlined notions of the concepts of a theory, as already considered so far, are that theories must contain universal definitions and laws, with fundamental principles of 'law of nature', and also conform to generalizations within a 'domain' of a relevant science. These aspects, derived from the literature, supply the principles of a Requirements theory from four overlapping spheres of influence from;

1. Practical guide lines
2. IEEE and professional – standards
3. Text Books
4. Academic Papers

Each has a slightly different focus, which is characterised by the objective of their domain.

Classifications

Classifications are what things are and why they are so (in terms of the ends they serve) (Dewey, 1941). Categories separate out aspects of the world, of how people 'make sense by framing' particular aspects of the world (Orlikowski and Gash, 1994) and they may influence attempts to corroborate claims to knowledge. Bowker and Star's (1999) work on classification highlights that it is a spatial, temporal, or spatio-temporal segmentation of the world (Bowker and Star, 1999), a "classification system is a set of boxes (metaphorical or literal) into which things can be put, to then do some kind of work" (Bowker and Star, 1999). Classification is about the Form, an objective knowledge of the type that it must be of such a form that no other basic proposition can contradict it (Kaufmann, 1944) conforming to the second maxim, that the categories are mutually exclusive (Bowker and Star, 1999) and as such, every classification system imposes boundaries between it’s categories.

In Requirements there has been a number of different classification approaches, models and analysis techniques, so that Requirements can be classified on a number of dimensions, however, a typical well cited taxonomy is Klaus Pohl‘s (1993) classification of Requirements into three dimensions of Requirements Engineering, which are the main goals to be reached during the Requirements engineering process in order to develop a framework for Requirements.

This framework consists of the three dimensions:

- the specification dimension
- the representation dimension
- the agreement dimension (Pohl, 1993)

Standards

Standards are closely related, but not identical to classifications (Bowker and Star, 1999). A "standard" is any set of agreed-upon rules for the production of (textual or material) objects (Bowker and Star, 1999), composed and constructed by the terms of the ends they serve. Things like the practice of record keeping, methods of rational control; as such they are composed of the elements of institutionalized practices (Garfinkel, 1967), collectively making a scheme of interpretation, complementary to the traditional idea that methodologies are rules systems to be applied (Hirschheim, Iivari et al., 1997).

The ambiguity that occurs in standards is not contained within its idealization, but when it becomes an automatic justification principle for its use. The advantage of the use of standards dates back to the Industrial Revolution and the concept of mass production, which was made possible largely because of the use of standard, interchangeable parts. However, holding, gaining or controlling a standard also imbues dominance, both politically and commercially. History is littered with brilliant solutions to problems that have failed to persist because of non-compliance to a standard. The inherent danger is that the standard becomes the justification for something in which there could be ambiguity; in Requirements, specifications and standards are tools that can provide solutions to technical problems (Lowell, 1999), providing established uniform methods, tools and approaches.

This original perspective somehow became transmogrified into the dominant, all prevailing industry standards of a Requirements domain, with the principle headline of 'System engineering as the application of scientific and engineering principles that purports;

1. To form the orderly transformation of a problem into a working software solution
2. To optimize the total system definition and design and
3. Subsequent maintenance of that software through to the end of its useful life'

(Boehm, 1976; Davis, 1988; Thayer and Royce, 1990; Thayer, 2000).

These are the principles that underpin the foundations in two closely related and appropriate definitions provided by two military standards in the USA, MIL-STD-499A, and MIL-STD-499B (Sage and Rouse, 1999). Regarding the IEEE standards upon Requirements, specifically relevant are the IEEE 1362, 1233 and 830 (IEEE-SA Standards Board, 1993; IEEE-SA Standards Board, 1993; IEEE-SA Standards Board, 1998). Also, the clarion calls of today by the British Computer Society (2004) demand to redress the 'repeated lamented lack of professionalism in the IT supply industry'; "It is time for the IT industry to recognise collectively the engineering content of their work and to embrace the discipline and professionalism associated with traditional branches of engineering" (The British Computer Society, 2004).

Definitions

The software engineering process works primarily through its 'Requirements definitions' which are abundant in Requirements. The advantage of a definition is that it clarifies ambiguous statements. The disadvantage is that many things in the world are difficult to define. Even if or when an agreed standard of a definition could be reached, then events taking place in the world often contrive to challenge what is and what is not included, also the nature of the meaning of words change and mutate over time.

The difficulty is when: “Ambiguous terms should not, of course, be used in a science. However, if the ambiguity is removed by explicit reference to the presupposed system of axiological rules, there is no longer any reason to bar the use of value terms” (Kaufmann, 1944). This difficulty is problematic, opening up ‘gaps’ when used in the life-world.

The next stage of the framework of this chapter involves the expansion of the rules of codification, as suggested by the first maxim, which is that when employing a theory, only the terms that are defined in the theory should be used; this is the initial step for the Requirements theory, and is the subject of the rest of this chapter beginning with a review of the meaning of the definition used in the classification of the regulations of Requirements. When looking in the literature for a meaning of what a Requirement is, the starting point found in the domain of IT is from the position of it’s definitions and categories. This is the basis upon which the standards and classification principles of Requirements is built, in terms of guidelines for practice, in the production of methods and procedures, terms of assessment, and the constructs that set the boundaries of research in the domain of Requirements.

The above work has now established an understanding of how to construct an ideal type of Requirements that would act as a theory of Requirements from which it would be possible to test and examine its usage. Summarizing, the construction needs to be based upon scientific practice, having universals, definitions, laws, and fundamental principles of ‘law of nature’, which would explain or predict an event, as the 'success' of a theory is validated in the fulfilment of its predictions. Such a theory has a classification dimension, assisting in a classification of systems in drawing appropriate boundaries around the phenomenon to create the form. And lastly, a standards dimension, a set of agreed-upon rules for the production of the IT system object, assisting in development of an artefact based on the use of specific formalized methodologies, delivering constructs that thematize systems development (Avison and Fitzgerald, 2003).

2.6 Introduction to a working theory of Requirements; the three laws

There are numerous ways in which a classification or a definition of Requirements theory could be constructed, the aim however is to make it general enough to encompass most if not all of the many approaches, methods and procedures of Requirements elicitation, whilst at the same time being specific enough to encapsulate the necessary laws which would prescribe the operations. What is needed is the specification principles, the rules of the game, a construction of commandments, in a law like proclamation that would guide the operational actions of the Requirement-ist involved in doing the Requirements phenomenon. This itself would be a formulaic construction, by fiat, or a proposed arrangement with authoritatively sanctioned use of the terms.

The theory is not interested in which method is better, or that there is a specific procedure; the building of a theory of Requirements is the looking for the inference-making machine (Sacks, 1992 Vol 1, Part 1, lecture 14); the production of a theory which agrees with experience and also the explanation of the concepts of the nature of Requirements as found in the literature, or at least suggested by inference in their usage; the rules that form the constitution and form the legislation patterns as seen in the methods and applications, and in doing so thus implying idealization.

The goal of the theory of Requirements is generative and analytic; generative in the sense of the building of a theoretical framework of Requirements, based on the classification and generally accepted concepts found in the domain of software engineering and in the domain of IS-IT studies; analytic in the sense of exhibiting the axiomatic statements which are the essential constituent elements, and are at present the commonly tacitly accepted foundations upon which many assumptions are made. Analytic propositions are simple claims; such as; “triangles have three sides”. The truth can be determined by reference to the meanings of the claims themselves, no reliance on experience is necessary, and hence the meanings are a priori.

A theory relies on a systematic approach, and Requirements analysis is the study of a problem, prior to taking some action (DeMarco, 1978); the activity, the action of doing Requirements is the formulation of a plan towards the building and implementation of a system. Although there are many diverse sets of activities undertaken through Requirements analysis and many different methods and approaches claiming to operationalize Requirements analysis, there are, regardless of these differences, some characteristics of Requirements that share commonalities. The interest, in this last part of the chapter is, essentially, to build upon the Requirements analysis with a pragmatic solution; with “the practical application of scientific knowledge in the design and construction of computer programs and the associated documentation required to develop, operate, and maintain them" (Boehm, 1976).

The proposed theory of Requirements has three essential laws;

a1. we can solve the problem with a product
a2. we can get the Requirements right
a3. we can get the stakeholders to agree

2.6.1 'We can solve the problem with a product'

The basic principle of this law is to substitute a product for the model, or to make explicit the optimum solution, after recognising and selecting a solution. The model itself can be thought about as a theory about how something works. As such, a Requirement is the understanding of the dynamic inter-exchange between the facts or data, and the model. This models traditional research practice, and which comes first is a matter of preference, the model followed by the research, or of research and then the model. The process echoes research practice, in that it starts with defining the variables.

"The projected system will reside in an environment whose structure and behaviour must be understood. To this end a model, or more accurately models, of the environment must be constructed. These models must be in a form that the interactions of the system with the environment can be defined" (Finkelstein, 1994).

The first analysis step is to establish the problem to solve (Patterson, 1999); a Requirement is a capability that the system must deliver (Yeh, 1990). The outcome, the Requirements-specification document, is a 'complete description' statement of the products (Pressman, 2000), a machine's external behaviour (Jackson, 1995; Macaulay, 1996). The principle is the leverage of the 'problem to solve', which is gained by an understanding of 'optimal solutions to the information system problem, and the end solution is a product or artefact'. At the formal end of the continuum, the approach and process was originally typified and idealized by Churchman, Ackoff et al, (1957) where the major phases of an O.R. project are:-

1. Formulating the problem, and establishing the research problem, which is to determine which course of action is the most effective, relative to the set of pertinent objectives

2. Constructing a mathematical model to represent the system under study, and establishing the variables of the system that are subject to control
3. Deriving a solution from the model, through either analytic procedures or numerical procedures
4. Testing the model and the solution derived from it
5. Establishing controls over the solution
6. Putting the solution to work, the implementation

(Churchman, Ackoff et al., 1957)

The essential characteristics of the approach is to find an 'optimum decision', policy or design for the organization. Churchman Ackoff et al, (1957) express the characteristics of the method as the 'application of scientific methods, techniques, and tools to problems involving the operations of systems, to provide those in control of the operations with optimum solutions to the problems'.

Of note is the second step, 'Constructing a mathematical model', which is in response to the issue of correctly identifying the problem. It is about selecting the correct model from a library of solutions. As such, recognising the rules is a matter of recognising the 'know-how', which is the same thing as knowing the rules to a game of chess. Social systems exist as a set of interaction rules, which are bound by normative behaviour. Problem solving is driven simply by matching the rules to the goals, and by generating sub-goals, this is built upon the idea of decomposing the systems into modules (Parnas, 1972), with simple rules that can be executed by programming. The modern characterization, found in the elicitation of business rules and equating to functions, appreciated into the functional Requirements of a system. The logic of a social situation, set to rules and conventions, with typology of signs as signifiers, reliance on an agreed set of rules governing their use, and rules at the meta level defining the language that is used for formalisation (Goguen, 1994). Essentially, this is a closed system with set designs for user interaction.

The diagram below typifies the approach, with the modern interpretation of using the UML diagramming tools that are often associated with the tools of the professional Requirements engineer. Reinforcing the characteristics of software Requirements generation phase requires highly skilled analysts and applications specialists (Thayer and Royce, 1990).

Three main activities should be pursued during the Requirements phase;

1. Problem identification, identifying and describing the needs of a system for particular purposes;
2. Problem understanding, with collecting and analyzing information about the system, it's environment, and it's interaction with it;
3. Problem specification, describing the behaviour of the system

(Yeh and Zave, 1980)

The starting position is that an analyst must first have a good understanding of the problem (Yeh and Zave, 1980) although the analyst operates and is expected to produce a solution within the given 'terms of reference', relating to the boundaries of the system and constraints, particularly those associated with resources (Avison and Fitzgerald, 1995). The contract of the systems analyst is to 'design' by making a model of the Requirements, elicited from the users. User Requirements elicitation is considered a difficult but largely non-controversial exercise, as the analyst controls the selection and uses the information of the stakeholders as a resource, from which to collect the information needed towards making a model: the users are there to be asked what information they need in their jobs, and they can provide the input of the system Requirements.

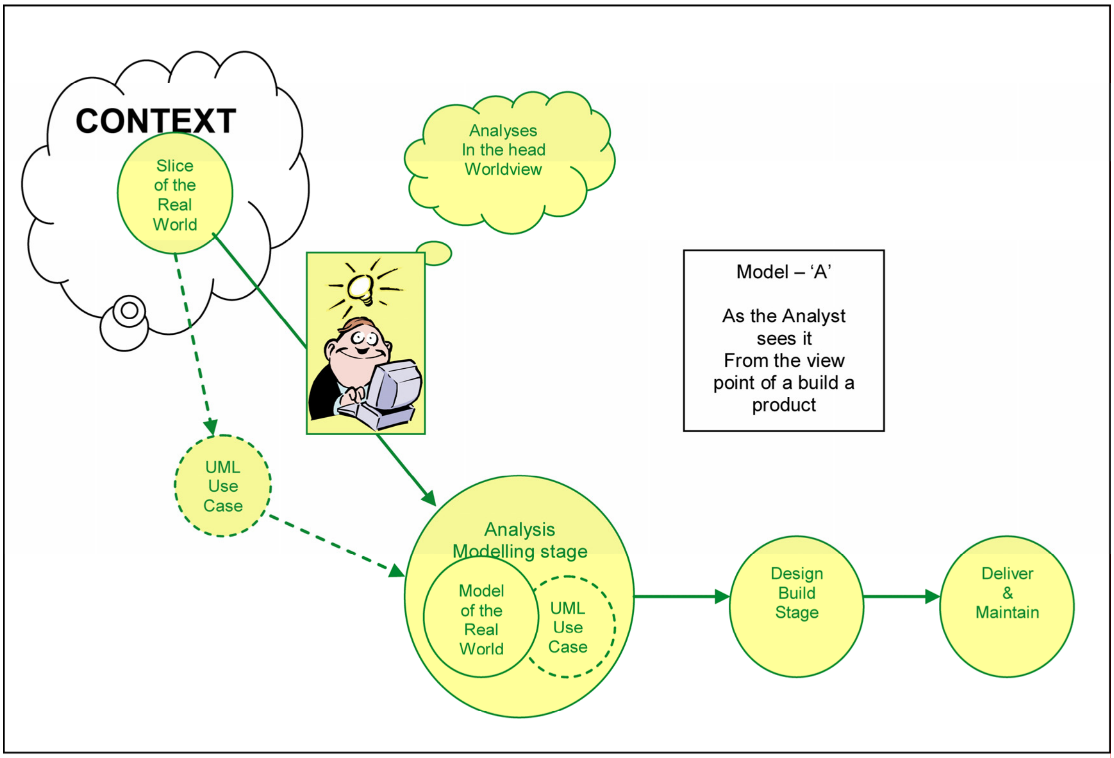

Figure 2.2: Traditional development the 'A' model

The Requirements problem to be solved is formed from the viewpoint of the designer of the system; as a professional, also from the organisation perspective.

The characteristics of a1) ‘we can solve the problem with a product’

The IEEE Standard 1233 1998 edition guide for developing system Requirements specifications provides the exemplar rule that has been set to help the analyst capture Requirements at the beginning of the system Requirements phase. The specification control process includes the identification, organization, presentation, and modification of the Requirements, with the aim and purpose to provide a "black-box" description of what the system should deliver. The organization of the process is to take the unstructured users' statements, and with them form a structured set of Requirements. The outcome of this process produces a document that provides an agreement between the customer and the technical community, with a ‘structured collection of information that embodies the Requirements of the system’, in a form that gives measurable qualitative or quantitative attributes, with characteristics that can be stipulated.

The definition of need is the operational concept of the process, and the system analysis task is to produce the ‘product description’ of what the system's customers expect it to do for them in the system's expected environment, with the system's usage profile, its performance parameters, and its expected quality and effectiveness, (what the system must do), with all to be contained in contract documents such as a ‘Statement of Work’. Requirements are understood in terms of capabilities and attributes (conditions and constraints). In this model the concept of constraints is interpreted as those Requirements that are imposed on the solution by circumstance, force, or compulsion, leading to a design configuration of a Requirement that is built into the specification.

The definition of the control process of a Requirement as conceived in this standard borrowed in this standard from (IEEE Std 610.12-1990) is:-

(A) A condition or capability needed by a user to solve a problem or achieve an objective.

(B) A condition or capability that must be met, or be possessed, by a system or a system component to satisfy a contract, standard, specification, or any other formally imposed document.

(C) A documented representation of a condition or capability as in definition (A) or (B).

Although the properties of this process control give a clear definition of the necessary elements (see table 2.1 below) in the notion of a product, there are hidden difficulties. Two examples serve as demonstrations: in the table below 2.1, the standard has the property of 'd) Complete', however, it also acknowledges that "Requirements are rarely static. Although it is desirable to freeze a set of Requirements permanently, it is rarely possible", yet at the same time the standard gives no indication of exactly what completeness entails with regard to emerging Requirements, nor the exact fit of completeness with regard to the boundaries of the organisation. Secondly, the standard notes that "political influence is seen as environment where the system will be manufactured and/or used to ensure that the system conforms to all of the governmental laws and regulations", yet, this complex and thorny issue is not considered as an important property.

Setting up the elements of the rules of Requirements based upon the properties of the IEEE standard 1233, 1998 edition (IEEE-SA Standards Board, 1998) .

a) Unique set	Each Requirement should be stated only once
b) Normalized	Requirements should not overlap (i.e., they shall not refer to other Requirements or the capabilities of other Requirements)
c) Linked set	Explicit relationships should be defined among individual Requirements to show how the Requirements are related to form a complete system
d) Complete	A system Requirement should include all the Requirements identified by the customer, as well as those needed for the definition of the system
e) Consistent	System Requirement content should be consistent and non-contradictory in the level of detail, style of Requirement statements, and in the presentation of material
f) Bounded	The boundaries, scope, and context for the set of Requirements should be identified
g) Modifiable	The system Requirement should be modifiable. Clarity and non-overlapping Requirements contribute to this.
h) Configurable	Versions should be maintained across time and across instances of the system Requirement
i) Granular	This should be the level of abstraction for the system being defined

Table 2.1: The Properties of the IEEE Standard 1233

In conclusion, 'we can solve the problem with a product' is saying that it is possible to satisfy a need with a definite solution (product object). The claim made is that IT has a process by which we might discover that need; essentially it is a process to make a statement.

The underlying model; [Requirements-Problem-Solution] conforms to a pattern (Requirements + Build = Product) as a core belief.

The product artefact is found in the 'formal specifications', as a logical, coherent plan of the physical attributes and qualities of a product. Getting the right product depends on setting off on the right course, with the aim of finding an elegant solution; the first step begins with the assumption, and proceeds with the process and methods that exist (which are well defined; we are building products) progressing with the development as the means of production, using functional integration and structuring towards building the product. The outcome, the Requirements-specification document, is assumed to be a complete description of the product's external behaviour (Davis, 1990), a Requirements artefact. If the analyst does the task perfectly i.e. correctly, the agreement to develop a product = ensuing success.

2.6.2 'We can get the Requirements right'

The aim of this law is to apply the disciplined, systematic approach of industrial engineering design to software, and the primary role of the analyst is that of the expert in information process design technology, tools and methods of system design, and project management (Hirschheim, Klein et al., 1995). To assist in this task there are numerous software engineering methods, tools and approaches that are underpinned by sound engineering principles.

The Requirements engineering approach starts with the process of separating two basic steps, the analysis step, followed by a coding step (Royce, 1970). The product of the analysis stage is a Requirements artefact, usually a document, which describes these needs, of firstly, what problem needs to be solved (Nuseibeh and Easterbrook, 2000), and secondly, supplies the input to the second coding step, which is the software development process that produces the software product.

The process of the Requirements fragmentation, the separation of analysis from the design implementation (Dijkstra, 1972; Parnas, 1972; Knuth, 1974) provides an fundamental prerequisite fracture, facilitating a necessary transcendence or transformation of the functions uncovered in the analysis of the problem into the meta-physical domain. "Most Requirements engineering research and practice embodies a philosophy that I call abstractionism, which involves the building of simplified models of domains of discourse and proposed systems" (Potts, 1997). The consequence of such a move means that the reality of everyday life is apprehended by symbolization, or by the translation of everyday discourse into pictograms of logical symbols. This is basically because computers have no common sense; they just follow orders, and as such, natural language is not sufficiently precise for stating Requirements (Canning, 1977).

The Requirements analyst is concerned with 'typical' schemes of actions, using simplified, abstracted and generalised versions of social actors as models. The process of symbolisation is to make, construct or represent a generic activity which characterizes the very nature of an object, or to create a realization of an abstract idea. For science, symbols are an ap-presentational reference of a higher order; models are constructed according to the postulates of logical consistency that can be assessed in terms of adequacy by validation. Validation is the process of ensuring that what is intended to be built corresponds to what is actually required; it is concerned with the completeness, consistency, and correctness of the Requirements (Thayer and Royce, 1990).

The Requirements product is derived from, or arrived at, by employing self-evident reliable methods of inference. The assumption has a basis that the world is well ordered and patterned. The method emphasis is upon unearthing and describing this "fixed pattern" and on how it is maintained over time. The functions explain the nature of the product, and the model provides the means whereby the functional part is related to the whole.

The quality of a system's design is determined by how accurately Requirements are captured (Lee, 2001). Consequently, qualitative Requirements statements, consisting of general statements of natural language are not well suited for stating Requirements, as they may contain ambiguity and are generally unsatisfactory; what are needed are specific testable statements containing specific statements of what performance is expected of the new system (Canning, 1977), consequently vague mission statements are replaced, in order to avoid errors. The quality referred to is the quality of the system, and not the quality of the system in the context of use anywhere else other than in the context of use specified. The essential Requirements, found in the Requirements specifications are; functions, performance, design constraints, and quality attributes of the software and its external interfaces (Thayer and Dorfman, 1990).

To fulfil the quality, every Requirement should be stated in measurable terms, and a test should be written to validate that Requirement (Canning, 1977; Yeh and Zave, 1980; Yeh, 1990). However, the IEEE standard specification 830 states that; "There is no tool or procedure that ensures correctness". Hence, the validity assurance is subsumed by the responsibility that is assumed to be contained within the use of the method. In this area the method of use has the same affinity with the validity of methods used for the research purposes of constructing and using theoretical concepts in the academic domain of understanding. Consequently the Requirements propositions have direct connections with "universal validity", Requirements engineering research, and practice embodies abstractionism (Potts, 1997), granting them these generalizations because the assurance of validity is through the use of the developed methods, tools or procedures, and are borrowed from the same methods as are used academically in theoretical concept construction. The IEEE Guide to Software Requirements Specifications, ANSI/IEEE Std 830 also states; "If a method cannot be devised to determine whether or not the software meets a particular Requirement, then that Requirement should be removed or revised (IEEE, 1984). The emphasis is upon method and methodology and it's legitimacy in use, specifically it's acceptability, and false methods should be rejected, for instance; Goguen and Linde (1993) claim that 'introspection is an inadmissible method' (Goguen and Linde, 1993) this is because it is based upon sense-perceptions, and although it has occupied a central position in traditional psychology, it is rejected as unscientific, on the ground that it's results cannot be tested (Kaufmann, 1944), the next chapter explores this point further.

The academic IS-IT domain has laid claim to a scientific legitimacy, from which to justify further action (Angell and Straub, 1993), and with this claim, the scientific basis for Requirements elicitation and the variety of methods, approaches and tools, have largely been developed by academics (Chatzoglou and Macaulay, 1996; Mumford, 1997; Avison and Fitzgerald, 2003). With the importance of acquiring legitimacy, noted by Angell and Straub (1993) "the authorities of technical, social, and organizational expertise have hammered out between themselves a set of methods that serve their particular purposes", the reasons, as discussed above are to make Requirements a legitimate engineering discipline and a recognized profession. The aim of a method is seen as providing a developer with complete control of the IS and it's impact on organizational performance (Lyytinen and Hirschheim, 1987).

There are myriads of different methods discussed in the IS literature, which can be categorized and grouped by generations, theoretical and philosophical principles (Boehm, 1976; Lyytinen, 1987; Hirschheim and Klein, 1992; Hirschheim, Klein et al., 1995; Iivari and Hirschheim, 1996; Livari, Hirschheim et al., 1998; Avison and Fitzgerald, 2003; Avison and Fitzgerald, 2003). However, for the purpose here of developing a theory, most if not all could be characterised as variants, lying somewhere along the continuum, originating in lineage from one of the two main traditional model approaches as previously discussed; the Winston Royce's waterfall (Royce, 1970) and the process model of the iterative spiral (Boehm, 1987; Boehm, Egyed et al., 1998).

The characteristics of a2) we can get the Requirements right

The IEEE Std 830-1998 (Revision of IEEE Std 830-1993) is the IEEE recommended practice for software Requirements specifications, aiming at specifying Requirements of software that need to be developed, and this specification control process describes the recommended approaches for the specification of software Requirements.

This control of the process specification interest, advocates a scientific approach, although it does not proscribe any one particular method. This standard consists of guidance to the rules of procedure which the method should achieve, and a number if not all, of the methods, tools and approaches that would claim to satisfy this specification remit, also could additionally act as the technical validity of the methods.

The goal, or objective, is to produce a 'Requirements Specification', which limits the range of valid designs, but does not specify any particular design. The table (2.2) below is of the characteristics of the law of the process that will result in the correct software Requirements specification, the law of 'we can get the Requirements right', with the process controls of the methods ensuring success.

a) Correct	Correct if, and only correct, if, every Requirement stated therein is one that the software shall meet
b) Unambiguous	Every Requirement stated therein can have only one interpretation
c) Complete	Functionality, performance, design constraints, attributes, or external interfaces.
d) Consistent	No subset of individual Requirements described in it should conflict with any another
e) Ranked for importance and/or	Ranked for importance and/or stability. Each Requirement in it must have an identifier to indicate either the importance or the

stability	stability of that particular Requirement
f) Verifiable	There already exists a finite cost-effective process with which a person or machine can check that the software product meets the Requirement
g) Modifiable	Structure and style are such that any changes to the Requirements can be made easily, completely, and consistently while retaining the structure and style
h) Traceable	Each Requirement must be clear and facilitate the referencing of each Requirement in future developments or enhancement documentations.

Table 2.2: The Properties of the IEEE Standard 830-1988

(IEEE-SA Standards Board, 1993)

In conclusion; Shayo, Olfman, et al. (1999) reiterate; “in systems development, it is essential to 'get the Requirements right' before instigating system design, the selection of system development tool, and the actual development, because system failure or high maintenance costs have been directly attributed to poor Requirements definition” (Shayo, Olfman et al., 1999). For Canning (1977) the three main essentials for getting ‘the Requirements right’ is to; recognize the types of errors, get user involvement, and to select an approach for handling complexity. "Getting the Requirements right" is an area that deserves priority attention by data processing management (Canning, 1977). In the so-called modern methods, such as agile, the ‘client’ is kept from the responsibility of ‘getting the Requirements right’ as the rapid development of a prototype answers a single question about Requirements content (Tomayko, 2002), thus extenuating further the resource reliance upon the development method.

2.6.3 ‘We can get the stakeholders to agree’

The relationship between users and the system is central to the success of systems development projects (Beath and Orlikowski, 1994). This reflects the presently held position that one of the most important Requirements for IT systems is that the intended system should fit the task (Lee, 2001) Clearly the need is for technologists and business design to recognise the need to take “the human system” into account in redesigning businesses (Sachs, 1995). That is, the system should be suitable for the job it is supposed to do. Thus incorporating, by projecting or extending the Requirements concept out from the two previous characteristics of; firstly, the black box product concept, and secondly, by employing self-evident reliable methods to control the process, outwards, towards the idea of obtaining an understanding of the ‘use’ of computer systems or address the ‘real’ Requirements of the user (Saiedian and Dale, 2000). However, the opening up of this dimension also brings a different set of particular difficulties that now also have to be taken into account during the elicitation process. The justification for the extension outwards stems from the learning of the lessons of the 1960's; which is that; no system is going to succeed without the active and willing participation of its users (DeMarco, 1978).

The first aspect contributing to the characteristic law falls under the umbrella of research studies, commonly known as ‘usability studies’ and Human-Computer Interaction (HCI) which studies the interface and the research areas related to human, computer interaction. For Myers (1998) research in HCI has been spectacularly successful and has fundamentally changed computing. He claims that the basis for the achievement has been the academic input role of university research and corporate research labs, even though the subject of HCI did not really enter onto the agenda until the early 1980s (Benyon and Imaz, 1999) The study of the user input originates from the 1950’s Bell laboratories when they began to look at the push buttons on telephone sets, the spatial arrangements, the physical actions, and the ease and reliability of use of the buttons which became natural subjects for study by human-factors engineers (Petroski, 2000). The name of human-factors engineering was a direct descendant from the scientific-management movement of Frederick Winslow Taylor. An equal UK branch of classical experimental psychology research, which emerged during World War II, became known as ergonomics, and in 1995, the Human Factors and Ergonomics Society established a technical group called 'cognitive engineering and decision making' as an outlet for research and development (Lipshitz, Klein et al., 2001). But for some, “despite the extensive efforts of HCI and information systems researchers, establishing user needs, and mapping these onto technical specifications and providing sufficient flexibility to address changes in user needs have proved difficult areas in which to make progress” (Hemingway, 1999). Reflecting the academic input into the tradition in HCI studies is still one of research and evolutionary design in product development concerned with the cognitive mechanisms and with individualistic models of information processing (Clegg, 1994).

The second aspect covers it’s parallel associated sister science of HCI, the applied theoretical aspects to the organizational setting, which is “concerned with designing computer systems to match the needs of people” (Preece, Rogers et al., 1994) with the perspective of looking out onto the human or social environment. Douglas Ross as guest editor IEEE Transactions on Software Engineering in one of the first review articles on Requirements problems noted that; “Even the most mundane use of a computer is part of a system, and even the simplest such system does involve man, somehow" (Ross, 1977). For Ross, in every case, some form of system technology is used to build a tangible, real system intended to satisfy user needs. Ross's basic thesis position is; IT is an interactive information system, providing it's users with 'conversational access to data'. For Ross, the system is supposed to act as a mirror; nothing comes out of a system that 'we ourselves do not put in', although the system has technological imperfections that prevents the resulting systems from effortlessly extending our social environment, like a perfect mirror (Ross, 1977).

The notion of an information system being a mirror, with the processes of the person being mirrored in the computer (artificial intelligence) and the processes of the computer mirrored in the person (cognitive science) (Clegg, 1994) conceptualises the two dimensional plane of the IS domain, capturing the qualities and characteristics of the polished reflective surface of an inter-exchange system. Instead of being a window upon the world, the IS domain organises viewpoints of the visible world into a mirror reflecting its own captured qualities and characteristics in the polished reflective surface. The mirror doesn't answer back, it is reflecting only a concrete viewpoint. This contains two conflicting perceptions; one concrete, the other abstract. The mirror analogy is that of asymmetrically dialectic elements reflecting objects that are part of a concrete reality, while masking the system of process that translates them into depictions that are supposed to realistically mirror that reality. The representation supposedly appears to reflect the world in front of it, but it is actually, reflecting a world of the mirror that exists in a different reality or dimension, having a conceptual rather than a concrete existence. At first glance, the relationship of each part to the whole seems coherent; and this appears to place the Requirements process as the marriage of dialectically opposing elements, and giving birth to incredibly complex processes that attempt to reconcile the two disparate factions. But, this is not so, in effect it is a reflection of itself, because the Requirements domain claims that it is a mirror, and not a window, in that it reflects an information system of processes. Hence, the cross-fertilization between cognitive science and the physical theories that abound in information processing and systems representations.

This analysis leads to the basic concept that the Requirements concern is with the modelling of the information process within the problem domain (Crabtree, 2003). To some, the field of HCI represents a multidisciplinary, applied domain within which researchers and practitioners apply theoretical fruits from cognitive psychology and cognitive science (Clegg, 1994).

The IEEE std 1362-1998 standard, the guide for information technology-system definition, adopts ‘a user-oriented document that describes system characteristics for a proposed system from the users' viewpoint’ (IEEE-SA Standards Board, 1993). The aim is the production of a ‘contents of a concept of operations’ (ConOps) document which would communicate overall quantitative and qualitative system characteristics to the user, buyer, developer, and other organizational elements. “A means of describing a user's operational needs without becoming bogged down in detailed technical issues that shall be addressed during the systems analysis activity” (IEEE-SA Standards Board, 1993). As such this standard suits the characteristics of a3) we can get the stakeholders to agree.

a)Scope	Identification - Document overview - System overview
b) Current system or situation	Background, objectives, and scope - Operational policies and constraints - Description of the current system or situation - Modes of operation for the current system or situation - User classes and other involved personnel - Support environment
c) Justification for and nature of changes	Justification of changes – Description of desired changes - Priorities among changes - Changes considered but not included
d) Concepts for the proposed system	Background, objectives, and scope - Operational policies and constraints - Description of the proposed system - Modes of operation - User classes and other involved personnel - Support environment
e) Operational scenarios	
f) Summary of impacts	Operational impacts - Organizational impacts - Impacts during development
g) Analysis of the proposed system	Summary of improvements - Disadvantages and limitations - Alternatives and trade-offs considered

Table 2.3: The Properties of the IEEE Standard 1362-1998

IEEE-SA Standards Board - 1993 - IEEE std 1362-1998 - guide for information technology-system definition—concept of operations (ConOps)

2.6.4 Conclusion: Characteristics of the three dimensions of the theory of Requirements

The preceding three sections provided a structural analysis of a working theory of Requirements. The stocks of knowledge at hand, textbooks, academic journals and standards, constructed typifications of the characteristic structure of the operationalization of Requirements, together gather the three interconnected features of the genetic organisation into three laws; a1) we can solve the problem with a product a2) we can get the Requirements right a3) we can get the stakeholders to agree. The relevancies of the thematic material display a core concept represented by the previous Figure 2.2. The 'A' Model, which is logically consistent with the first two rules, provides the justification for product building with a methodical control to correct any deficiencies; however, the primary model suffers from a defect, which is that of not taking into account the problems of the stakeholders, largely due to historical reasons, as the process belongs more to the era of the analyst drawing up the specification for the analysis programmer.

> *With the IS-IT increasing its infiltration into the organisational structures and administrative processes it means that the design determination necessarily has to be extended out into additional steps so that it can accommodate the stakeholder agreement dimension.*

The outward growth illustrated in Figure 2.3, the 'B' Model depicts the additional areas of concern, as the analyst seeks validity from the environment, or from the business but not from the internal product specification itself. Requirements from the model B is the Requirements of the real world, a list of the desired presents from wish lists and sundry scattered and tangled business needs that require sorting into business rules, since they sit at the heart of business and any human activity system or information system associated with that business; Business rules = States + Events + Conditions (McDermid, 1997).

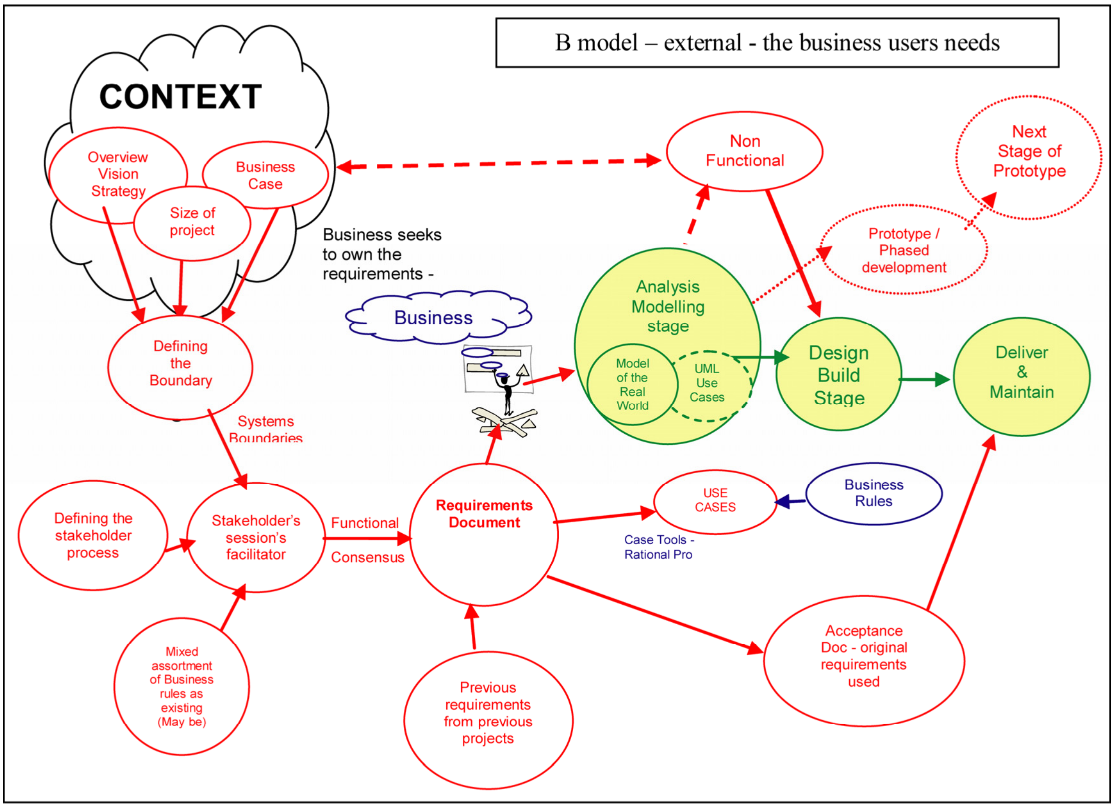

Figure 2.3: Extending the 'A' model – the 'B' model

2.7 Discussion: Where do the value judgments start

This chapter established that the Requirements domain thinking is framed by standards, categories, classifications and definitions which shape the tools and concepts that the analyst uses being informed by the educational courses and text books structurating the stocks of knowledge at hand for Requirements analysts, thus 'ensuring' that the processes used are valid. The organisation of Requirements into a discipline defines 'roles' and creates institutionalized actors. Practitioners do not necessarily have the opportunity of choosing between different courses of action, as they are almost bound to reach the interpretations that they do, when the reference material available is part of the baggage of experience (Schutz, 1967). Consequently, a Requirements analyst carries around the theory of Requirements as a belief. By using standards, categories, classifications and definitions of the 'job' in the work of the analyst, a measure is evoked, with which the course-of-action and an assessment can be made. The assumption must be that they are acting with the belief in Requirements in mind; otherwise, they are operating with a false belief, which would be the action of a lie.

Wrapped around the practitioners' perspective is the systematic knowledge base of the Requirements profession, grounded in science, forming what Berger and Luckmann (1966 pg, 158) hypothesised as 'secondary socialization', which is the social distribution of special knowledge that has arisen as a result of division, and has been bounded within the institutional arena of the academic domain. For Schutz these second level constructs inform the behaviour of the scientists as they observe and try to explain the phenomenon in accordance with the procedural rules of the science (Schutz, 1962); in doing so, and as a part of the operationalization of science, the task is to form the theoretical constructs, or a thesis, to be used to guide the conduct of research that is bounded in the domain. This interdependence, aptly captured by the quote; "theory without practice is sterile; practice without theory is blind" (sometimes attributed to Karl Marx), has some interesting implications and tendencies which will form the basis of the questions for investigation in the next chapter. However, this chapter's aim was to produce an introductory theory of Requirements with a working proposition of adequacy, a typified laws construct, with a logical consistency and compatible with a scientific model of the conceptual framework implied by the principles of the IS-IT domain. It was deduced that there are three constructs, or laws of the Requirements theory; 1. we can solve the problem with a product, 2. we can get the Requirements right, and 3. we can get the stakeholders to agree.

In this chapter it was explored that IS-IT practice is sometimes perceived as a 'trade off' between a quasi-profession, an industry and a sort of quasi-science (Probert, 2004), this quasi, suggestive of not really having the same integrity as pure science, and inferring that something else is added, or is missing, or that parts of the process are dropped in some manner during practice, or that somehow, in the practice of operationalization, the process appears to differentiate itself, or has become corrupted. This added 'ethical burden' (Fitzgerald, 1991), is however deeply problematic, as it only serves to open the gap and to raise a new and increasingly difficult question to answer; the Max Weber (1864-1920) question of 'Who governs?' Who controls the game? The danger here is when the domain discipline of Requirements just papers over the cracks by merely reiterating the mantra of more 'codes of practice'.

Dahl (1961) in his thesis on 'who governs' concludes that professionals cannot escape a high degree of uncertainty in calculations, and that they act with imperfect knowledge, the consequence of which is that the decision maker in practice 'imputes a structure and meaning' to the situation that goes beyond empirical evidence and scientific modes of analysis.

The opening up of the gap between theory and practice reveals a predicament that requires further examinations and explanation. From the academic perspective the question for the thesis has, by default, been the inclusion of the Requirements practice perspective; it must now therefore be also inclusive of the Weberian problem, of who controls the game, which further provokes the asking of what is meant when people say that Requirements practice 'goes beyond' scientific modes of analysis. The problem is that it questions the academic IS-IT domain claim to hold scientific legitimacy, from which the justification of Requirements action is supplied (section 2.2). Why? Because to be a legitimate science, a theory being an explanation based upon the understanding of cause and effect, has to be able to explain the phenomenon.

So what if there is a difficulty of a dynamic interplay between theory and practice. This chapter only established that there is a connection, and the nature of that connection; being the baggage of knowledge in the domain that frames the Requirements thinking, results in a belief that is expounded in the three laws that encompass the approaches and methods that purport to be the operationalization of Requirements. But, underpinning this, and the constructs used by the domain, to justify its position, is a philosophic foundation. Consequently, it is necessary to examine this connection to establish if the meta-physical constructs are accurately reflecting the way that the world is purported to be. Further, whether or not the methods of research are equally intertwined with assumptions that could and should be challenged.

Chapter 3

Examining the belief held on the Requirement theory

"But it is doubtless impossible to approach any human problem with a mind free from bias. The way in which questions are put, the points of view assumed, presuppose a relativity of Interest… Rather than attempt to conceal principles more or less definitely implied, it is better to state them openly, at the beginning. This will make it unnecessary to specify on every page in just what sense one uses such words as superior inferior, better, worse, progress, reaction, and the like" (de Beauvoir, 1949)

3.1 Introduction

The previous chapters have established that the process of Requirements is for the 'descriptions of the application domain and the problems to be solved there' (Jackson, 1995). Based on the premise advanced in section 2.6.4 of a model 'B'; that Requirements Engineering has 'expanded' to include more than just software construction (Loucopoulos and Karakostas, 1995) yet, Requirements, at root, maintains the model 'A' perspective of the world (figure 2.2). The demand for the expansion outwards has been well documented and reasoned, for example by Galliers (1994) as "moving systems out of the back room and into the 'sharp end' of the business, would create, in many cases, distinct competitive advantage to the enterprise" (Galliers and Bakers, 1994). Consequently, the demands placed upon Requirements are as an accepted process for defining the outcome of systems analysis (Dawson and Swatman, 1999).

But, contained within the Requirements expansion there is an assumption that needs to be substantiated; and this is to be addressed in this chapter. It is necessary to question the justification of the method that has objectively linked the concepts in the use of Requirements, and to query the claim of extending it out into the context of discovery. This has additional implications for the selection of an appropriate research approach for the investigation into the [phenomenon of Requirements], as the research approach cannot adopt the same set of methods that have the same justifications as those that are used in the phenomenon that is under investigation.

3.2 Positioning the problem from the consequences of the theoretical position

The previous chapter (sections 2.6) developed a theory of Requirements, encompassing the approaches that guide the operational actions of the Requirement-ist in elicitation. Three laws were presented; the Requirements theory; 1. we can solve the problem with a product, 2. we can get the Requirements right, and 3. we can get the stakeholders to agree. The developed theory emerged from the body of knowledge that has been accumulated under the banner of software engineering, that has been further underpinned and supported by establishments of academia and professional practice institutions (section 2.3.1).

The Requirements process is underpinned by two key design approaches; the waterfall approach and the iterative design method, and from these two many variations have been propagated in the forms of methods, tools and sub-approaches (section 2.3.2). However, the genealogy of these approaches emerged from reflective experience, with a mixture of tacit or explicit inferences linking them to a domain of engineering science. The union between the domain of engineering science and reflective experience has produced a perspective with well established methods for externalising the object, the Requirement, and this reflects a generic approach of scientific progress, by the following of scientific methods, in describing the phenomenon, formulating a hypothesis to explain, and producing a model to predict, demonstrate and gain insight into the system.

However, it is also common wisdom that the methods prescribed for Requirements have accompanying practicable problems with a history of project failure (sections 1.3) and value judgements (section 2.7), which are seemingly intractable, leaving the impression of a ‘gap’ (section 2.2) between the theory and the literature. Often, this is conceptually seen as the Requirements problem (section 2.3) that are resolvable though the discovery and application of rigorous principles. However, the problem of the Requirements operationalization is masking a deeper conceptual problem, which can be found in the philosophical perception of the viewpoint taken upon the world. It appears that our reflective process of producing models that mimic the real world relies upon the justification of a method that is not necessarily applicable for use in the life-world (See appendix 3a). This further highlights several weaknesses that can be found in the empirical literature which looks at the evidence that links the proposals of the models, methods and approaches of Requirements.

Researchers have criticized the lack of empirical research on systems development in real organizational contexts (Fitzgerald, 1997) in that there have been few empirical studies of IS development work (Button and Sharrock, 1994; Button and Sharrock, 1996), nor is there much evidence that information systems evaluation is practised (Avgerou, 2000). Only a few studies are undertaken to identify how the system development methods are selected or adapted or on how they are used (Wynekoop and Russo, 1997). The empirical data that is collected is mainly obtained through surveys of organizations and the empirical data examining failures is limited to anecdotal evidence (Beynon-Davies, 1999). There are no empirical studies showing a correlation between software project and the development process model used (Ewusi-Mensah, 2003), reiterating the point that Requirements empirical work is often driven by theoretical concerns (Easterbrook, Beck et al., 1993). Consequently, when Truex, Baskerville, et al. (2000) talk of method as being 'privileged text' among the academic and practical communities (Truex, Baskerville et al., 2000), it would seem that its privileged position is the lack of any theory that is adequate in relation to the empirical phenomena of Requirements Engineering (Jirotka and Goguen, 1994).

> *Such anecdotal evidence and lack of empirical research is on the actual use of ISD methodologies (Hirschheim et al., 1997), but this one sided elliptical viewpoint also means that the possibility of 'closing' the gap between theory and practice is more complicated than just automatically adopting or making a Requirements method from the theoretical constructs that rely upon the validity and justification of the correct scientific method.*

The intellectual idolatry in the privileged talk of method masks a discussion concerning the epistemological debates about the problems involved with accurately portraying the world. This is a subject reflected in the IS research debates (See appendix 3b) however, this has been largely divorced in the Requirements literature by insistence of the separation of the What-How distinction (1.5 and developed as an issue 4.2.1 and 4.2.2). The need is to unpick this confusion, wherein the terms of reference that imply a particular perspective are woven into abstract statements. At every step, the process must remain true and accountable to testing. So, assuming that the underlying social and technical theories can be tested in empirical investigations (Kling, 1980), the need is to firstly connect the theory with its underpinnings (Discussed in appendix 3c), the implications of which are then further discussed in the next section (3.3) and following this a discussion on the consequences of why the research approach into the Requirements phenomenon requires an alternative approach.

3.3 Attachment of the Requirements theory to its underpinning

Text books proffer many differing generic approaches, methods and techniques advocating the 'How-to-do' operationalization for Requirements in practice, as discussed in the previous chapter, in which it was also noted that the approaches were underpinned and labelled with a scientific base (Wood-Harper and Fitzgerald, 1982; Avison and Fitzgerald, 2003).

> *The attachment to Science adds authority and legitimacy and consequently the rationale of accepting the adoption of methods and techniques, because they adhere to, or are inferred from scientific principles. Appendix 3c discusses the laws of Requirements and adduces that a strong position has been forged, with links throughout the work of authors who tacitly state, implicitly or explicitly, that the underpinning of Requirements draws upon a relationship to the three main philosophical positions of Behaviourism, Cognitivism and Functionalism. However, as the logic of these philosophical foundations form a secondary subsidiary debate, the body of that discussion is to be found in appendix 3c.*

3.3.1 Finding the Requirements phenomenon theoretically

The generic principal of the Requirements laws, encompassing the range of methods and techniques, utilizes the dominant, underlying assumptions of the broader field of natural scientism (See appendix 3c). The presumption of Requirements is that a requirement is a specification problem, and that its operationalization is a rational specification process for use in the life-world, to gain an explicit statement of purpose; with the desired functional and performance characteristics, 'of some component independent of any actual realization' (Roman, 1985).

The analysis phase of Requirements moves a system design up to the conceptual level. The method by which Requirements does this is by ‘bounding’ the domain problem to be solved. The Requirements analyst draws a boundary around the interest, creating an artificial bubble of external relationships and in doing so, defines the system boundaries. The advantage of drawing of a boundary around the ‘context of discovery’ is that it “frames” the principal parts to give systematic and sharply focused help in reaching a solution (Jackson, 1995).

This infers that the method, tool or technique used by the analyst to represent the system should result in being able to say with certainty that this entity belongs to the system or to its environment and that that attribute describes the system or describes its environment (Davis, 1990). However, these system boundaries and objectives may well be impossible to define, as Checkland (1993) observed, accordingly methods such as the ‘soft-systems’ approaches were developed specifically for ‘ill-defined problems’, to act as a guide for use in ‘social systems’ and to develop a framework in which to place purposeful activity during a systems study, enabling stakeholders to reach an agreement.

Summarising, the mechanism, framework or fundamental metaphor employed that encapsulates the Requirements methods, techniques, approaches or tools etc, conforming to the laws of Requirements, creates a pattern that can be seen to recur throughout Requirements engineering. This is summarised in the table below 3.1 which links the theoretical concepts of what a theory should do (section 2.5.1), which are the first three components of an ‘ideal theory’ as previously discussed: (1) explicit, (2) universal, and (3) abstract; these are long held conventions dating back to Socrates.

Theoretical Domain	**(Explicit**	**(Abstract)**	**(Universal)**
	↕	↕	↕
Requirements Domain	**Defining**	**Representation**	**Usage**
Potts (2001)	**Reification Abstractions** as material substances and containers	**Spatialization** Abstractions as locations, trajectories and spatial relations	**Anthropomorphisms** to attribute a human form or personality to Mechanism as Mind
Pohl (1993)	**The specification dimension**	**The representation dimension**	**The agreement dimension**

	the degree of requirements understanding at a given time to transform the operational need into a complete system specification through an iterative process of definition and validation	the different representations categories of representations	the degree of agreement reached on a specification the evolution form the personal views to a common agreement on the final specification
Davis (1990)	**Definition of the "system"** the thing that we are analyzing or specifying	**Level of abstraction** the level of the external view of the system	**The what versus how dilemma** user needs definition establishes the overall mission to be automated – what the appropriate output will be - what the problem being solved is without defining how it will be solved
Yeh (1980)	**Problem specification** describe the behaviour of the system	**Problem understanding** information about the system and its environment, as well as their interaction	**Problem identification** identify and describe the needs of a system for certain purposes

Table 3. 1 The theoretical relationships of Requirements

However, difficulties appear, both in the presupposition that claims that the 'contexts of meaning' and the 'context of justification' are one and the same thing, and that Requirements, underpinned by the requirement-ing-science domain approach and the rationalist specification process, can be used in the 'context of discovery'. Although some theoretical underpinnings to this can be shown, the premise that the theoretical domain recasts itself reflectively back in the life-world cannot be assumed automatically and assuredly.

The particular interest here is in the warrant which implies justification of the use of Requirements, with the claim that it extends out into the context of discovery, also that the operationalization of Requirements accurately defines the characteristics of what it is that makes a Requirement.

At root is the issue of validity, rigour and legitimacy, as it centres upon questioning the warranted assertions of the Requirements domain that advocates and provides a concept framework that claims to accurately capture the 'What' of the life-world, and in doing so claims legitimacy to solve the original problem that the process was invoked to solve.

Unfortunately, a twin parallel issue is also invoked; which is that of the problem of selections of research approach and methods for the investigation of the Requirements phenomenon.

3.4 Finding the phenomenon in the life-world

The problem-solving approach for research also uses the common wisdom that the use of an appropriate strategy provides better and faster solutions than the use of no strategy (Nelson, 1974). This is a key concept, to both Requirements (Baets, 1992), and for IS research (ISR). The assumption is that the use of a strategy will promote a disciplined approach with a discipline of method; of making plans, with ensuring that the chosen plan is correct, and that this will lead to one and only one result, and will ensure that it is the justifiable one. Appendix 3b has a discussion on another subordinate argument, locating the difficulties encountered currently in Information Systems Research, a debate that resonates with the theoretic constructions of Requirements. The discussion here concerns the implications of that debate; that the ISR debate has unresolved schisms, making it a difficult issue of selection upon an appropriate research approach and method.

> *The point is that the ISR debate spills over and echoes in the Requirements debates upon Requirements methods; which is that the strategy cannot be automatically selected and employed with the expectation of producing justifiable valid results just because the method is said to be valid, and also that there is a deeper epistemological problem.*

3.4.1 Why research methods should not be automatically assumed

The particular interest of this shortened chapter is the interlinking between the implications of the philosophical debate and the positioning of the research approach towards the investigation, which is the subject matter of the next chapter. The subject matter of the link is a discussion upon the problematic Research methods and approaches that are used in the investigation of a phenomenon. This is highlighted here in a brief overview in order to discuss a problem that was alluded to above, which is that the connections joining the procedures of abstraction and formalization, with a special sort of idealization proceed with various assumptions about the 'valid' approach.

At base is a Philosophic debate, and Philosophy helps us to define, and often redefine, our primary, axiomatic, beliefs (Fenton, 1997). It is necessary to clearly state the beliefs upon which the research design was based, so that any validity claims can be assessed. Failure to do so has led to 'serious methodological and philosophical confusions' in many of the approaches to information systems research (Probert, 1997).

The argument can be seen clearly from the viewpoint within the research approaches to Requirements. For some time, a few authors have questioned the rational scientific approach to Requirements elicitation; there is a significant general IS observation reported on by Klein (1987), which is that it is widely believed that the powers of science and technology are limited in scope. Consequently, the problem that needs to be addressed is more than applying or just simply using the gloss of the academic theory to give some legitimacy to practices (Fenton, 1997). As section 2.4.1 highlighted, there are some authors that advocate abandoning the up-front specification demands. But, the exact philosophic beliefs upon which the 'so-called alternative' approaches are based are somewhat indistinct and incoherent (See appendix 3c). Generalizing, the arguments that challenge the dominant position have a commonality about them of questioning the hegemony of the scientific method, namely, the use of geometry. Ciborra (1998), for instance, questions subtle transformation carried out by scientific method, by which geometry first uses ideal shapes as approximations of the vague shapes that exist in nature, both for description and manipulation purposes (Ciborra, 1998).

In brief, the argument is that there is some difficulty in attaining rigour in a specialised region of a domain that is separated from the life-world, as it leads to renunciation of the existing social world (Farber, 1970; Feyerabend, 1978; Latour, 1987; Feenberg, 2000; Garfinkel, 2002). Latour (1987) particularly, is very demonstrative and graphically argues against the 'abstract' forms of mathematics and its application to the 'empirical world'. His claim is that 'abstract' mathematics never apply to the 'empirical world'. He points out: "A cloud of points obtained from the census through many transformations ends up, after a few more statistical rearrangements, as a line on a graph… the adequation of mathematics with the empirical world is a deep mystery" (Latour, 1987 pg, 244).

A conclusion can be drawn, and utilizing Schutzian terminology; 'scientific theorizing has its own 'in-order-to' and 'because-motives'; "it is planned, and planned within a hierarchy of plans established by the decision to pursue and carry on scientific activities" (Schutz, 1962 pg, 246). Science is 'always' discussed in terms of an objective 'context of meaning' (Schutz, 1967), and science can treat the life-world as it's laboratory, with everything in it subject to the rules of theory. However, the need is still to grasp the implications of researching the Requirements phenomenon, and its purpose, which is addressed in next subsection.

3.4.2 The problem for Requirements research upon Requirements

If, a Requirements analyst applies a method (correctly or incorrectly), in the course of their work of Requirement-ing, the judgment made upon its correctness is made with the supposition of a Requirements framework.

The assumption contains the attributes with which to adjust and 'fit' the actions of the analysis work and actions. The main concern of the Requirements analyst, is in the designing of a system dependent upon the boundary definition (Robertson and Robertson, 1999 pg. 71). For the researcher who is researching upon Requirements it offers an accountancy choice, to include and assign an action as a variable to a category within the remit of recognised domain of Requirements, or to exclude an action, and claim that certain activities fall 'outside' the necessary frame of reference.

The How-What distinction (Boehm, 1979; Yeh and Zave, 1980; Davis, 1990; Pohl, 1993; Potts, 2001) that still dominates Requirements thinking is a good example of such a dilemma (Davis, 1990), where the main concern is the separation of the specification form implementation advocated by (Wirth, 1971; Dijkstra, 1972; Parnas, 1972; Knuth, 1974; Kotonya and Sommerville, 1996). Identifying and agreeing a system's boundaries affects all subsequent elicitation efforts (Nuseibeh and Easterbrook, 2000) so does Research upon the Requirements phenomenon, which starts from the same frame of reference.

Research should judge the effectiveness of the procedure, but this also entertains the notion of the concept from a given domain, which is that analysis is being driven by pre-defined theoretical commitments, both in practice and in the researching of that practice. The questioning is of the symmetry of the Requirements, shaped by the general artificial model that controls the process, which is, the Requirements theory.

This begs the question, about the nature of the evidence, as it is presupposing the very thing that it claims to establish.

However, there is also plenty of empirical evidence that the Requirements model is not working from the perspective of the domain, and that there are factors that appear to be working against Requirements. From the perspective of the Requirements domain a researcher will regard these other actions as conflict, consequently the conclusions that the researchers draw often start with noting that Requirements are often badly, or incorrectly done. Therefore, new models are required that will ‘resolve’ this conflict, such as those based upon the concept advocating ‘better communication’. But, this only further begs the question as to whether or not any counter evidence would be accepted as evidence against the theory of Requirements. If not, then the theory is un-testable, consequently it should be rejected on methodological grounds.

3.5 Opening up the question of ambiguity

The warranted remit uses the natural scientific viewpoint of Requirements theories and theoretical propositions that lend themselves to the idea of building concepts, based upon a form of an abstracted ‘ideal-type’. Therein emerges the main complication, which was studied by Weber (1949) and hypothesised as the ‘rationalisation of the conduct of life’. The danger of not recognising this for what it is, has already been recognised by Lyytinen and Hirschheim (1989) as; “Computer based IS will mean one long step towards ‘the eclipse of reason’ a life-form which will limit free will and undermine our humanistic inheritance” (Lyytinen and Hirschheim, 1989). However, the pertinent relevance to the remit of Requirements is Weber’s investigations concerning the research approach into the social world, in the questioning of the “spuriously "ethically neutral" tendentiousness, pseudo-ethical neutrality” (Weber, 1949), that exists when an ‘ethical imperative’ is amalgamated with an abstraction drawn from the empirical process (Weber, 1949).

This Weberian concept, the process, and the use, of ‘rationalisation’ is particularly appropriate when examining the functionality of the Requirements process. Because the Requirement scientific advancement of the unconditionally valid ethical imperatives, as found in the Requirements 'codes of practice' cannot be automatically assumed and taken at face value. The codes and guidelines, based upon previous practice and experience, which are included in the principles that guide the Requirements process, to produce concrete norms by the application of ethical imperatives, are riddled with the "ethical valorization of nature" (Foucault, 1970).

The scientific viewpoint would ague that more discoveries are needed, codified and theorised. However, the foregoing work has led to a questioning of the Requirement research approach into the [Requirement phenomenon], as the assumptions in it cannot be automatically assumed to be valid.

3.6 Discussion informing the next step

The work of this chapter examined the workings of the justification and philosophical underpinnings which may distract a research project investigation into the phenomenon of Requirements. This chapter revealed that there might be an underlying problem, an ambiguity at work, which manifests itself through the application of methods; so that researching the phenomenon from the same propositional standpoint will only confirm the commensurate effectiveness of the assumed applied theoretical position. The problem is that; researching upon Requirements from the same conceptual framework, still assumes that the same fundamental model is valid, that the research tools are valid and that these methods justifiably depict reality. This leads to confusion and has resulted in an inherent 'dangerous' assumption, already insightfully recognised by Weber in that the '*ideal type'* and '*reality'* will be confused with one another (Weber, 1949 pg, 101). Thus begging the question of, whether or not the problem is a methodological issue, and posing the problem of how can it be possible to test the Requirement theory.

Therefore, the starting point for any [Requirements phenomenon] investigation must be that there is a presumption contained in the given Requirement remit, that results in the ambiguous statements of the What; and this is supported by the evidence in statements reporting upon 'Requirements failure'. Thus, the research into the Requirements phenomenon must be without the presupposition of holding a Requirements theory.

The inference, which led to the sources of ambiguity, is that we do not know the nature of ‘what-is-a-Requirement’ and we may never know, because there is no one single truth in this or that context. So, it is not possible to say ‘what’ in terms of multiple possible alternatives to a single actual world, but that a ‘what-is-a-Requirement’ does exist in multiple actual worlds. The consequence of this is to see the world under different frames of reference (Goodman, 1978). The suggestion is that the ‘How’, and how it is achieved, is not an entity that is removable as a separate and discrete subject from the ‘What’. They are the two sides of the same coin; the problem is that they are fundamentally intertwined, presenting a different philosophical perspective on How, and therefore the ‘What’ upon the world.

Chapter 4

Phase One: Mindset free of presupposition

"…. as we know, there are known knowns; there are things we know we know. We also know there are known unknowns; that is to say we know there are some things we do not know. But there are also unknown unknowns -- the ones we don't know we don't know"

Donald H. Rumsfeld, Department of Defense news briefing, February 12, 2002

4.1 Introduction

This chapter considers the structure underpinning the research approach for phase one. The aim is to organise the understanding of the 'what-is-done' and 'how-it-is-done' of a project group who were 'doing' the Requirements process.

The previous chapter identified a possible source of ambiguity in that the 'How' has an implicit assumption of the 'What'. This presents the problem of the specification process, wherein an implicit assumption has, or may have taken place, reflecting Weber's (1949) observation of the inherent danger of 'ideal type' and 'reality' becoming confused with one another. Requirements methods are legitimised by their foundations of scientism. This places strong emphasis upon using the method that is valid and is one that should lead to correct results.

The enigmatic conundrum yet to be examined still concerns the 'How', and the wider consideration of how the theory is used and brought out into the 'context of discovery'; of 'How' the process, procedure, approach, method, practice or modus operandi of Requirements operates, and how it captures and obtains an understanding of the 'What' with the use of the Requirements approach. But, before it is possible to examine the operationalization of the Requirements it is necessary to conduct a research enquiry, while not taking any presuppositional positions, as any presuppositions could impinge upon the methods and techniques of the data analysis. Consequently, this chapter is an exposition of such a research approach.

4.1.1 Questioning the theory of Requirements: built upon layers of flaws?

"Requirements" is purported to be the design process for the understanding of the 'What', that is found in the 'context of discovery'. The aim of this design process is to produce a specification, and that, as has been presented (section 2.1), emanates from the IS-IT domain of 'doing' an engineering science underpinned by foundational scientism (See appendix 3c). This applied science of Requirements has an operationalization remit to simply describe the facts that are before us in relation to 'external' objects, strictly speaking, it is a logical problem, with the process holding the perspective and the rationale to represent and translate, abstract and objectify, the 'What' in the world. The next logical stage of the investigation is to test this theory, however; there might be a problem with the theory of Requirements itself. The proposition, based upon the evidence of failure, would be that; Requirements is not the correct design process for the understanding of the 'What' that is found in the context.

There now follows three sub-parts setting out the foundations to the research strategy into the investigation into the [phenomenon of Requirements].

4.1.2 Working theory, theory working issues

The proof of any theory is in the ability to make predictive explanation (Flyvbjerg, 2001). That the explanation is 'correct', 'if', it is possible to deduce the explanation from the laws of the theory and the antecedent conditions (Appiah, 2003). The proving and validation of Requirements as it stands, or of providing proof for the theory of Requirements would be in finding that the Requirements problem has incontrovertibly been captured correctly. To claim that a theory is false, without justification cannot be enough in itself, what needs to be done is to demonstrate how the theory lacks integrity and is untenable.

This introduces the problem of the limitations of empirical observation, that is, by determining whether or not that which is claimed by the proposition actually corresponds with the facts of the world, and secondly the problem of the research method of procedures in collecting and methods of analysing data. But this also depends upon the perspective adopted; as a physical scientist's interest when studying the boiling point is in the movement of the molecules of water, a geologist might be interested in water erosion of rocks and a meteorologist in rainfall patterns, each interest depending on the individual perspective of that domain, and here a particular perspective is taken of not starting from a domain with a theoretical generalized perspective.

Karl Popper (1902-1994) has raised an argument about universal generalisations in saying that; in any example produced there can never be certainty, and that for him a theory can only be shown to be false. His point was that science need only consider theories that are falsifiable (Everitt and Fisher, 1995), theories that cannot be disproved are not valid scientifically. Despite its popularity among scientists, for Hughes and Sharrock (1997) there are certainly problems with Popper's particular view and as an account of how science works, for some it is 'clearly deficient' (Hughes and Sharrock, 1997). Especially, for the sciences that report on the social world, or other domains of academic study in making claims to knowledge, examples being music or literary criticism where falsification is problematic. This is especially pertinent to Requirements where there is some doubt about the social nature of Requirements.

Excluding a data fact collected from an activity of the phenomenon in the domain, just because it does not necessarily fit with a particular conceptual schema is potentially misleading; the problem for a Requirements theory is that;

- The Requirements laws have not been previously determined, other than as proposed in section 2.6.
- There is a lack of a theory from which to derive the generalisation, except that which was noted in section 3.3.
- Since the generalisation is drawn from experiences (section 2.3.2), all we have is a generalisation.
- The IS discipline is a hybrid, making it hard to classify as a natural or a human science (Ciborra, 2002).

Importantly, along with general statements of the conditions under which the Requirement theory is applied, its application in practice has to be determined post hoc, through the mechanisms intuitive plausibility, otherwise the test will be assessing a tautological position of a definition.

Although Popper's refutative position is problematic for theory testing on its own, the problem of testing the theory of Requirements is that it relies upon it's own justification principles, and here modern epistemologists have raised some serious doubts about the foundationalist structure. Everitt and Fisher (1995) build upon the Goodman and Hempel stance to show that it is possible to start from an innocuous assumption, yet it is still possible either to be led into having to accept incompatible generalizations, or to find that almost everything will count as confirming to some degree to almost every generalization (Everitt and Fisher, 1995).

The justification issue raises problems with the induction and inference from the particular to the general and the question for Appiah (2003) is whether inductively based beliefs can provide a form of knowledge. Appiah states that; ”induction is not a generally reliable method of belief formation because it can be seen to lead us astray with predicates” (Appiah, 2003). This concurs with many other modern challenging positions that have led some to the conclusion that there is no description-independent way that the world is (Rorty, 1994).

Since Edmund Gettier's article on counterexamples, in which he found that there are examples of justified true belief which do not turn out to be knowledge (Gettier, 1963), modern epistemology has had a challenge to produce a clear account of that which can be taken as a justified true belief. Philosophers have shown us that on a cognitive level there are few, if any, aspects of our personal existence about which we can be certain (Giddens, 1990), and as discussed (See Appendix 3a), serious epistemological doubts have challenged some very basic belief forming structures that presently count as justifiable knowledge, such as the beliefs that can be found in the traditional theories of Foundationalism, which are claimed and used as the justification support for Requirements, and also the justification of the Requirements methods which are underpinned by the theory of Requirements. This leads to questions about the basic mechanisms that support the rationale of Requirements.

This leaves no real space in which to completely trust what Giddens would call the ‘disembedding mechanisms’, and taking it that Requirements is a disembedding mechanism, with the capabilities to organize social connections across indefinite sectors of time-space (Giddens, 1991), the immediate issue is then, that what is being questioned is the remit of the justification of Requirements, but not yet the theory itself. What is at stake is the use of the justification which extends the process of rationality out into the ‘context of discovery’.

The highlighted issue in the preceding discussion is that;

Within the theories that are instituted within the theory of Requirements there are certain assumptions and claims that have been made regarding the constructs of the theory of it.

The issue also posits questions as to how the knowledge of the theory has been established, how it is used and how it is interpreted. It is not enough to reject the questions merely because there just might be an issue with the justification of the Requirements approach. The work needing to be undertaken is to find and be able to show that there is possibly the existence of some flawed assumptions within the theory, which might explain why, and how the Requirements approach so often leads to failures in the outcomes. To show this, it is necessary to display the interaction of the theory, or the belief in it, that is at work, which seems to indicate that the predictive explanation is 'correct', and appears to operate according to the laws of the theory and the antecedent conditions.

4.1.3 But, the life-world is full of various serendipitous surprises: the issue of no freezing moment, no termination

The analyst's task in Requirements is to capture rational action with a set of planned and clearly defined goals, proceeding though various 'states' until termination. However, the meaning of an action is different depending on the point in time from which it is observed (Schutz, 1967).

There are two different perspectives; the reflective glance and the act of 'intended meaning' which is projected into some future time. The assumption is that both the micro task and the macro project of the past will be exactly replicated in the future. This distinction between the reflective and non-reflective is of major importance and not just for IT, as the different perspectives also present the problem of the way that normative concepts are defined in the future and can be used for the justification of past actions. The previous section raised this issue, and that of the difficulty of finding a justification, finding a need to dig deeper than the normative level to locate the accommodation of the Requirements laws in the accomplishment of action, and this cyclically returns the problem of where the termination line is drawn, due to the interaction differences of 'doing' and reflecting.

The attempt to freeze and take a snapshot of a moment in time, can have an implicit comparisons to research approaches that wish to produce abstract metaphysical structures of control, of objective meaning of logical plausibility of connecting action to a pattern to that lies behind it (Giddens, 1979). Whereas, having no terminations implies relations between people set in the continuity of interaction in time (Giddens, 1979). Having a non-termination point is not a far fetched notion. It is acknowledging that the world is in a continual process. Never arriving but always in transit. As Baskerville and Travis, et al. (1992) articulate; “the concept of emergent systems is built upon the belief that human systems are not deterministic; rather, they are products of constant social negotiation and consensus building” (Baskerville, Travis et al., 1992; Truex, Baskerville et al., 1999). Re-emphasising that the ‘structuring of structure’, is a continual process of production (Giddens, 1979). Also that “the structurization of our stock of knowledge at hand changes continually” (Schutz, 1970). Thinking that the life-world is in a continual state of flux changes the viewpoint and the perspective taken upon the world. Thinking that the life-world does not have any definite fixed points is somewhat unsettling, even disturbing, running counter intuitively to our comprehension and understanding of a fixed and stable world, but perhaps chaos and crisis are parts of the natural order of things, and should not be seen as disorder or as mis-representation of geometric order, and or as something that needs to be put right. Rather it is the comprehension and sensemaking of accidental or spontaneous order with implicit consequences of action that is required. Suggesting that an adaptive value is placed upon the emergent phenomenon and that of action, that is not predetermined, but neither is it random (Suchman, 1987).

The changing, emergent approach starts with thinking from within, in the thinking as participants; in thinking in process terms (Shaw, 2002), that are sympathetic to living systems ‘Systems should breathe, be designed to adapt to unknown change’ (Paul, 1994). To have emergent properties, things, events, objects, or entities emerge atypically of an anticipated event. In a new experience, it’s character of being is unfamiliar, "How strange!” (Schutz, 1970). There can always be ambiguity; something can start, seemingly, as an accident, a slip, arbitrarily or superficially and chance events can seem to conspire and create life’s various spontaneous responses.

Conventionally, the approach of studying accidents is in the province of probability and is amenable to discovery. The ultimate understanding of nature to which science aspires would find no place for accidental properties. The thinking is that; surprises that happen in the social world can be assessed in the same terms of risk as in probability events occurring in a physical world. This can also include all aspects of human nature for example Churchman, Ackoff et al (1957) saw “there is no logical or methodological reason… why such concepts as ‘good will’, ‘morale’ and ‘responsibility’ cannot be reduced to quantitative terms”. That physical systems and social systems are somehow, comparable, interchangeable and interpretational.

Beck (1992) draws to our attention that there is an inherent danger contained in the thinking that assumes that accidental surprises in physical systems and social systems are one and the same thing and that both are intertwined and are explainable as risk. In the Risk Society he postulates that risk has become a central part of an intellectual and political web relating to the slow crisis of modernity and industrial society’ (Beck, 1992). The risk he highlights is the (re-)introduction of modernization through the back door, with a return to the techno–rationalist approach. In the IS this has already been recognised by Lyytinen and Hirschheim (1989) as; “Computer based IS will mean one long step towards ‘the eclipse of reason’ a life-form which will limit free will and undermine our humanistic inheritance” (Lyytinen and Hirschheim, 1989).

Where there is no termination it must follow that it is the journey that matters. In travelling, there is always a leading edge, emerging outwards, interacting with and demanding flexibility from any concretely perceived structures, and the possibility of making spontaneous discoveries. This alternative viewpoint proposition is sometimes difficult to grasp, especially if perceived from the world perspective of modernity, which contains the thinking that life can be determined through risk. Yet the post transition to an era of post-modernity is far from certain, and it may even mean a reinvention and re-interpretation of pre-modernity thinking. The alternative starting point appears to be a return to a version of the naive realist, which is the position explored in appendix 3a, with Locke’s division questioning the difference between nominal essence and real essence. The accusation to counter from the rationalist point of view is that; it is irrational to say there is no a priori way of determining what exists. This is further complicated by having to deal with the issue of emergence, it therefore must follow that it is irrational to say there is no a priori way in which new objects can be called into existence by changing the circumstances. But events that happen in the life-world sometimes have qualities and aspects of seemingly irrational characteristics and the only way to explain such things are as just accidents and unforeseeable incidents. The need is not to appeal to some sort of metaphysical justification, as this just leads back to the problem of the justification principles that are used, and which are in doubt, as discussed in the preceding section. The need is to examine how accidents and surprises are dealt with, attended to, interpreted, understood, and can perhaps be taken opportune advantage of.

The alternative starting point is that things such as accidents and surprises are pre-discourse, prior to thought, and that they are events that occur, having serendipitous or spontaneal qualities; that accidents cannot be foreseen, unless that is, there is such a thing as an essential quality of having an accident; a tautological position. An accident is a atypical thing or event, and 'if' gets to be noticed, it becomes an opportunity for a new experience; as it is firstly recognised in character of being unfamiliar.

Schutz's (1970) notion of "How strange!" then becomes an enquiring postulate forming concept, or a phenomenon; of things such as accidents seeking an explanation, since the event or accident has 'breached', or stands out from, what is taken to be the natural flow, or is "taken for granted", and so the event is sensed as a phenomenon when set against the background of the normal daily activities of everyday living. There is a suggestion here that "how strange" is an invitation; curiosity invoking an inquisitive attitude, or of touching a chord of fear or delight. To find things out with an artistic leap, or flight of fancy is the conjoining of that which appears to be irrational being transformed into the rational. The same process is at work when one is surprised by a magic trick in a conjuror's performance, or by a comedians' punch line in a joke. The point of the artistic leap of explanation becomes demonstrable only after studying an event and in working out the way in which 'how strange' becomes explained. Laughter is a reaction to the displacement of reality which is the basis of a joke (Schutz and Luckmann, 1973); applause or clapping is a demonstration of approval, commendation and collective support (Heritage and Greatbatch, 1986). However, these things, clapping and laughter, can be engineered and set up; the genuine surprise referred to here is one where the creative leap is required and for that, it is the understanding that starts from within the mind and makes sense of it that is needed to explain accidents and surprises, that is; the mind has to have artistic abilities in order to link and connect things together.

The influence upon the research approach

Studying the leading edge, the place where sense-making is made, provides a fertile grounding in which to start to build a perspective to examine the actions involved in the phenomenon of Requirements, thus breaking away from the conventional research approaches of understanding a phenomenon from a retrospective gloss.

To grasp, how to discern, the different research perspective undertaking, starts from the understanding of things like accidents, being examples of occurrences that that surprise, making us stop and think. This is important because these types of events break the linear causal thinking of connections. Non-causal interrupts stops determination and by the fact of their being accidents, can only be seen as discontinuous events. When ‘b’ does not necessarily follow ‘a’ we are required to stop and think, and reason-out the fragments of information, which are presented in a mosaic pattern of a different interaction. Only upon reflection do we seek to make-sense of an interaction at the edge. The wake effect distantiates the temporal flow of looking forward, giving an opportunity to break the rules, which is the next step in understanding the research approach, explained below.

Breaking the rules

A simple example of explaining a strange event becoming transmogrified into something else, with the mind at work, can be labelled as the process of interpretation. The need would be to look at these moments, ‘as’ an incident occurs and to witness the event. Of course, for a witness that would mean that they would not be attending to anything else at the time and of them knowing where to look, or to be actively waiting to watch the drama unfold, as prior knowledge would have foreseen the event. The problem is that there cannot be pre-awareness of an accident, and therefore the witness who is attending at the event will be surprised. An event happens, and it is only afterwards that sense is made of it, and even then only if necessary, in order to explain, if required to, and even then only if it has been noticed. But always at base the thinking and interpretation of events is from within.

Demonstration of this claim, of the retrospective account making, seen at work in acknowledged creative endeavours, is the artist at work; In 1947 an artist called Jackson Pollock produced, originally by accident, ‘accidental’ creations of paint splattered canvases, dripping paint produced with balletic movements; his work produced frozen moments of what became, later, labelled as ‘action painting’ by the artistic community of scholars. This artistic movement was later, retrospectively located and included as congruent ‘political realism’. However, Pollock’s accidental accident, and his accidents process, poses the question as to whether the ‘artistic act’ is more important than the ‘artistic work’ it produces.

The Pollocks question mirrors that of the research approach. For example, do we define the ‘What’ from the end, the product perspective, or do we define the ‘What’ from the experience of the process. The Pollocks question of; is it the artistic act or the artistic work that is more important, is highly relevant in Requirement research study. Because now, the suspicion is that the Requirement has been defined from the 'end product', 'the artistic work' rather than the 'artistic act'. And Pollock's' example has highlighted the fact that despite his 'accidental' work, the 'end product' is defined as an act of 'political realism'. Then the question is of which is the more important, and of which perspective it is that gives a true definition of the 'what'. The question is whether or not it is possible to make sense out of the accidental, surprise or serendipitous process during the creation of it, or whether it is only possible afterwards. The implications of this are potentially serious not just for the artist, but have wider implications for what it could mean for researchers.

Changes to the thinking about a concept within the current stocks of knowledge occur because some "thinkers either decided not to be bound by certain 'obvious' methodological rules, or because they unwittingly broke them" (Feyerabend, 1978). But this is human nature and turbulences are unsettling and disruptive of a normal state of affairs in our daily routines. A something that happens, an event, occurrence, accident, slip of the tongue or a serendipitous moment, affects an individual's state, mood or feeling; and this is initially personal. Consequently, the immediate need is to make sense of the happening and to place, firstly, within ones own personal stock of knowledge, any atypical events into a typification framework that is capable of making sense of it within the ordinary pattern of daily living (Zaner, 1973). This is in effect, acknowledging that in doing, or in an action, exertion takes precedence, furthermore that there is a discordant and disrespectful attitude, be it ever so small, taken towards the idea of a fixed preordained 'social world', also that every action is a potential point of divergence that has the potential to lead to infinite multiple future re-interpretations of points of interaction.

The problem of artistic action for computers

To contrast this last point; Computers are good examples of objects that lack the ability to respond artistically; they are incapable of improvisational work as they are the product of pre-planned rational action; they conform to external representational rules that have been internalized, to make the perfect ideal external world. Lucy Suchman's work (1988) (See also, Suchman, 1987) highlights the problem that computers have, in that computers fail from the constraints and the limitations that are in the situation of the user's circumstances. Human-machine communication cannot detect and repair breaches in understanding and a breach in communication prevents meaningful order of activities and causes confusion. Literally for computers, users breach the law of the machine, and the designer’s conceptually ordered framework of the context of use. The Requirements capture is the process of the operationalization of the rules, whereas for the person, if a process breaks down in the stage of an on-going activity, the attention given in attending to the job in a project is ruptured, akin to Heidegger's embodiment of the "broken hammer". Garfinkel likewise used 'breaching experiments' to show the 'incompleteness' of efforts at literal description of, or instructions for, real-world events. His developed Ethnomethodological approach examines ‘the work’ necessary to sustain the common understandings and the practical reasoning that is the basis of the social order (Garfinkel, 1967). The understanding that is given by humans when a process breaks down, so that an accident is not left in chaos, is reconciled in an embodiment of sense-making. A person attempts to make sense of the situation, and attempts to label, make sense, use ad hoc considerations, and rationalise the occurrence, until the accident fits in with their own stock of knowledge. Over time, things like re-occurring accidents are smoothed over and explanations are created for the events so that they fit into the common stock of knowledge. Disruptions to the flow of life are not seen as un-natural; they are commonplace, normal occurrences and are sometimes termed by insurance companies as acts of God. The modern computer scientist is resigned to the fatal error of the blue screen.

In Frederick Brooks jr, ‘Essays on Software Engineering’ he notes that, the driving force in using Software Engineering principles in software production was the fear of major accidents that might be caused by having uncontrollable artists responsible for the development of ever more complex systems (Brooks jr, 1995). The rationale for the expunging of this process has been the assumption that the artistic Requirements endeavour has never been a reliable process (Davis and Leffingwell, 1999). Consequently, the problem of the techno–rationalist approach and of the Requirements handmaiden, is that of presenting Requirements as a science of software engineering that is driven by the methods of operationalization, which expunges creativity and de-humanises the options of explanation, so that ‘ideal type’ and ‘reality’ can be correctly connected together, facilitating predictive futures, thus ensuring the natural order of things. Weber’s original observation of the inherent danger of confusion remains relevant and largely unanswered.

However, the human innate abilities of sensemaking cannot be so easily discounted, and this has been one of Science’s misconceptions. Some have reported that the reality of scientific activity has its artistic and subjective sides (Pettigrew, 1985). In Requirements, quality products are an artistic blend of needs and solutions (Humphrey, 1989), there is an 'artistic embroidery' upon prescribed procedure (Ciborra, 2002), "design will always have an artistic component" (Fitzgerald, 1996). And that "artistic competence is needed in good design" (Ehn, 1993) in making the 'Creative leap' (Rittel, 1973; Mintzberg, 1979). It does not matter where research looks, at work, at ideas, at concepts and even at research itself; it will always find 'the work' of the human, engaged in the artistic endeavour of making sense of the world. Indeed, Science is not always driven on by pure rationality, human factors also play their part, as John Waller (2003) reveals, the truths behind many important scientific investigations have some very unscientific managements.

So what, for research

Because of the innate artistic qualities of humans it means that we cannot discount their ability to respond to the situation they find themselves in, by making serendipitous or spontaneous discoveries. Consequently, the need to study 'what-is-done' and 'how-it-is-done' and not the work that has been done. Therefore, the next section the thesis lays down the presuppositional position to study the what and the how.

4.1.4 Studying 'What' and 'How' of Requirement

The work of this chapter 'inverts' the conventional understanding of the way in which the understanding of the How is obtained. By starting with the process of attempting to understand 'ordinary' actions (Heritage, 1984; Coulon, 1995; Garfinkel, 1996; Garfinkel, 2002; Hammersley, 2003) of mundane activities (Heritage, 1984; Maynard and Cayman, 1991; Gouldner, 2003), the blink of an eye, the 'umm' and the 'err' (Sacks, 1992), 'oh' (Hutchby, 2001) the laughter (Pinch and Bijker, 1987; Hutchby and Woolffitt, 1998; Eisenhardt, 1999; Schegloff, 2001), and those silence moments (Jaworski, 1993), etc; that is, the properties of the events that are simply there (Psathas, 2003) present all along (Psathas, 2003), the haecceity found in the "brute force of fact" (Pfeffer, 1981; Shaw, 1990; Moldoveanu and Bauer, 2004). This is about examining the 'taken for granted' (Gurwitsch, 1962; Schutz, 1962; Berger and Luckmann, 1966; Garfinkel, 1967; Schutz, 1967; Zaner, 1970; Weick, 1996) of process. In examining these moments, the 'accidental' (not of the nature of its essence, OED) artistic acts emerge as a series of [Bracket-ed] intersubjective understandings, but nevertheless they remain as 'accidental' transactions until they become enveloped and transmogrified into the ghosts of descriptive entities and are captured by systems of intentional meaning. The [Bracket-ed] intersubjective meanings become distinct secondary phenomena entities in themselves; the interest is in the how, not from an outside theoretical framework that supposedly coordinates activities, rather, the question posed is how the actions in these [Bracket-ed] phenomena are practically accomplished. The role of the researcher is crucial here, as all the analysis ownership of the [Bracket-ed] intersubjective meanings belong to the people who make them, so for the moment the consideration of the observer-analyst reporting is sidestepped, as it will become apparent that interference from an outside perspective is pointless and futile.

The remainder of this chapter firstly examines the issue that needs to be addressed and discusses why it is an issue, and secondly, looks at the questions that are unresolved, which are discussed in the following section. This is then followed by a section that looks at the underpinning and rationale of using an alternative approach for the examination of the Requirements phenomenon.

4.2 The outing of the issue to be examined

1. The ambiguity of 'we can get the Requirements right' with the notion of emergence

The first ambiguity of the 'How' is carried forward from previous discussions (sections 1.5, 3.3) and further developed in the first half of this chapter, concerned the identification of the 'What' through 'How' it was achieved. The ambiguity, crossing the divide between the ideal and the reality is apparent, in the conventional sense, through the use of categories, definitions etc. This justifies the construct of 'we can get the Requirements right' that 'it' is correct, because Requirements can be frozen and represented as abstract pure concepts that exactly maps reality. But the potential flaw with the method is exposed when it extends this attitude into a context domain other than the predefined boundaries of its own making. The principle problem for Requirements occurs when having to consider the notion of emergence, of having to freeze the actions of the future. The current concept rests on the idea of a fixed and predetermined world view that can explain and account for accidents and breaches of action. This is nowadays calculated as assessment of risk, and of the probabilities of an event happening. However, the recourse of having to rationalize accidents and the like becomes problematic, as risk is causal dependent and the concept relies upon the thinking that it is possible, in theory at least, to produce an accurate description-independent way of how the world is, or how it could be if there were no unforeseen occurrences or accidents. The ambiguity here is exposed when questions are asked, such as what if the 'What' cannot be defined. However, the irrationality of accidents can be seemingly accounted for 'if' the problem can be re-conceptualised somehow as an artistic leap. This forms the next section, and impinges upon the second issue, that seeks to underpin the concept of people acting intentionally upon the world, this also relates to the problem of understanding thought intersubjectively rather than independently.

2. The ambiguity of 'getting the stakeholders to agree' with multiple viewpoints

Particularly problematic of ISD is the matter of 'having to consider' world views and the complexity of having to accommodate multiple points of view within a complex problem domain. This is not a new problem for IS, and this difficult perspective has been raised as an issue in section 1.2 and further discussed in explored in section 3.6, reoccurring again in 4.3.4. The theory of Requirements imposes constructs; to abstract out the ambiguity (Yeh, 1990) to take, abstract and objectify, out of the ordinary life. However, Barbara Czarniawska (1997) cretaceously points out that "the choice of a theoretical frame of reference is always situated in time and place and adapted for the frame of reference" (Czarniawska, 1997 pg, 71). Her analysis and interpretation on the role of theories is that they are devices for 'imposing cohesion and stability'. The assumption Czarniawska is challenging is that of the one-world viewpoint. A 'theoretical frame of reference' is just another perspective, taken from, or imposed from a temporal silo. The viewpoint frame of reference that her work challenges is that; the messy world needs to be rationalized in order to be understood and that there is 'A' correct method for achieving the one correct viewpoint. Boland and Pondy (1983) were two original early IS researchers who looked at the issue of an alternative perspective, drawing to our attention that the ambiguity of the problem was 'not a choice between rational or natural systems', and these different world views must be understood as a 'genuine union', 'an appreciation of both in their field of mutual context' (Boland and Pondy, 1983). But then, the question is left open as to what is considered a 'natural' system and how this fundamentally differs from a rational system. Further, if there are now two world views working in unison to take into consideration, why not more, why stop there, how many more worlds are there?; perhaps a return to Czarniawska's imposing nihilism, and the problem of cohesion. Such a perspective opens up the problem of "imposing" and the idea that Requirements is a thinly veiled political football. In which case the ambiguity is found in the justification of how the theory becomes understood as a 'genuine union', and in how it becomes operationalized, used or adapted into the frame of reference. The question that follows is to ask why there is a need to take the multiple-view seriously. Is it because no two people are same, or is it that no two Requirements are ever the same. The consequence is of 'having to' reconcile different frames of references, and of 'having to', 'getting the stakeholders to agree' as found in the second construct of the theory of Requirements. This perspective alters not only justification but the operation of the How and the What.

3. The ambiguity of 'we can solve the problem with a product' by a selective rationalist specification process.

The third ambiguity derives from the problem of not knowing or being able to define what needs or wants are. To analyse information Requirements is to define what an information system is and what it should do; this is a tall order, easily glossed over, and it presents a challenging and hidden but important problem of what is information. This is a fundamentally different problem from that of designing a product, where an object has properties, here information has indefinable qualities, namely values, and this ambiguity emerges with the process by which people act or react and their interpretation or misinterpretation of the models and constructs that people use as information to enable them to decide upon actions. Here it is the use of the theories and theoretical concepts that are open to interpretation of 'fact', but that conform with the values of facts located within systems of the social world. An example in system design given by Boland (1979) identified that designers "have selectively ignored their own biases in observing the decision making process, and underestimated the ambiguity and dialectical quality of social reality" (Boland, 1979). The ambiguity arises in the mismatch between that which occurs in practice and the theoretical idea; in IT theory, people are not presumed or supposed to have their own biases or their own values, Boland's point is that designers have a selective perspective, which is that of the IT perspective, and that in procreating the IT viewpoint selectively they ignore the qualities of the social reality life-world. The underpinning issue of scientism has its own biases; such as the belief that "a need", equals "Requirement" equals "rationalist specification process". Unfortunately, the literature that has studied the Requirements domain in detail has the default perspective of procreating the Requirements specifications perspective, and it has selectively ignored the ambiguity and dialectical quality of social reality. What is needed is to be able to understand how Requirements emerge and how they are decided upon. To briefly elucidate on part of the problem: when Garfinkel (1967) studied the actual events of jurors' decision making he produced analyses to show the features of that decision making process. His analyses showed that jurors were engaged in deciding “reasonable causes and remedies”. They do this by consulting the consistency of alternative claims with common sense models (Garfinkel, 1967); these models are typifications based upon their own commonsensical understanding of the world; the biographical baggage of experience that is carried around (Schutz, 1967). For Garfinkel, what becomes apparent is that the jurors decide “the facts” (Garfinkel, 1967), against commonsense models. A similar research approach and finding was adopted by Weick‘s often quoted studies of organisations, when studying legitimising behaviour, as a way of making such behaviour meaningful and explainable (Weick, 2001). His findings report upon the thinking process; that people use retrospective accounts to explain surprises (Weick, 1995). The ambiguity highlighted here is the problem of establishing how people decide or know what they want, how they achieve it and how they rationalise their decisions. ”The heart has its reasons of which reason does not know” (Blaise Pascal, scientist philosopher 17th Century). The Requirements process, in the theory of ISD, points to relationships made in the context of translation of an ideal world, with a priori constructs of knowing. Once abstracted out of context and placed into the correct categorical domain, then it can then be reduced into an analytical numbers game. For Requirements, this would equate to ‘we can solve the problem with a product’ of the Requirements theory. However, it becomes ambiguous, in having to explain that people use their biographical baggage of experience to make sense of their environment, and also that they use this sensemaking process to decide, negotiate, and achieve their goals, sometimes in a seemingly accidental manner.

The outing of the three issues has made connections of the theoretical constructs to the theory of Requirements found in chapter two, ‘we can get the Requirements right’, ‘get the stakeholders to agree’ and ‘we can solve the problem’. This now facilitates the investigation of the problem of Requirements, signposting on to how these issues can be investigated and reported upon, which is the subject matter of the next section, leading to a general discussion on the foundations of the research strategy.

4.2.1 Re-questioning ‘what how’ Issue – getting serious

In the work of chapter one, it was noted that there was a shortage of detailed empirical studies reporting upon the ‘actual’, detailed work undertaken in situ, in studying the process of the Requirements phenomenon. The missing bits of analysis are the chronicled account details of how practitioners, stakeholders and interested parties ‘actually’ manage the task, which, for them is a matter of serious significance. Be that as it may, the literature on the subject has provided numerous and copious reflective accounts that are mostly anecdotal, with empirical reports, explanations and reasons reflectively compiling a list of Requirements ‘issues’ and problems resulting from the Requirements process. These have been largely retrospective glosses that have found a posteriori rationalization (Ciborra, 1987); explanations that give an account for the errors or mistakes, and then report upon the general fallibility of the human aspect in ISD proficiency. The starting point, reporting upon these failures is from the position of having a belief in the Requirements process and in the method of effectiveness and correctness of following it’s theoretical approach, even if not explicitly stated but inferred, through reliance upon the domain literature for justification.

The consequence leaves an ambiguous state that needs further exploration, highlighting the issue of using experience as a rational tool of explanation and its problematic use in the context of discovery. The problem is of having to explain the using of experience and intellect, rather than just an application of a skill set. The use or interference of the experience perspective highlights a rub against the theory of Requirements as a tool for the specification of action. This is a recurring theme throughout the thesis, with different perspectives taken upon its exposition.

Conventional Requirements analyses draw formal, a priori boundaries around computer-based systems, their immediate users and their work groups or at formal organizational boundaries (Kling, 1987). The ‘ideal’ process (Parnas and Clements, 1986) of design takes the a priori analytical lens used for the coding of idea generation, evaluation, and consensus, all of these being shorthand for using a method, consisting of a system of logical rules and definitions, to map, to replace or to reflect upon the real world. The resultant process is expected to lend itself nicely to quantitative analysis of group and member behaviour (Trauth and Jessup, 2000). But the literature has found that these boundaries cannot be completely defined a priori (Kling, 1987). There is a problem about explaining how systems that are true by definition can be informative about a world that is not (Gregory, 1997). Consequently, some consider that a Requirement is not a measurable trait and that it can only be inferred a posteriori (Harwell, 1993). Thus suggesting that we cannot exactly define what we want to do before the actual action takes place, unless, that is, ‘all’ future consequences can be foreseen. The problem can be expressed as; when examining Requirements retrospectively, problems often emerge with the processes that have to be fixed, adjusted, compromised or just plain fought over. Leading to the positional claim that the process is "faked" by producing the documents that we would have produced, ‘if’ we had done things the ideal way (Parnas and Clements, 1986). The suspicion is that the documents production process in IT is following the same route as Garfinkel’s jurors in ‘deciding the facts’.

Formally summarizing the ambiguity in a form of a proposition, aids and distils the issue of a research approach to the Requirements phenomena. A statement cannot be both an analytic and an a posteriori truth (if a posteriori means that it can only be known by being based on experience). Indeed, most philosophers would agree that all analytic truths are known to be true a priori and that all a posteriori truths are synthetic. The question of where to draw the line between the a priori and the a posteriori is a live and difficult question (Baggini and Fosl, 2003). That is, if it is indeed a line, as it increasingly becomes complicated, when according to Kant, some of our a priori knowledge is synthetic: it is about the way the world is, not just about the meanings of terms. For Burrell and Morgan (1979), this is foundationally consistent with the tradition that runs counter to sociological positivism. It has its history firmly rooted in the German idealist tradition, and in the view that the ultimate reality of the universe lies in 'spirit' or 'idea' rather than in the data of sense perception, consequently, it is embraced by the interpretive paradigm (Burrell and Morgan, 1979). But, this may be another categorisation process at work, suggesting that it is not simply an easy matter of compartmentalizing research approaches. Even so, if a posteriori, or experience based reasoning is accepted, then there is room for subjective meaning, in which attributes are given that meaning, and are inferred afterwards, based upon experience, that knowledge is collated, is accepted as ‘norms’, has an empirical dimension and is accepted as a provisional fact, until a better explanation replaces the generally accepted wisdom. Yet, IS-IT still maintains that it is possible to capture the ‘real world’ by abstraction with logical rules that can predict and project forward a plan that would be capable of coping with future action, as the Requirements process and theory is claiming to do, and as is supported by a domain working from constructs upon a foundational base position, using analytic techniques that count as ‘the essential true’ justifiable knowledge. Thus there exists a seemingly incongruous, incommensurable position of having to reconcile two different sets of propositions; either both are synthetic or both are analytic. Unless, that is IS-IT wants to change it’s basic philosophical position to an interpretive position, or adopt a meta bridging construction. As chapter three discussed, the latter position soon conflates to either pole, unless, that is, the justification principle is changed. At this point the enquiry into the setting up of a research approach cannot progress any further as the detail of the modus operandi of Requirements operation is displaying aspects of opaque transparency and this obscurity needs to be removed in order to progress towards the reconciliation of the ambiguity.

Returning to Parnas and Clements (1986) whose claim was that the rationality of the systems design process was imposed a posteriori on design documentation. This still leaves a problem of how the 'faking' process proposition is inferred and produced. This now adds to the original complication of a lack of empirical details about the Requirements process itself. And the 'gap' of the missing literature, which becomes glaringly apparent as soon as questions are raised about supplying the research details and descriptions, questions such as; how did the Requirements problems, become originally framed in what is commonly seen in the messiness of the actuality of the doing. The implications flow into a second problem of missing literature of; how the original problem became expanded into the concepts of the 'Requirements problem', and that exists as a IS research problem, remaining to be solved, as the quest of looking for the silver bullet.

The dominant IS-IT approach, implies that there is an inbuilt assumption, a starting default position, as posited in the dominant literature on Requirements and underpinned, as chapter three explored, which presents a pre[de]-scription based model, founded upon a rational account of Requirements, that is bounded by definition and underscored by Foundationalism and natural scientism. Resulting in 'text-book' knowledge and definitions of information Requirements analysis approaches, and associated methodologies, adopting a unitary/objective stance (Galliers and Swan, 1997). The Requirements process makes certain assumptions about the environment and of the capabilities of people (Jones and Walsham, 1992). By using the developed methods and tools, it presents the rationale that, 'this' is, the 'correct', rational approach by definition, which needs only to be applied; the method supplies the rationale and justification for acting and performing, 'professionally' in practice. The rationalist specification process can be summarised; it starts from the textbook theoretical conception and definition that is found in the IS-IT literature, which influences practice, and it goes on to reproduce the framework as a vehicle for the understanding of the context and therefore tautologically confirms its own definitions of the meaning of what Requirements is, and what in effect it is supposed to be doing.

Much is made of the need to understand the environment in which the rationalist specification process and the IS-IT is intended to be used. That is, used in the conventional understanding of social context, by the IS-IT analyst in practice, and followed by the researchers, in seeking to solve the Requirements problem, so that it becomes an exercise in collecting the variables and in counting the frequency of property-variables among a collection of empirically identifiable data sets that can be mapped onto 'objects' in a substantive domain. The method becomes a model of scientific work, extracting the relative importance of key independent variables, and finding the correlations of measurement to facilitate a translation process. The method is using the rationale as a crutch, for reaching a justifiable understanding of a motivated act, of projecting the current stock of knowledge towards some future action, which is itself composed of passive motivational causes (Boland, 1979). Many, if not all, IS-IT studies and text book (pre)descriptions approach the subject matter from this position, implicitly or explicitly stated, which is, that it would solve the Requirement's problems by developing processes and methods into abstract representations or copies of the real world. The result is to present a formal presentation of Weber's 'ideal type', in the object-attribute relationship, objectivated in a typified form.

The consequence from holding a pseudo problem perspective, as opposed to scrutinizing the actual problem [phenomena of Requirements], has been to represent the problem as one that needs to be solved, while at the same time maintaining implicit assumptions and beliefs about how the world is and how it must be represented as an object. From the 'given' perspective of Requirements it naturally follows that the main issues to be 'solved' are ones of representation and communication from a compatibilist reduction standpoint. A generous interpretation of this vision is to posit 'an instrumentally rational actor whose choice among alternative means to a given end is mediated by norms of behaviour that the culture provides' (Suchman, 1988). But, this merely shifts the focus of attention on to what is 'set-up' to mean 'culture' provision, as institutional or organisational norms. The problem for the rationalist specification process perspective would be the acceptance of the alternative viewpoints upon how the objective world is made, irrespective of local characterisations. Consequently, the Requirements domain offers a pragmatic 'fix'; that the solution to the Requirements problem is the need for "better" communication (Chapter 2) and inter-exchange of information and maintains that the prescribed strategies and methodologies accommodate the cultural norms and language used in particular settings.

But, the contention of the thesis is that the language and its communication are more than instruments of signs. Dewey (1910) expressed that language as the expression of thought conveys only a half-truth, and a 'half-truth that is likely to result in positive error' (Dewey, 1910). Schutz surmised that an interpreter of acts has no basis for knowing the real intention of an expression, only the interpretation that they themselves place upon it, based upon an appeal to a different context of experience (Schutz, 1967).

The alternative perspective starts from the spatial and temporal dimensions of the life-world (Schutz, 1962), and the 'ongoing accomplishments' (Garfinkel, 1967) of persons operating within the natural attitude, within the meaning endowing acts themselves (Schutz, 1967).

4.2.2 Making sense of 'What-How'

As noted above, the underdetermination of the Requirements theory appears to leave, and will always leave, some un-specifiable element. The net result leaves a tension between scholasticism and the recognising of the need to apply common sense to the theory of Requirements in application. As Boehm (1976) originally acknowledged, the techniques used for determining software Requirements are generally an ad hoc manual blend of systems analysis principles and common sense (Boehm, 1976).

Some modern, often cited, academic authors such as Weick have reflected on the problem of sensemaking (Weick, 1995) between the social context and the interplay of common sense found in its application; His general conclusion was that institutional norms are not invariant, that they sometimes even create uncertainty (Weick, 1996). There appears to be a missing link between theory and practice and the link would appear to be that of common sense, but what does that mean? Common sense is a sensemaking processes (Weick, 1996), a tacit resource (Clayman and Maynard, 1995), found in the natural attitude (Psathas, 1975), of experience (Gurwitsch, 1962), made in the interpretation and meaning production (Garfinkel, 1967) and method (Turner, 1974) whereby individuals and groups reflect on and interpret phenomena and produce intersubjective accounts (Schutz, 1962) of human affairs (Luckmann, 1970) and from which are able to make a contribution to knowledge (Psathas and Waksler).

The philosophical background of understanding common-sense

Schutz's philosophical oeuvre was in the observation of the familiar commonsense world of everyday life (Garfinkel and Sacks, 1970). Alfred Schutz's work was the systematic conceptual contrast of "common sense" and "scientific" rationalities. The life-world, that is lived, is 'mastered by action, and we are engaged in it by acting and changing it by our actions' (Schutz and Luckmann, 1989). The natural and social givens are as pre-given realities, "with which we must try to cope" (Schutz and Luckmann, 1989). Schutz's work, discussed later, stands at an intersection between Hursell's phenomenology and the methodological detail in the social understanding of Weber's grand unifying theories of social action. His fragmented work resonates in much of the underlying thinking of some modern social science authors, such as Gidden's undertaking on structuration and Scott Lash's post modernist work, such as 'Critique of Information' (Lash, 2002). However the main influence of his work has been upon the work of Garfinkel who developed an Ethnomethodological approach to the study of common sense knowledge and common sense activities. This approach consists of treating the phenomena as problematic, being the actual methods whereby members of a society, doing sociology, lay or professional, make the social structures of everyday activities observable (Garfinkel, 1967 pg, 75). The particular interest for this thesis embraces Schutz's problem, lying between the constructs of the life-world by common sense, and of those of scientific thinking. Also, of interest for this thesis is the added third dimension, which is that of the practice of doing research itself; as well as in the work of doing, or professionally practising, in the realm of science, where common sense can also be seen to be at work, as a part of the activities in doing research. Indeed Eisenhardt (1989) postulated that in doing research, authors develop theory by combining observations from previous literature, common sense, and experience. Similarly as does Yin (2003) who acknowledges that there is a rift, a gap of discontinuity in the way that investigators reach out to capture reality'. For Yin, in the making of research conclusions, "the inferences, in turn, must be based on convergent evidence from witnesses and physical evidence, as well as some un-specifiable element of common sense" (Yin, 2003 pg, 61).

The application of 'common sense' appears to be a suitable candidate for infilling the gap of the 'missing' ingredient; for making the bridge that could span the gaps in the Requirements underdetermination, the theory making of Requirements, and the practice of implementation of Requirements. The cotangential common sense thinking activity also appears to be a necessary part of understanding in the research approach of the investigation. This makes the act of doing having precedence over social structures and constructions. Indeed the creative act is needed; is an essential Requirement to make sense of the existing stocks of knowledge that is carried around as baggage and is always brought to bear upon any problem in hand.

Mintzberg (1979) often works in this void, in identifying that theory making requires “that creative leap, however small, that breaking away from the expected to describe something new” (Mintzberg, 1979). Also, Rittel (1984) summarized and reconnected it to the problem of the underlying philosophic position. He famously characterised the problem as a ‘wicked problem’ highlighting that there are no “solutions in the sense of definitive and objective answers” (Rittel, 1973). His conclusion, and the problem Rittel emphasised is ‘synthesizing information and waiting for the creative leap, 'work out solution', or the like, as this type of scheme (in reference to engineering) does not work (Rittel and Webber, 1984).

So, having identified the conterminous overlap of the research approach with that of the Requirements problem, together with that of the [Requirements phenomenon], the thesis enquiry needs to face up to and square the ‘wicked problem’ at this confluence. To ‘face the fantasy’ of that which gives us an image of that inventive, creative leap (Boland Jr, 1987) and investigate what common sense is doing with the process that it takes for granted. The Philosophers of science have tended to argue that common sense on any particular matter is just another theory (Appiah, 2003). However the real difficulty that has to be engaged with is that it has turned out to be much ‘harder than one expected to formulate a theory of common sense’ (Dreyfus and Dreyfus, 1990). A point not lost on the AI community.

In order to give up the appeal of obtaining Requirements from a set of fixed prior constructs, in which the objective is to find objects or goals for computerised action to work towards, there is a need to start, or rather to re-start afresh, an enquiry from a presuppositional position. This means a fundamental, even radical, alternative change in understanding, starting from a study of how people ‘actually’ go about their daily activities, and endeavouring to capture and render the actual reality in the field of everyday life (Bittner, 1973). The contrasting alternative starting position to that of the external causation would be to locate, seek, and capture the nature of reality in agent-causation, where a person or agent, firstly determines their actions and then projects the want or need forward onto an already accepted, given mundane world.

This section discussed common sense, establishing it as a lynch-pin of tension between scholasticism and the theory of Requirements in application. Some authors have reflected upon the problem of sensemaking, most have quoted, as a derivation, the genealogy of Schutz's philosophical oeuvre in the observation of the familiar commonsense world of everyday life. However, some have argued that common sense on any particular matter is just another theory.

> *Nevertheless, the implication of this has opened up a gap of discontinuity in the way that investigators reach out to capture reality and the gap is conterminous with the creative leap, as discussed in the introduction sections.*

The next stage is to lay out the detail of the research framework to investigate the emergence phenomenon.

4.2.3 The research approach: of phase one

Approach of understanding sense-making

Starting with the position of common sense, this entails looking, sensing, hearing and sense-making about a scene, situation, or event, without a presupposed opinion, or pre-judgement upon what that scene is about. Without the certain knowing an uncertain innocence is evoked about the meaning of the actions and events that are being performed. The position of having an open mind is more of a challenge to the enquirer than the enquired upon. At first, the position appears to have a flavour of naive realism; there is a world out there and with ease one can bump against floating flotsam. But naivety also suggests freshness and directness of approach, due to absence of artificial sophistication (Dewey, 1941), that is, it begins without taking into account the existing various schemes of interpretation.

Underscoring this research approach is the occupation of ‘sticking to the facts’, the done deed, the fundamental ‘brute fact’ of 'observational datum' (Hughes and Sharrock, 1997). Actions are elements of ‘facticity’ which manifests itself in our everyday lives as moods and changes of mood (Pietersma, 1979). These ‘moods’ are in effect manifestations of a spontaneous life which result in certain characteristics (Schutz, 1962). For Ciborra (2002) the sense of mood is improvisation as ‘a special disposition or attunement with the situation’, which has a more privileged point of access than the dispassionate study of improvisation as situated action (Ciborra, 2002). From this perspective, it is emotional feeling which creates values, as it is prior to the causal character; it is the base from which projected acts are cast. Values are pre-supposed by feeling, and if that is true, facts are also values (Rogers, 1904). Actions, such as discourse, the communication of thought by speech (OED), does not mean an empirically correct statement, but a belief, that is, an assertion of fact (Simon, 1945).

Not looking for a betoken-theory, nor the 'theory-in-use' but seeking thinkingness

The basic principle of scientific research is the principle which calls upon us simply to understand and describe the facts before us (Schutz, 1967) and to decide between what is a fact and what is not, is anything but naive. The Schutz's postulate is that; only in the understanding of 'individual action' is it possible to gain access to the meaning of social relationships and structure as constitutive acts, thus making the social world intersubjective (Schutz, 1962). But this is radically challenging some deeply held beliefs about what constitutes acceptable knowledge acquisition, consequently extreme caution is needed in the exposition of the research approach.

A point of confusion occurs with the assumption that there is inequality between a 'theory-in-use', which is weaker, and the research quest of finding the actual observed act that concurs with a pre-existing theoretical construct of a betoken-theory. Argyris (2004) is one prominent author who distinguishes the understanding of action out into two types; "one is the theory that we espouse, which is composed of values, beliefs, and action strategies. The other is the theory-in-use, which is stored in our heads in the form of designs that are composed of action strategies, intended consequences" (Argyris, 2004). The problem identified, was that (Argyris, 1980; Schön, 1991; Argyris, 2004) embedded in the norms of science research is the objective of knowledge becoming complete and demonstrable in the hallmarks of 'rigorous research', 'looking for problems where there is variance' (Argyris, 1980 pg, 55). But, the theory-in-use approach becomes shorthand for contingency, adaptation to the situation, generating the problem of finding a clear and adequate formulation of what the problem situation "is". This still leaves open a possible cognitive rendition (cognitivism = behaviourism, see appendix 3C) and leaves analysis as a hostage to the fortune of metaphysical ethics. There is a commonplace assumption in Requirements, also found in much research thinking, which is that the theories-in-use somehow match up, as in, when a 'need' becomes expressed, or when a topic subject is raised, they (the actors) are only reiterating, somehow, the background structural pattern which will have the means-ends rationality of action.

This ambiguity, which downgrades the human ability to act intelligently in the life-world, with the work of the human being considered secondary to an external explanatory framework, has been up-ended or inverted in this phase one research approach. This alternative starting position concerns the understanding displayed in the achievement of the acts, and in the using of experience towards the intentional gaol. The assumption here being that people act thoughtfully act in the life-world, while involved in a project.

Weick, like Garfinkel makes a finer distinction, also empathizing with the phenomenology of Schutz, whose parallel studies on the ‘Sense-making’ (Weick, 1995) perspective is of an "enactment process" (Weick, 2003) of literally "making of sense" (Weick, 1995), as the people involved are embedded in the process of enactment through which people proactively bring their realities into being (Boland Jr, 1984; Morgan, 1990) it “is less about discovery than it is about invention” (Weick, 1995). Consequently, the research approach is to study the achievement of people working with the materials at hand.

Short introduction to why there is [Bracket-ing]

The research has a need to ‘frame’ the collection of facts that are supported by evidence, together with those that exist as assertions of fact, either through the spoken or written word. Having ‘framed’ or [Bracket-ed], suspended a fact from its temporal flow, it facilitates examination, and scrutiny. The use of the [Bracket] method is fully explained in the next chapter, but to give an overview; it concerns iteratively asked questions about a [Bracket] sequence, and this opens up new avenues of enquiry with different horizons of interest. Each [Bracket-ed] examination of ‘what-is-done’ and ‘how-it-is-done’ reveals different aspects, offering up research challenges as to that which counts as knowledge, and facilitating an evaluation upon what factors contribute to and inform the stocks of beliefs. ‘Epistemology’ is the word that has historically defined standards of evaluation (Denzin and Lincoln, 2000). 'Epistemology', is preoccupied with the status of knowledge, with what constitutes valid scientific knowledge, historically it has been associated only with objective knowledge, with the correspondence between representations and things (Lash, 2002). However, many received discourses on epistemology are now being re-evaluated (Denzin and Lincoln, 2000). The research approach has an interest and a need to maintain 'the correspondence' between the facts of the doings of the case study, and the method by which these facts are turned into their representations.

Examining the different horizons at work and the need to maintain the link

The research approach needed is to start with and maintain a strict audit of evidence throughout. This is so that when any evidence is used to examine the different horizons at work, it cannot be disengaged from the creative origin and it's [Bracket] of action, In maintaining the link, a cord, or an audit line between the evidence and the different horizons of interest, it does not separate the actual world from the ideal world, unlike IS-IT Requirements where 'facts' in Requirements is the separation specification from the implementation by representation (Dijkstra, 1972; Parnas, 1972; Knuth, 1974). The reason found there, in the conventional understanding of the Requirements approach, is that it is organised around the justification principles, with standards of mathematical proof and is built on axiomatic foundations. But the work of the thesis so far, has proposed that this approach may be problematic and a possible source of ambiguity, especially when pushed out into the social life-world.

The benchmark of proof proposed for this research approach, the standard of evaluation, is to be found from the naturally occurring evidence. starting with the [Bracket] selection as a "a finite segment of the meaningless infinity of the world process, a segment on which human beings confer meaning and significance" (Weber, 1949). Thus, there is reliance upon verification of meaning; and on the inspection of the commonsensical sensemaking abilities innate to the meaning imbued to what it is like to be conscious, aware and of being a creative participant in the life-world. Hence, maintaining an epistemology that remains centred always, on evidence. What is required and should be opened up to inspection is not a metaphysical claim; this would be bringing back in the operative baggage constructs of existing theories and categories rather than a developed approach set up to establish intersubjective meaning upon the process, and as created by the people themselves, in the doing-what-they-claim-to-be-doing, that is, in the doing of Requirements. What has to show; is the naturally occurring fragments of conversations and the explanations of-what-they-are-doing in the 'what-is-done' and 'how-it-is-done'.

The missing bit, is the work of the analyst researcher, whose contribution is as much, or as little, as that of anybody else who has more than a passing interest in Requirements; all the research framework has to do is to bring the data to the table for verification. Proof of the pudding is in the eating, so to speak, as Quine (1969) remarks “meaning remains centred as always on verification; and evidence is verification” (Quine, 1969).

4.2.4 Research design of phase one

The basic research strategy approach of this thesis is to make visibly-rational-and-reportable the ‘what-is-done’ and ‘how-it-is-done’ activities. The simplest way to do this is to split the analysis into two distinct phases;

> 1) First stage: is to look at the context where the-doing-of-Requirements-is-said-to-be taking place; and this forms the subject matter of chapter five and six.
>
> 2) Second stage: is to examine the [Requirements phenomenon] in relation to the theory of Requirements at work, using the understanding of the context.

The main requirement of the first stage is to be able to unravel the intertwining of the different viewpoints expressed. Besides the differing viewpoints, the problem is complicated further by the differing horizons that operate at different levels, which means that there is a need to identify all of the different horizons at work and then to be able to focus and account for both them and the methods of their assemblage. This forms part of the discussion in section 4.3 along with the philosophical underpinnings.

Based upon the above discussion a research diagram of phase one shows the flow of the data set work material of this stage of the research project. It is a pictorial representation of the data flow that illustrates the logic that links the data collected, from the initial questions of the study, to the conclusions (Benbasat, Goldstein et al., 1987; Yin, 1994 pg, 19). The research design is based upon the above discourse of research strategy. The diagram shows the iterative emergent life cycle, showing the unwinding of the themes, which leads towards an understanding about the case and the work undertaken by the people involved.

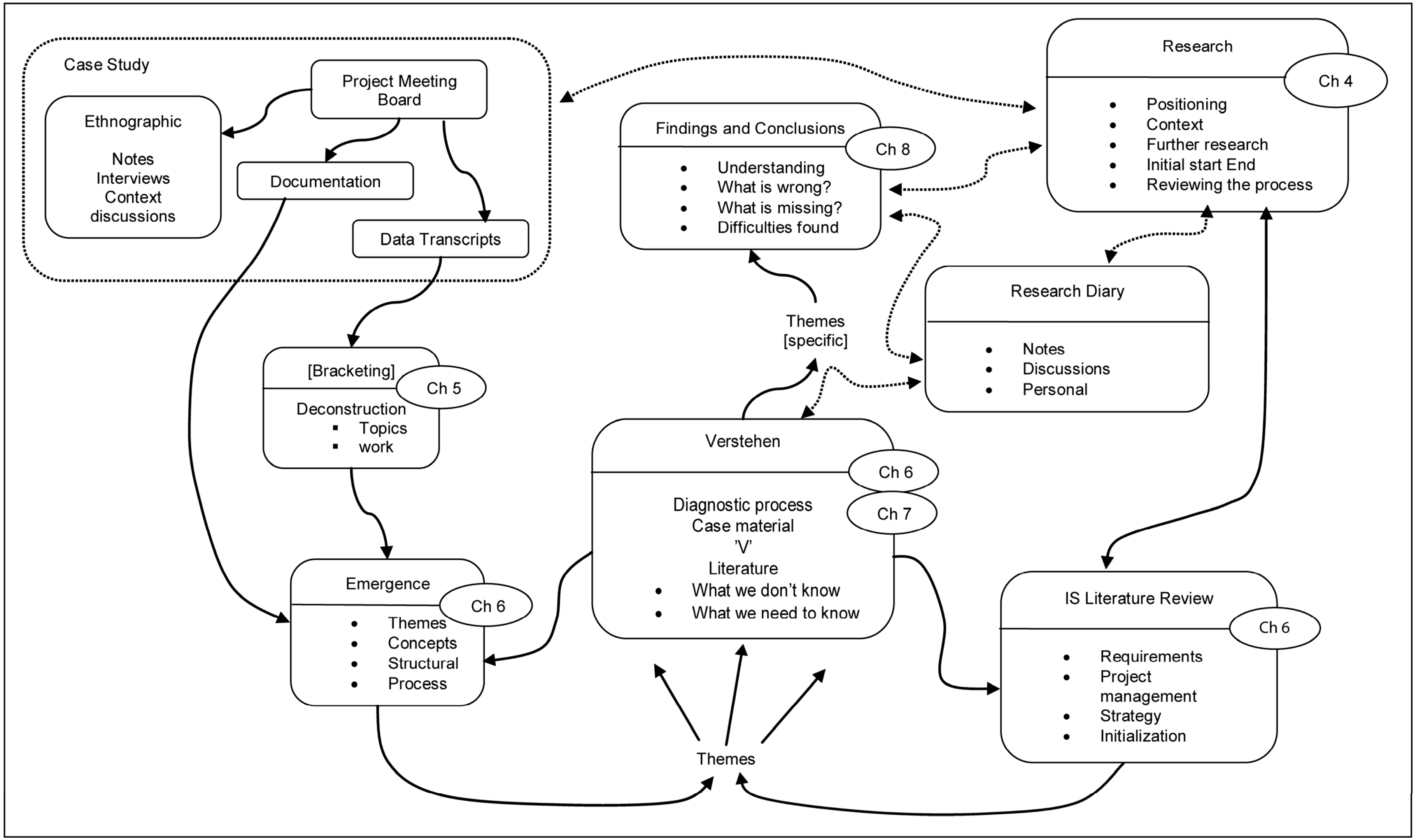

Figure 4.1: The research project data-set work flow

4.2.5 Concluding remarks; the underpinnings to the research approach

This section has discussed the approach needed to uncover the 'what-is-done' and 'how-it-is-done' in action. The strategy that underwrites this is an arrangement that sets out with a pre-suppositionless philosophic position rather than one that starts out with a particular viewpoint. The approach seeks to be rigorous, with austere limitations of not allowing valorization of the data. It seeks to be radical, in concentrating upon what is pertaining to the roots and that which can only be found in the data. The empirical framework has practical limitations of meaning, empirical is neither logical (as in classification) nor ontological (Lash, 2002). Dewey (1936) summarises empirical as not going beyond the descriptive; it is circumstantial, resting upon the accumulation of spatiotemporal conditions in the sense in which conditions mean circumstances (Dewey, 1936).

4.3 Underpinnings of research approach

In the domain of the analysis of meaning the contribution of Alfred Schutz was his work concerning the clarification, as he saw it, of Weber's ambiguous concept and definition of social action. Schutz contended that Webber had 'inconsistencies, confusion and wrongful concatenation of merely reactive behaviour and meaningful action' (Schutz, 1967 pg, 19). His postulate of intersubjective understanding, built upon the theories of Franz Brentano and Edmund Husserl, dealt with the question of phenomenological 'meaning'. For Schutz, that meant that 'all our knowledge of the world in common-sense, which includes scientific thinking, involves constructs, i.e., a set of abstractions, generalizations, formalizations, and idealizations specific to the respective level of thought organization' (Schutz, 1962). Schutz's contention is that 'strictly speaking there are no such things as facts… all facts are, from the outset facts selected from a universal context by the activities of our mind' (Schutz, 1962).

Transferring this to the need of analysis procedure would mean that understanding has to act vertically and horizontally in terms of the meaning stratification, laying down meaning-context in layers. Schutz's (1967) expression of this is; "every objectivity which can be regarded as an already given and constituted meaning-content can be analyzed in terms of its meaning-stratification" (Schutz, 1967). For the purposes of this research, this starts from researching and gaining an understanding of spontaneity and serendipitous discoveries, in that meaning is embedded in action

(Natanson, 1970). The Requirement of the research approach should be able to demonstrate, make observable, and transcribe, and report on people's practical actions from their perspective, in their natural attitude, and to look for and understand their actions that are made towards the projected goal of their project.

The starting point recognises that action is thoroughly grounded in the minutiae of detail and is also bounded within in the given temporal context of time and space. This level of understanding, feeling, and attentiveness needs to be attuned to the finest level of detail, and as such requires assiduous listening to err's, umm's and interjections between speakers and careful monitoring of the level of pitch in the voice, in order to detect signs of anxiety, stress, anger, or any of the whole spectrum of emotions that could indicate intersubjectively, the understanding of an individual with a perspective or a feeling about the issue. Research here starts from the position of living with, while ethnographically immersed within, and living in the same world as the people who are realizing the phenomena.

The strategy of this research approach begins the investigation by needing to assume the persona, "to walk the talk", and to place "I" in empathetic understanding into the actual point of observation; to assume the role of, to act the part, speak the lines, reproduce the intonations, expressions, and act out, the feeling of what it might be like to be a person in that room, of speaking in their words, and living the moment. This doing of, is to be in a position 'to see things from her or his point a view'. That is, to see the viewpoint of the person who is in the throes of doing a project with an anticipated goal in mind, while bearing in mind, and this point is crucial, that the goal has yet to be achieved, and the aim is only projected forward as a concept with an envisaged outcome. The person doing this action is drawing upon their previous stocks of knowledge; "I have done something like this before" and a belief. In doing this, there is more required than the collecting of attributes, labels and ascriptions of representation of context or of a society. In order to do this, the researcher has to have the same sort of consciousness. But, this is not a return to the previous thinking; that all people are islands unto themselves with the 'atomistic' conception of human beings; this thinking has now been replaced by what Rorty (1979) construes as pragmatism, and he articulates the perspective; "If we see knowledge as a matter of conversation and of social practice, rather than attempt to mirror nature, we will not be likely to envisage a meta-practice" (Rorty, 1979 pg, 171).

The next section looks at the underpinnings of a research approach that seeks to gain understanding from a pre-suppositionless position. The basic premise is that we are constantly making sense of other people's talk, actions and events. What is needed is to be able to develop and use a process that will capture the life-world, not only intersubjectively but also meaningfully.

4.3.1 Phenomenology, the unfurling constructs of common sense

An exact meaning of what Phenomenology 'is', is difficult to pin down, and depending upon the source, the meaning has different substances to different people, which is in itself Phenomenological. "Phenomenology not only shows vast differences in its manifestations, but it has served as a tool for extremely divergent enterprises" (Spiegelberg, 1960). Perhaps the label itself is misguided, suggestive of a single cohesive movement, which is in itself misleading. For example, Introna and Ilharco (2004), in their review and work on the concept of the screen have argued guardedly that there is such a thing as phenomenological synthesis, whilst at the same time presenting a transcendental approach. Whereas Richard Boland employs the phenomenological method, which is central to the subjectivist, interpretive approach and apposite to that of the social sciences (Boland and Day, 1982). He employed phenomenological hermeneutics, found in the work of Paul Ricoeur and the 'text' as a metaphor (Boland, 1991) in order to study ISD. On the other hand, Ethnomethodologists would argue that the world is as it appears in its natural attitude, and that it's radical empirical approach is concerned with primordial relations, visible orderliness and a preoccupation with production problems (Sharrock and Anderson, 1986) repudiating all 'constructions' that are not believed by the Garfinkelian faithful, even to the extent of questioning the use of phenomenology itself.

Giddens' indebtedness to social phenomenology and the 'constitutive' approach of phenomenology, with the founding text of Husserl's work and following through to the later works of ethnomethodology, is apparent in his work of structuration (Bryant and Jary, 1991) Giddens' work has subsequently influenced many ISD researchers such as Walsham. Another branch root directly stems from the work of Berger and Luckmann (1966) 'The social construction of reality', and yet another branch can be found in Action Research (King, 1996). Ciborra is 'inspired by phenomenology' (Ciborra, 1998) mostly concentrating on IS interpretations of Heidegger's (1962) 'Being and Time', where it is often said that Heidegger "rejected Husserl's method of phenomenological reduction" (Pietersma, 1979), a branch of phenomenology closer to the Existential project. Whatever, the picture of Phenomenology is inherently confusing, and rightly so, as its premises starts from the accomplishment of the conscious self; in asking a simple, deceptive question; what does it feel like? "Phenomenology" is the philosopher's word for reflecting on the nature of our conscious mental life (Appiah, 2003). For some Phenomenology is more than a philosophy, it is also a method, and approach (Psathas, 1973) suitable for providing a comprehensive guide, also, at its deepest level, it is a criticism of consciousness (and subjectivity) in all its strata (Zaner, 1970 pg, 107), thus implying that it operates at different levels. For others the definition of Phenomenology is; the science of every kind of object, or whatever is encountered in consciousness (Moran, 2000 pg, 82). Hussel's ultimate goal was said to be the creation of a pre-suppositionless philosophy (Wagner, 1970). That would place Phenomenology before other domains of epistemology, which is thus a criticism of science, art, religion, and every other human engagement (Zaner, 1970 pg, 107).

Its continuing development and spread into IS is arguable, with many authors happy to rely on the work of an intermediator, which has left a regrettably confused state of affairs. Phenomenology is not a finished method (Boland, 1985), suggesting that it can and has easily led to misinterpretations and odd adaptations of what IS Phenomenological based research is doing. Partly because of this, and recognising a need to return to a base position, this thesis has taken a certain perspective and primarily used the work of Alfred Schutz's (1899-1959) as the main source ordainment, supplemented with Garfinkel's Ethnomethodology. Many reasons exist as to why Alfred Schutz's work became central to the enquiry; the journey to Schutz's work is easier to explain, as he provided a suitable regressive stop. The advantage of having a philosophical base like that of Schutz is found in the detail of his work, which provides a consummate reference source for interrogation. Consequently, the next three sections only concentrate upon the adaptations and a snapshot overview to use for ISR purposes, in the investigation into the phenomenon of Requirements.

4.3.2 Verstehen

At this stage of the research, the approach adopted draws upon a particular interpretation of Alfred Schutz's work on Verstehen (Schutz, 1967; Schutz, 1970), in which he sought to clarify Max Weber's "interpretive sociology" and notion of Verstehen, or of understanding as opposed to explaining (Coulon, 1995). Unfortunately Alfred Schutz's work is unfinished and his manuscripts of collected works and papers are published posthumously (Psathas, 1975). Schutz's endeavour was to produce a theory of intersubjectivity as the key that he proposed would bridge

Weber's gap; a theory that he began, but regrettably never completed (Heap and Roth, 2003). Although many contemporary authors have used and extended this body of work, particularly notable is the work found in the social constructionalism of Berger and Luckman, who were students of Schutz, and the Ethnomethodology tradition founded by Garfinkel (1967). For the purposes of this work, the aim is to connect the Schutz theory of intersubjectivity with the domain of IS-IT Requirements, readdressing the issues, as previously, in the section 4.2.

Using Schutz's work on Verstehen as a research resource, is by way of the arrangement and presentation of the intersubjective viewpoints that can be found in the on-going sensemaking achievement of naturally occurring conversations. The purpose is to be able to look at the micro sense-making processes, and of the making sense of 'work' undertaken in daily activities. It has been developed here as a method for tracing and binding together the three attributes of; "the natural attitude of common-sense thinking of daily life" (Schutz, 1953), the phenomenon of emergence, and its extension into the realm of how it gets to be transferred into the academic and professional practice domain of IS-IT.

For Schutz the word Verstehen is the interpretation of both the subjective and objective meaning-contexts of 'products' (Schutz, 1967). For him, only when the equivocation is identified does the problem become known. The equivocation that Schutz is alluding to is the shift in meaning, or a misdirection that leads towards an unwarranted conclusion; the job of Verstehen for him is this unpicking of the impressions given by changes in key meanings that are assumed to exist in the premises but mysteriously become glossed over. For Garfinkel and Sacks (1970), "Glossing practices exist in empirical multitude", "glossing practices are methods for producing observable, reportable understanding, with, in, and of natural language" (Garfinkel and Sacks, 1970).

The whole problem for Schutz of interpretive understanding (Verstehen) involves three related but different issues: Verstehen

1. As the experiential form of common-sense knowledge of human affairs
2. As an epistemiological problem, and
3. As a method peculiar to the sciences (Schutz, 1970)

Verstehen (1) is the first-level construct upon which the second-level constructs are formed, Verstehen (2) are the products made in accordance with the procedural rules that are valid for all empirical sciences. These ‘empirical sciences’, their methods, foundations, and concepts, are also all products of consciousness. Then there is Verstehen (3), theoretical systems embodying testable general hypotheses, for Schutz, peculiar to the social sciences (Schutz, 1970). So to attain the aim of understanding, or Verstehen, is to comprehend the meaning of something, the ‘aboutness’ of a phenomenon, to confirm that there is vertical understanding, ending up in typifications, with also horizontal understanding found in the world of human affairs, and in the life-world of the ongoing, doing, activities therein.

Schutz postulated that Verstehen is not just a method used by the social scientist, but is also pre-predicatively found in the particular ‘experiential’ form in which common-sense thinking takes cognizance of the social cultural world (Schutz, 1962). The key is in the meaning of ‘experimental’ and the interest here is of how the common stock of knowledge (and here particularly the phenomenon of Requirements) together with the belief, is used in everyday practice. According to Schutz then, the constructs that are found in common-sense thinking are used in everyday activities, or the horizontal life-world. This means that there is a need to delve further into the understanding of emergence, which is examined in the next section and was discussed previously, in section 4.1.2.

The experiential Verstehen, or the common-sense knowledge of human affairs has positioned itself as preceding the other types of understanding. When viewed from this perspective, together with the assumption that people act creatively, with intentions upon future actions, and that people react to accidents and surprises, by making sense of them, that people have capabilities of rationalising upon previous conscious thoughts, experiences and events through the baggage of theoretical constructs and systems that have been learnt from the aegis of intersubjective living, it can be assumed that people work with typifications, abstractions and formalizations, and that these are constructs of idealizations specific to the respective level of thought organization (Schutz, 1953). Further, that generalization can conflate down to recognitions found in the ‘attitude towards daily living’, found, that is, in the life experience of a person. This reflects that ‘facts’ are learned through the biographical situation and are used as a resource directly in response to the level of involvement and are always enacted in relation to the ongoing context.

The three levels of Verstehen can now be seen in commonplace activities, also inclusive of doing the scientism of research in IS, or of applying it professionally under the auspices of practice, or just in the using of the belief in it, while being separated from it only by levels of thought organisation.

In adopting the phenomenological attitude to investigate Requirements [phenomenon of Requirements] in ISD, the thesis builds on an understanding of the constitution of meaning (Bittner, 1973). For the researcher, the 'sense of phenomenological method' is very much like that of the analogy of the explorer (Zaner, 1970 pg, 35); the aim is to examine the 'intersubjective' nature of practical human activity during the construction of an information system. This appears to be a different approach, offering an alternative perspective on the research into the problem of the phenomenon of Requirements; other approaches have been discussed in previous chapters. As Phenomenology is a pre-suppositionless philosophy (Burrell and Morgan, 1979 pg, 233), it appears to be an ideal candidate, at this stage of the research, to use to investigate the naturally occurring processes of Requirements. The objective is in the opening up and laying out of phenomena (Lash, 2002), so as to expose the equivocation bare. This starts with the issue of emergence, or the actions and events that have emerged out of motivation and which appear in processes "in-order-to" to achieve a goal.

4.3.3 Emergent

There are many aspects to emergence, but key here, is that there are two different focuses, dependent upon where the cause is located. Both recognise the need to understand and recognise the emergent nature of the strategy process, referring to the emergent aspects of user needs that appear during Requirements development, but, this understanding and research interpretation of emergence is conceived as a problem waiting to be solved from the perspective of understanding greater complexity by ever extending the causal agency model and the goal of predicting organizational changes associated with information technology (Markus and Robey, 1988). The conventional approach starts from the thinking that the world system view is composed of cause and effect relationships. This returns to the main issue of quantitative research, looking at the problem of causal connections and the ability to predict future actions via abstract models (Harvey and Myers, 1995). The need is to handle the prediction from the 'emergent' perspective; to deterministically (Lash, 2002) ascertain and predict how people involved would behave in action.

The alternative focus starts from an altogether different proposition "whatever occurs could not have been expected precisely as it occurs, and that whatever has been expected to occur will never occur as it has been expected" (Schutz, 1962 pg, 287). This relocates understanding to common practice of the life-world, in the commonsense thinking of everyday life and the ability of the self to cope with the unexpected. The difference is subtle, but it is the difference between the acquiring of an understanding of the 'physical' and that of the 'intentional' description; these are not incompatible, but they are incommensurable (Agre, 1997). Moving between these planes of understanding changes the perception of the objects, in that some appear as fixed, as frozen in time, and others seem to be objects that dissolve into transitory existence; or as ephemeral moments. The physical is readily reducible to a stock of knowledge, that can be translated as models and manipulated with symbols. But the other intentionality, which is the meaning, conveyed as information, is given in a biographically determined situation; meaning is serendipitously made, the implication is that that there is a separation between action and reflection and furthermore that there is a difference between the doing and the observing, and underlying this is the problem of where meaning can be found. Is it found in the intentions of individuals, or given in the precise definition that is accomplished through analysis of meaning?

The terms 'information', 'systems' and 'information systems' have, for Lee (2004), fallen into such careless use that they seemingly no longer denote anything different from one to another. Reverting back to data plus meaning, often understated in IS as just information, it is not just something that has one meaning, nor even one level of meaning; it possesses more than a resource of physical data, and has endless possibilities according to 'intentionality'. For example, it would follow that in pursuance of the same item of data, the actions of the IS researcher and the person occupied in daily life doing Requirements professionally could be pursuing different aims. For the researcher it has one potential meaning, for the Requirement-ist another and this extends to different people doing the same job, and so on, as no two people are alike, no two people use, receive or understand information in exactly the same way, with the result that data is understood from a perspective. The action and the toil of work for the scientist is of acquiring suitable understanding acquiescent to that domain, as Schutz puts it; "the construction of the scientific world is not an arbitrary act of the scientist which he can perform at his own discretion" (Schutz, 1962 pg, 87). The conventional, theoretical attitude assumes that the person occupying the role is more or less interchangeable, or that one lawyer is much like another. But this overlooks the fact that working with the intention of action to bring about uses allows emergence, and forces changes within that domain. The person, who is occupied in the toil of the life-world, invokes actions, with "in-order-to" motivations to achieve a goal. For example, in the case of a Requirements analyst this would be to deliver the specification. But that is the very point. It is because we know what a Requirements person is doing, that we are able to infer that to do Requirements means using a Requirements method or employing a Requirements person to do the task. Nevertheless, it remains that the method chosen and the application of tools chosen belongs to each person as his own individual accompanying baggage of how to do Requirements. The assumption that has been established and that needs to be questioned is the inter-changeability of people occupying the role.

Emergence of daily activities is the spontaneity of acting with a 'stock of knowledge' rooted in a life-world the world of everyday experience as opposed to the realm of transcendental consciousness (Schutz and Luckmann, 1973; Burrell and Morgan, 1979; Boland, 1985; Lash, 2001), in not just physical things but including concepts such as values, ideas, relations, numbers, music, meanings, institutions, mores, folkways, laws, beliefs and so on (Zaner, 1970), as all are involved in the life-world, in a commonsensical way. Whilst doing is not the same activity as the contemplation or the reflection upon a previous activity, and another's is not the same as one's own, there is also a great deal of difference between actions actually performed and action only imagined as performed (Schutz, 1970 pg, 134). No one intentionally and deliberately plans for failure, (if not for themselves) in a project, and it is safe to assume that things will happen along the way, things get involved and may interfere with the journey, unanticipated events occur which alter, or even disrupt and change the course and direction of the planned goal. But all of this would sound far too vague for the scientist, researcher or the professional Requirement-ist; in the theoretical attitude there is the need to plan, and to draw up 'the blueprint'. To predict accurately a complete success, prior to any execution would have to mean that nothing would be left to chance. For this to happen, any extraneous events, influences and contingent attributes that may emerge, will have to be accounted for and dealt with, either by some process of post hoc explanation or adjustment during the process (Garfinkel, 1967). Designing a plan, which just might be a satisfactory arrangement for a laboratory setting, would be discounting the fact that some experiments and discoveries of science are arrived at by chance, born through accident (Waller, 2003), by the application of expertise in trying circumstances (Collins and Pinch, 1998) by acting politically (Mumford and Pettigrew, 1975; Knights and Murray, 1994), or through the learning process of reflective practice (Schön, 1991).

The notion of the idea of 'designing' and planning becomes deeply problematic when the plan is itself positioned, sometimes erroneously called embedded, in the social environment, which is exactly where the Requirements process seems to be. This is the same problem found and reflected in the familiar story of the project of Requirements. As previously discussed in chapters two and three, and having being identified as the problem of abstraction; the starting default position is, as the present strategy states; that the goal is to achieve a Requirements specification, preferably to be achieved through the application of a method, or process which will lead to delivery, via design, to the producing of a product that has a typified social interaction.

The constructs of this thesis takes a more radical empirical approach, coupling the thematic horizontal acts; which are the consciously intersubjective pragmatic in-order-to interactions, together with, interlocking with the structurizing (Schutz, 1970) realm of relevance, which is the vertical appresentational reference scheme detached from any intersubjective context (Schutz, 1970). At this intersection stands the life-world of emergence, locking the two together. Thus, by always locating the temporal moment as the key anchor reference point the result is the making of serendipitous discoveries, rather than detached and abstracted constructions into second order concepts. The remit for investigation here is about how the improvisational, experimental and tentative practice produces intersubjective products, which are recognisable as the outputs of a process of doing this, or that, and how this or that becomes recognisable.

4.3.4 Multiple viewpoints

Multiple viewpoints are often used in Requirements Engineering (Nuseibeh, Kramer et al., 1994; Lamsweerde, 2000; Viller and Sommervill, 2000; Stary, 2002), the claim is to provide richer modelling 'abduction' for the domain (Menzies, Easterbrook et al., 1999). This commonly found approach conforms to and has a justification appeal to the rationalization foundational scientific thinking of a model, involving the constructs, abstractions, generalizations, formalizations, and idealizations. However, In Schutz's general thesis of the reciprocity of perspectives; idealization and congruency, he raises a difficult issue; that of how systems of relevances are operationalized. Schutz argues that 'Socialized knowledge' is socially derived, and that any interpretation or understanding is a construct; making the claim that all 'social scientists' and their 'ideal types', models are 'just constructions'. Schutz's postulate is that, in daily life or in social science, people are always 'forced' to operate within 'typifications of human conduct' and 'models' of social processes. But, when this is applied to the actionability of Requirements then the problem of multiple viewpoints equivocation is laid bare.

For Schutz, 'intersubjectivity' of the common world in the face-to-face relationship is founded upon his "general thesis of the reciprocity of perspectives" (Schutz, 1962 Vol 1, Part 3). This is composed of two parts; a) the idealization of the interchangeability of stand-points, and b) the idealization of the congruency of the systems of relevances (Schutz, 1962). The first assumes that if two people 'change places' despite there different personal biographical history there are sufficient overlapping commonalities, for all practical purposes, for them to arrive at a common understanding. This would appear at first to contradict statements in the preceding section, but a clear distinction is made here between research sceptically seeking understanding and conducting the research activity of theorizing through retrospection and that of the daily acceptance in the life-world reciprocal conduct is 'taken it for granted' and we "assume" others to do the same (Gurwitsch, 1962). At the personal level, the perspective is taken that focuses on the horizon taken by the individual, the constitution of meaning in the solitary ego (Bittner, 1973), and at an intersubjective level, the focus is on how meaning is transferable and reciprocally understood between people. And finally, at a post-subjective level, the analytical interest is to examine how meaning is made to 'leap' onto the province of theoretical thought (Schutz, 1970, 260); becoming the constructed object of social thought, as an objectified source, detached from the individuated meaning, where it becomes a typification residing in an representational horizon.

For the researcher, it means that there is a sceptical space created which is a position that is similar to that in the jobbing work of an actor, when, preparing to 'play-the-role', asking; "what does it feel like to be this character?, and what is 'my' motivation for this part". This space gives an opportunity to reflect upon the dialogue, as in a script, and to look for insight into the lines. It also forces the researcher to accept that particular perspective and from there to concentrate upon those actions that are projecting forward so that the 'in-order-to' motivations can be grasped without the theorising to other abstract 'because-motives'.

Schutz's interest in music and drama (Schutz, 1982) was used to postulate that through the arts, works and productions are capable of reproducing the life-world. The spatial-temporal world of the stage, through 'the living movements and actions of the actor', provide the illusion of true duration, an imaginary duration, not our duration, but one in which we can temporarily accept that the other lives. This is the inclusion of the spectator into the Thou relationship, surrendering to objectification. The Thou relationship, which can be clearly understood, is an essential precondition of the drama, and is a precondition achieved because of interpretative transference and the ability to understand action and life in sympathetic introspection.

Schutz expresses this as a part of a “natural attitude”; which draws upon previous experiences, the ‘stock of knowledge at hand’ and the unlimited, extraordinary capacity of people to construct objectives, actions, and events of social life. This aspect, used with an open mind, is useful for researching, understanding and generally getting the feel of things. But when this is also used in conjunction with a frame of reference, from the perspective of Requirements, then the reciprocity of perspectives already has a perspective, which is filtering out all practical purposes and transmuting them into a model, hence the ‘forcing’ attitude. Because it is ‘forcing’ people to operate with an inflexible model of a single social process, and this single perspective viewpoint is particularly prevalent in Requirements thinking, as the common understanding is that there can be here no multiple viewpoints. The problem is that the approach has already fixed the elements of the attribution systems, the future project is fixed; the project act is seen as a completed task that already exists although in the future; this results in inflexible rules of navigation in an abstracted system which in effect offers no choices or alternatives on the way to the goal. The future practical actions of having a comprehensive representation are unattainable, whereas, in the natural attitude of the here and now, where future actions can only be imagined, there are no absolute representations and it is not possible to separate out exact and precise future characteristics.

This suggests that; what is required of the research is to develop a strategy that will lead to an understanding of how people in situations make and use representations and theoretical constructs. That is now starting with “The essence of the social world, conceived as the constituted texture of meaningfully interlocking activities of actors on the social scene” (Zaner, 1961). The research especially needs to extract and examine the intermediary layer, the in-between fluctuations between the personal level perspective and the constructed objective of social thought of typifications.

4.4 Conclusion

This chapter critically assessed the What-How problem, formulating a strategy to empirically investigate the [phenomenon of Requirements], and, mindful that research methodology ‘interferes’ with the research effort (Trauth and O'Connor, 1991), focused instead upon the interpretive schemes and inter-actional processes through which people create and "accomplish" in their world.

To do this it was decided to split the research framework. Phase one, the subject matter of the next chapter, and of chapter six, where the work involved in the sensemaking of an IT project is examined, capturing the practice actions and noting the missing literature, with accounts of how practitioners, stakeholders and interested parties 'actually' manage the IS task. Secondly, phase two, chapter seven, organises a framework from which to test the Requirements theory.

Three ambiguities were examined in relation to the three laws of Requirements. ‘we can get the Requirements right’ invokes the problem of freezing the specification. The ambiguity of ‘getting the stakeholders to agree’ has problems with multiple viewpoints. Lastly, the ambiguity of ‘we can solve the problem with a product’ assumes that there is a selective rationalist specification process that matches human activities.

Chapter 5

Phase one - the case study analysis using workbooks

"If an organization can be found that does not know what it is doing, it would be wise to stick to it and learn more about it" (Weick, 1974)

5.1 Introduction

The objective of this chapter is to leverage an intermediate step in two basic stages; the first being to introduce and give an overview of the case study, with an outline of the background context influences that structure and provide many of the antecedent conditions, and in the second stage to critically discuss the collection and formation of the data set and it's role in supplying the material for the analysis.

The next section develops the research approach and formulates a framework for the implementation of its investigation, building on the conceptual underpinnings of the previous chapters. This is followed by an introduction to the case study and a discussion on the contextual background. The last section focuses on the data collection with a critical discussion upon the data sets and data collection methods, and the interrelationship of data materials.

5.1.1 Methodical approach to presenting the case study

Phase one is about producing an understanding of the case, in formatting the material, and while doing this, facilitating an audit trail that should promote an iterative learning spiral to advanced levels of meaning whilst connected to the fundamental 'brute fact' of 'observational datum' (Hughes and Sharrock, 1997). This process is achieved by the use of the recordings of naturally occurring conversations, applying the concept of [Bracketing], which is a method to interrogate (formatted, making sense of), to observe the 'what and how' of what is happening, whilst maintaining the original temporaneous moment. This method starts from a basic premise of transcribing and then notating the visibly-rational-and-reportable-for-all-practical-purposes (Filmer, 2003) as found in the locally produced linguistic typification of its constituent phenomena (Psathas, 1975). In short, establishing that the topic of conversation, at this or that point, was about this or that particular subject or topic.

The analysis of phase one is further broken down into two stages; stage one selects the topic of the conversation, which [Bracketed] the phenomenon out. Followed by stage two in which the development of Workbook analysis uncovers the about-ness of the phenomenon. The placing of the [Bracket-ed] topics into Workbooks facilitates an iterative process of outputting 'key' aspects.

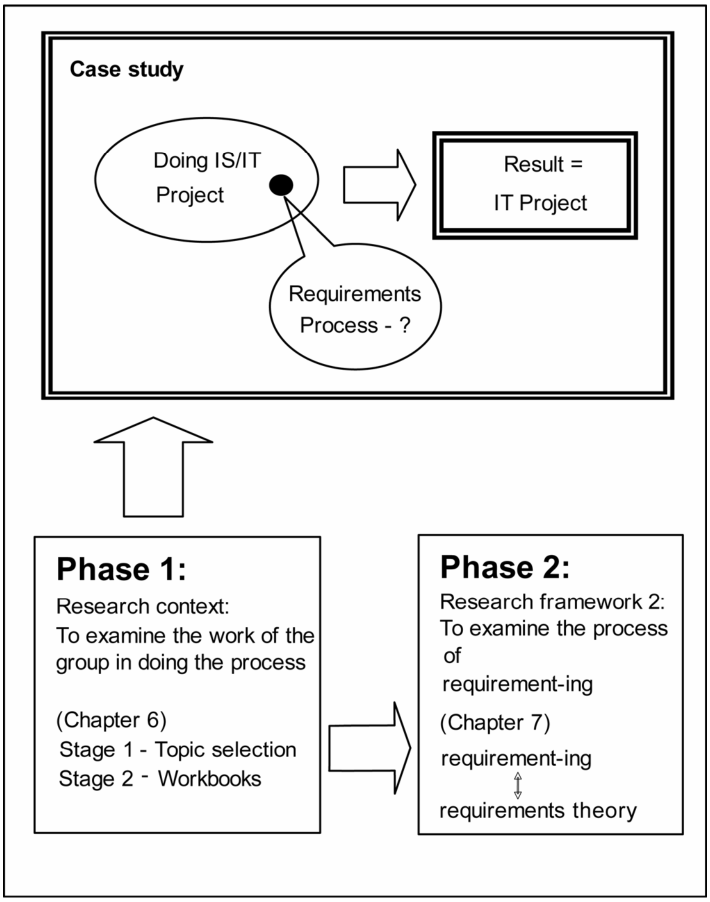

Figure 5.1: Phase 1 & Phase 2

Phase one, is the "about-ness" of the case study. The aim is to produce a body of reference material about the people-doing-an-IS-IT-project, with the specific interest upon the How, or How 'they' managed the process. This is an alternative position to the researcher picking out or selecting details, taken from a particular referenced perspective, or in starting from a predisposed requirements framework to test a set of attributes against a theory. It is also differentiable from a Grounded Theory, from the perspective of the researcher creating generalizability from category making. The aim here is 'NOT' to directly make or construct categories in order to theorise. Rather, it is to ask the simple question; is it possible to 'recognise' elements of 'category use' that could be acknowledged as belonging to a particular process?

This research approach construction is following the Schutz postulate of adequacy, as the grounded ideal type of the first order. Which is, that "each term, in such a scientific model of human action, must be constructed in such a way that a human act performed within the real world by an individual actor as indicated by the typical construct, would be understandable to the actor himself as well as to his fellow-men in terms of common-sense interpretation of everyday life" (Schutz, 1962). Thus, the aim of the phase one is to provide a body of reference material of understanding with an account of the actions undertaken in the making of an IT project.

The splitting into two phases, illustrated in the figure 5.1 above, serves a second purpose, in that it also helps to establish and identify the sphere of influence of the requirements process, its operation and the boundaries of the requirements theory in use.

Phase one of the research approach is about the detail of the work, where the-doing-of-requirements-is-said-to-be taking place, or where the phenomenon is taking place. This starts from identifying the phenomena at work, by recognising the processes of the attributions involved. That is; what assignment do 'they' make in their doing and in what ways did the ascriptions of the process-at-work become manipulated.

5.1.2 Understanding 'Context'

The methodological research approach identified the need to focus upon the composition of the phenomenon of Requirements organisational process. This led the research approach to produce an alternative attitude of having no presumptions. However the research problem as identified by Davies (1991) remarks that in ISR, the framework for the analysis of organizational context is not currently available, suggesting that data collection techniques could look for a mixture of sources to indicate possible diversities in a situation. He proposed that analysis has to deal with the recording of events, and that it should show intensity of feelings, moods, self attributes, re-interpretations, role-related issues, etc (Davies, 1991). These are the very qualities of being capable of giving a meaning, which cannot be expressed logically (Schutz, 1967) and as previously discussed in chapter four, in the section on 'multiple perspective', meaning-content can be analyzed in terms of its meaning-stratification and these qualities of expressions belong at one level as personal (or individual) expressions, but they are made intersubjectively, such as in a meeting or in a group context, and so expand into a continuum towards interactions at a group level. Here begins the process of typifications that leads to ever increasing anonymization and abstraction. It is the very process by which this spiral is operationalized that is of interest here in phase one. Other groups of people are referred to, epitomizing a grouping, 'those people as an example, or as 'them', who belong to the IT department. It is a small step before these 'other' groups become referred to as organisational aspects and remarks are made that refer to the organisation as an object entity, having characteristics and attributes that set it apart from other organisations. "This is the way we get things done around here", with the style, attitude and places that are in association with the organisational entity. In turn, boundaries are drawn around 'our' organisation in order to respond to other organisations that exist in the environment context, such as other local authorities, governments, identities and associations of nation states, for example the labelling of Paris as the city of love, and so on. All these aspects/associations have been formed in the minds eye, expressed in a meaning-given-context, with a mood or attitude towards the project and can be aligned with a self motivated aim when announced in intersubjective actions. Nevertheless, all found in the qualities of expression, these are rooted in the important antecedents of desire, belief and intention (McGinn, 1982). To be otherwise is a plain denial of the autonomous human.

This reason for bringing the background context into the debate is so that we can 'relate' the actions undertaken by the people who are embedded within a context, and which are then framed and help to shape ensuing events. The convention is to treat the antecedent contextual conditions as the derivative source from where much of the legitimacy (Pettigrew, 1987) is said to be obtained. For example, symbols and ceremonies are legitimized by their environments (Boland and Day, 1982). These are recognised constructions, composed of internal structures, often labelled cultural and political, and are aspects of the broader features of an outer context in which the organisation operates. The specific interest here is in the interplay, of how the concrete examples of action can shape and be shaped by the constitutive structure, with intelligible intentional meanings. And conversely, how these antecedent context conditions help to structure and shape the practicable activity of arriving at the quiddity. Some modern IS research works often reference Giddens' work, where he refers to this interplay as the duality of structuration (Giddens, 1979). His work builds upon the earlier phenomenological sociology approach of relating the personal actions in a macro sense of social structures; whereas, this research follows Sacks' (Sacks,

1992) starting point, by examining micro organisation of speech interactions, finding that in the constituting phenomena, such processes as formalization and generalization are parts of the ego's "experience" (Schutz, 1967). These schemes have their horizons and perspectives that depend upon the degree of attention which the Ego bestows upon them (Schutz, 1967). For Schutz, 'The reciprocity of perspectives' or the 'structural socialization of knowledge' has at it's origin many recipes for handling things and people in order to come to terms with typified situations (Schutz, 1962), and this has to also include the researcher's own research investigations approach.

For Schutz (1967), it is necessary to understand individual action in order to gain access to the meaning of each social relationship and structure, 'constituted as these are, in the last analysis, by the action of the individual in the social world' (Schutz, 1967). These context conditions are linked to the actions and events undertaken by the people involved, as these "antecedent" conditions help to shape the fit of the constructions and the patterns that subsequently emerge through the actions of people. "Phenomenological analysis 'alone' can provide this insight, because phenomenology is concerned exclusively with the structural relations essentially prevailing between the organization of the world and the organization of the mind" (Schutz, 1962).

5.1.3 Three perspectives at work

This sub-section describes the research application and the differentials between the perspectives of, firstly the originators, the people involved in the case study, secondly, the researcher, enquiring about the case study and thirdly, the reader, who is learning about the case study. The only direct link between the three is through the data set formed during the research. But an important shift in perception is taking place; all these three have different interests, motivations and interpretations of the data. This presents the research problem of presentation, and contains a potential source of ambiguity which has to be removed before the analysis stage, because the interest is not in extrapolating and manipulating variables into a model of reality, but is in seeking to engage with the problem of that which is needed to maintain the original conceptual moment of the data. To do just this, there is the necessary task of understanding the context setting of the case and secondly the perspectives at work in understanding this context.

The research approach step here is to assist in locating the viewpoints from which to examine the data. The job of the research approach is, as the previous chapter outlined, 'must be' and can only be, the understanding of the 'ordinary actions', and its methodological construction. Verstehen is the intersubjective empathy and comprehension of understanding from the actions of people from the different perspectives of firstly the originators, with the people involved in the case study, secondly, the researcher, enquiring about the case study and thirdly the reader, learning about the case study. The reader is furthest away temporally and spatially.

The analogy of explorer fits well with all three perspectives. Firstly, the expedition is setting forth into unknown lands, without the requirements intentions and beliefs, and is relying only on the characteristics attributable to the expressions and actions of the people involved in the case study. Secondly, it is analogous to the researcher, who is reconnoitring, retelling their story, and bringing back from the field memento vivere. Thirdly, the case study produces an Exploratorium for the reader to engage in as a critic with what 'They', are doing in the capturing of requirements, in the bounding of the requirements phases, and in deciding the need of what is, or what should be, considered important.

The inquiry, supported by the research approach is all about seemingly mundane events, because people will deal with unexpected events as and when they occur, by recasting the strange and unfamiliar back into the familiar. The meetings by the project group are about dealing with both "what is unanticipated," and that which is anticipated, in 'exactly' the same way that humans go about their own daily purposeful activities. There are also circumstances where intentions are not immediately understood, or are misunderstood, ignored or misinterpreted, in which case "stop and think" interrupts the flow, iterations take place, until the point of 'oh I see' emerges. This research approach also has to include the understanding of accidents and slips that happen, and the subsequent corrections, that is, if the other participants of the conversations have noted them. These are attributes of the sense-making innate abilities, formed from the baggage collection of previous experiences. But, the point is here not to retreat to the expected, as the drama that unfolds is not pre-ordained, and this is a point laboured in order to touch upon how the unfamiliar becomes familiar, by the artful, creative, intentional interpretations that are applied continually in the life-world.

The three levels of perspectives are highlighted here to differentiate them from the 'multiple perspective', as discussed previously in chapter four. The original speakers, whose voices were recorded in the real time frame of the unfolding event, the researcher, who transcribes, [Bracket] and interprets the on-going emergent action, and the readers, who have their own motivations, and who are separated from the original action. In part, it is the reason for supplying three fully transcribed transcripts, which are to be found in the appendix, to facilitate the reader to recreate the haecceity and the endogenously produced local order for themselves. The three transcripts sign-post the path towards understanding and sensemaking, through one's understanding of other participants working in the life-world. This highlights the way in which research activity and the recollection processes disrupts the temporal flow.

The need is for this research to understand what is involved in the different perspectives, between explaining for example, an accident, in terms of the existing stocks of knowledge, with subsequent, privileged, post hoc interpretations and that of understanding emergence, where it is possible upon reflection, for false intentions to misrepresent data when compared with the original intentions. A laboured point in order to take off the blinkered and misunderstood extemporal intentional viewpoint made at the time of the process of data collection, with the intention of turning it into knowledge, having safely removed the originator's intentionality.

The relationship gap is between the knowledge of the reader and the knowledge of the researcher concerning the background influences involved during the period of the case study. This concerns the quantity and quality of the original data material, and the researcher's experience in spending time at the scene, of talking over coffee, and of generally absorbing the atmosphere. The aim is to produce a report that provides what Denzin (2000) calls a 'realistic, concrete, "as to" character setting, atmosphere' account', the 'public-journalism-as-ethnography', the writer's story of "my-story", with the 'theory never far from the surface text' (Denzin, 2000). Also to produce the information needed for the reader to feel confident of recognising and setting the produced analysis within a framework of context. The main reason for presenting the wider background viewpoint is to help the reader to 'approximately locate' the data examples used and be able to put them into some sort of meaningful background. For this, Yin's (2003) wider definition appears to be apt for the case study overview; that it should cover the 'background information about the project with the substantive issues being investigated and the relevant readings about the issues'. However, this research aim is not to 'round up', as in latent theorising with the textual account of the data, but is to provide a background from which to elucidate and emphasize a report upon the concrete examples of typifications that were identified in the case study. In order to do that the reader needs to be able to relate to concrete examples of the antecedent conditions, that is, the factors that facilitated the actions and events that took place, and this presentational and research issue remains a partly unresolved problem.

The plain fact is that at every point, there is not one bracketed, extracted temporal sample that can be selected for investigation and put into its constituent parts, or as a part in its relationships to the surrounding context, that will ever be able to accurately represent, portray, and stand-in as a ‘fact’. The whole story exceeds the likelihood of anyone’s ever knowing of a way of representing of a viewpoint in it’s entirety through instrumentation. As at any level of understanding, there are always further horizons of exploration, and there can be no certainty. ‘No beliefs about the physical world are indefeasibly justified’ (Everitt and Fisher, 1995; Appiah, 2003).

The choice is stark; on the one hand, produce all the data and overwhelm the readers’ patience and workload, or alternatively scantily dance over detail and run the risk of ‘glossing’, and of missing the point about the locally, spontaneous endogenous production of order, or draw a boundary around the investigation, somehow using theoretical definitions. As this last option has been already dismissed, because of doubts about the theoretical concept, and the second option of glossing over holds problems of missing the necessary validity and detail, the choice is to create a research approach that will allow multiple levels of interpretation, with multiple iterative emergent aspects within the substantive detail. But then, the overall picture is lost, so 5.2 gives an uneasy, wary compromise, with an account that stands somewhat apart from the flow of the main thrust of the thesis, consequently it is no more than an indicator of some of the background issues that frame the research case study, rather than being a precise framing of the research question, because to include every detail is not a realistic or practicable possibility. But, without reporting some of the background knowledge, it will be impossible to make sense out of some of the later analysis.

As for validity, George Psathas (1973) suggests three tests for validity of investigations into life-world studies.

1. That “the findings are faithful to and consistent with, the experiences of those who live in that world”
2. “whether the descriptions and accounts of the activities would allow others…to recognize the activities if confronted with them in the life-world, after having only read or seen the account presented”
3. The research provides the rules, the recipes for performance based on and includes many everyday operating assumptions. So that; “the "reader" can become a "player" after having "merely" read the rules”

(Psathas, 1973)

5.2 The case setting

The case study overview, is, in a nut-shell; about a group of people that work for a large local government organisation who are putting together an IT project. The project was to produce a ‘Web based system’ which would enhance the facilities of the council members, in their management of casework. The profile of the project was not overly ambitious; in fact, it was small, ordinary and modest in aim. Yet technically, it meant changing part of the infrastructure to accommodate it. It foreshadowed changing working patterns. Its requirements elicitation process was multifarious and prone to many convoluted turns. The project demonstrated aspects of skulduggery and chicanery. The result ended in a botched job, partially implemented, with an intended but un-stated future development plan which was dependent upon the notion of there being phases of development, there were things still to do, and things that were not done, but put off. Finally, in the end, fate intervened and events overtook the original intentions.

For some people, the project was about changing working practices and changing the process of the work flow in the council. For other people, the project was about the integration of working practices into their own systems. The management saw the project ‘as-a-way-to-get’ IT things done and as an opportunity; while others saw it as a threat to the ways-in-which IT is achieved. It is, in short, a typical IT project, a ‘typical’ every-day story, of trying to get an IT project to completion. To the researcher’s advantage, the system project operational date was an immovable deadline, determined by the local elections. However, getting to the point of having something up and running was problematic, like so many other IT projects. However, the work of the analysis in this thesis is not about the story of the project per-se. Rather the attention is turned towards the detail of the-way-in-which things get done. The reproduction of their story as retold in the transcripts, is of the project group meetings which took place over a time span of just over a year, during which there were many difficulties and issues that the project group had to overcome. The purpose of the following section is to supply the background antecedent conditions of the story of the research, so that the case exists within a context of understanding for the reader before the presentation of the analysis data.

5.2.1 Organisation environment

The following section, the case study setting, is a discussion upon the ‘context conditions’, set out as a report to introduce the case study to readers. This cannot give a complete picture, nor is it ‘strictly’ central to the analysis approach. The aim is to furnish, up front, a notion of the multifaceted aspects of the background issues at work, with a presentation to highlight the scene setting influences. The presentation is performing the role of a gauze curtain raiser or the scene-setting, to supply the atmosphere; it is a backdrop to the enacted various situations, in order to study the ‘creative’ moments of the performers, the phenomenon being classified under the vague heading “the context”.

Overview of the council: The case study, Springfield local council authority (pseudo-name) is one of a number of local authorities which constitute a large metropolitan area. It has a large culturally diverse population, with approximately 132 different languages spoken, an acute problem of unemployment, and it suffers from small business relocations out of the borough, as such, Springfield has a mid range deprivation ranking in the national statistics.

The borough is divided into 21 wards with a population of 272,500 (2001) including five key town centre areas. 63 councillors, who are democratically elected every four years, serve the whole of the borough and have an overriding duty to the whole community. Each ward is represented by three councillors who are accountable to residents of their respective wards, including those who did not vote for them.

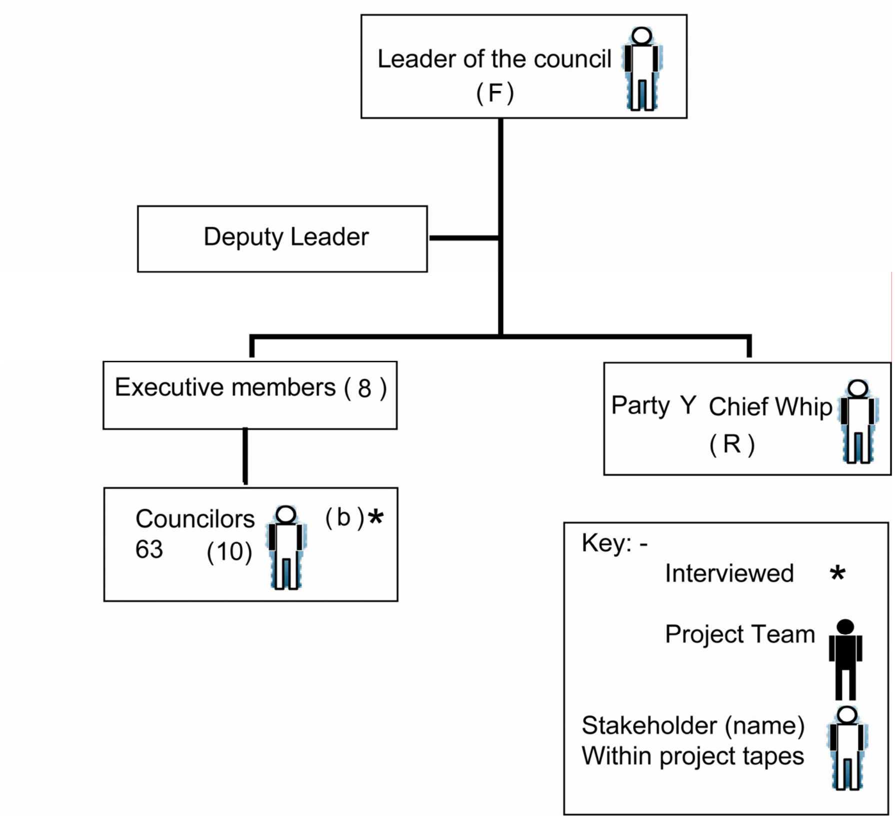

Figure 5.2 Organisational Chart of Council members involved in project

The Council is the supreme body, deciding the Council's overall polices and budgets, including setting the policy framework under which the Executive operates. The executive is responsible for policy implementation. It is composed of Leader, Deputy Leader and eight other executive members with portfolio responsibilities. The work of the executive and the Council as a whole is subject to scrutiny by one overarching committee and six sub-committees. The executive is responsible for the delegation of the day to day operations to officers, some direct 6,000 employees of the Council, and is also indirectly responsible for numerous contracted out services.

Within the remit of its operations, Springfield is directly and indirectly responsible for providing a large range of services, including the major ones of Education Services, Housing, Planning Environmental Heath, Roads and Refuse and indirect ones via partnership bodies consisting of; housing forums, transport, youth primary care trusts civil defence, Law centres and advice bureaus, community business partnerships and social associations.

Influence of the central government:

Central government exerts a huge influence upon the strategic policy direction of the work of the executive through various levers of control. One such mechanism is through the imposing of standards of services.

Central to the national government strategy is the local e-government strategy, and 'The Local Government White Paper' set out how the Best Value Framework is being 'streamlined and strengthened', to enable councils to use it as an opportunity for radical change and to engage citizens and staff in improving services (http://www.pm.gov.uk). The Prime Minister (Tony Blair) "...I am convinced that these principles, record investment, the skills of those who work in public services, and our shared commitment, will help deliver the high quality services that the British people rightly expect. We must not let them down".

The government plan committed local governments to produce vision statements for 'improvement' to local government electronic services delivery (ESD) setting a target of 100% ESD capability by 2005. Additional financial resource allocation of £350 million was made available nationwide between the years of 2001 to 2004, subject to successful application and a statement setting out strategy actions.

Springfield IEG Strategy plan identified that around 50% of services could be delivered electronically, that is, made available through the Internet or over the telephone with direct access to systems. At the beginning of the case study project, the IEG strategy was yet to be fully completed and was awaiting submission, but the main problem and hold up, was because they were still involved in restructuring departments; including the IT department. Consequently, positions and responsibilities were only just beginning to be finalized at the start of this project.

5.2.2 Project overview

The purpose of the project

The sanctioning authority of the chief executive and leader of the council created the project board to oversee the project case study. In many ways, this project was unique to the organisation and has wider interest for IS in three ways;

1. It cut across many organisational structural silos. The project involved joining up different and distinct operations, coordinating

and assimilating information sources to present a unified process to the councillors.

2. It was a web based project that sought to be application based rather than being marketing or informationally orientated, which is commonly termed in IS as brochure wear; this project would align with what Currie has labelled the fourth and final stage of Web systems, which is the integrated approach (Currie, 2000).
3. The interest for IS concerns the management of the project itself. The control of the project, the finances, project management and responsibility was all to be contained within the remit of this specially created project board task force for this project.

Of particular note was the fact that it was unusual for top management to have hands on, day to day, direct control of the running and overseeing of an IT project. The custom or the expected norm would have been to hand the project, lock and stock, to the IT department and have them report back through procedures. However, this project was special, particularly in that its timing was auspicious; it was initiated at a confluence of converging streams of opportunity and was skilfully, accidentally, coincidently or perhaps fortuitously seized. This was a situation where the structural workings of the organisation facilitated its commencement and there were multiple reasons, and ‘motivations’ to pull, push and keep the project up and running and highly profiled in the actions agenda.

In a nutshell, strategically, from the organisational viewpoint, it could be said that the leader of the council, acted with ‘amazing’ subtlety, using knowledge, design, and tactical positioning. The chief executive seized an opportunity, at a confluence of fate, to bring about a potential change in the organisation’s way of working, which would affect the work process at a high level, that is, at the decision making strata, this could also be interpreted as an double edged sword initiative, or a political action. The standing of the project had many subsequent implications, or potential future significations, and unforeseen future consequences. The directive actions that the leadership initiated sowed the seeds of ‘accidental’ consequences that stretched well beyond the horizons encapsulated in the original title headline remit, which had only envisaged limited boundaries of this particular project. The initialisation of the project framed a series of consequential knock-on effects. The implications, as-they-became-realized with the following bow wave, had potential and actual fall out with the ‘doing-of-the-project’ having direct consequences for the workings of the project board. It brought about open politicking directly into the area of the requirements domain. It was unusual, in that circumstances facilitated the chief executive to initiate this project, in by-passing the norms, which was due to there being no director of IT currently in post, and that the IT department was still in the throes of a comprehensive reorganisation. An interesting what if question would have been that; if IT had not been in such a weakened structural position, then would a project like this have progressed further than a feasibility study, or the creation of a project board. The suspicion of this researcher is, perhaps not. Perhaps, colloquially, it would have been stopped somewhere on the golf course.

The 'stated' motivation, purpose and aim for the project was to 'computerise', to assist and propel, the 'councillor's work' into the 21st century. This is neatly captured by the vision statement, which was a document revisited throughout the projects life time span.

The project brief:

The chief executive articulated a 'vision statement' document requiring further action, reproduced here in table 1 below.

"Our vision is that by June 2002, all Springfield Council members will be able to access their Springfield Council e-mail, and the Council's intranet, from any location in the world. There will be a single, fully wired members' enquiries system which will be easier for the Council and for members, and will provide enhanced facilities for members in their management of casework. Furthermore, members will be fully trained, and have full ongoing support, and there will be constant review of members' IT needs" Fully wired members will: 1. Be able to communicate with e-mail from their offices, homes and any other location in the world (using hotmail technology); 2. Require the necessary equipment, training and ongoing support; 3. Have intranet access from various locations; 4. Have an effective electronic casework management system; 5. Have full access to electronic diary facilities.

Table 5.1: Vision statement and requirements – the project brief from the leader

The vision statement was referred to and re-used throughout the project, for example; in Tape 1 [Bracket 2] the leaders' vision statement acts as the triggering event for the topic of conversation of what is effectively the opening of the project.

Extract from the Workbook Tape 1:

1. **Key Triggering Events: [Bracket 2]**

C	…. leader was very keen to have a vision on …the support for the members. He wanted us to go away and make it happen. Er (0.2) Certainly in time for May 2002 when we have the er (0.2) new intake of members, coming in…we will have a change around of about half the members on the council >potentially quite a lot of new people…

Text Box 5: [Tape No 01, Bracket 2, Line 8-13]

Making sense - of the leaders vision – take forward

Figure 5.3: Extract from Workbook 1

This fragment extract above is from a conversation that forms a part of an opening 'introductory speech', a positional statement about the 'background' and the current context position about the project, given by 'C', the project leader.

Jumping to the future, one of the last tapes, just under a week before the implementation date, the leader's vision statement is to be found again, this time to see if the requirements brief had been met. However, here a year later, the use of the leader's vision statement is for very different reasons.

C	I // was just looking at the leaders vision again and what they wanted (.) they wanted to be able to communicate with e-mail from their offices (.) home and any location in the world (.) so hopefully we will have that
M	yes
C	require the necessary equipment (.) training and ongoing support – except we've made a difference there by saying we won't be supplying the equipment (.) they have to buy it themselves (.) but we do need to give them guidance on it yer
M	yes
C	have intranet access from various locations (0.5) that's the bit we're still struggling with aren't we (.) the intranet connections
M	yes
C	have an effective electronic casework management system and have full access to electronic diary facilities (.)
M	well (.) they won't get full access to the electronic diary facilities because it'll be read only
……	
C	…. if they want to run their diary from the computer system

H	Outlook (.) oh that's right
M	…diary system (.) that will be fine ya
C	so we're pretty much sort of there (0.5) if Uxxx delivers on the work that he's done so far (.) yer which we need to chase Uxxxx and Wxxx Wxxx on (.) but when I spoke to him Wxxx said that (0.3) err the staff were 110% that they would deliver and he was 85% that they would deliver (.) so I think we just need to plug that gap there (0.6) OK

Text Box 5.1: [Tape 34A, Bracket 5, Lines 73-114]

In the text box above 'C', the project leader is re-reading the leader's vision. The vision statement is used here, in the closing stages of the project, as a check list, with the project manager (M), and it highlights the fact that the project still has a major issue(s) (intranet access) to resolve, without which the whole system will not work as anticipated.

Project leadership

'C's role is as 'Project Leader', marks out one of the interesting provocative antecedent conditions. 'C's position in the organisation is head of democratic services, a senior position, directly responsible to the chief executive. Unfortunately, 'C' is not knowledgeable about IT. In the introductions of the first meeting 'C' announces, unguardedly;

C	my name is C and I am (.) completely rubbish about IT (.) but I am leading this project (.) and we will see it through (.) so you will find me//

Text Box 5.2: [T0-B1-L23-24]

'C' is on the same organisational level with the Directors of Services. 'C's is a unique position in the organisation, and she performs the role of the conduit of work to and from the council members. The leaders' appointment of co-opting her as head of this project facilitated several positional arrangements (opportunities) that would not normally have been available for the leader to leverage.

Firstly, as there was no IT director in post at the initiation of the project, 'C's appointment allowed the executive director to ('directly') monitor the project, so that various reports and a meeting were conducted with him during the project (One of which this researcher attended). The opening provided an opportunity for the leader to contribute this project towards the fulfilment of the government's aim of e-government and as a pilot vehicle for E-govt IT provision.

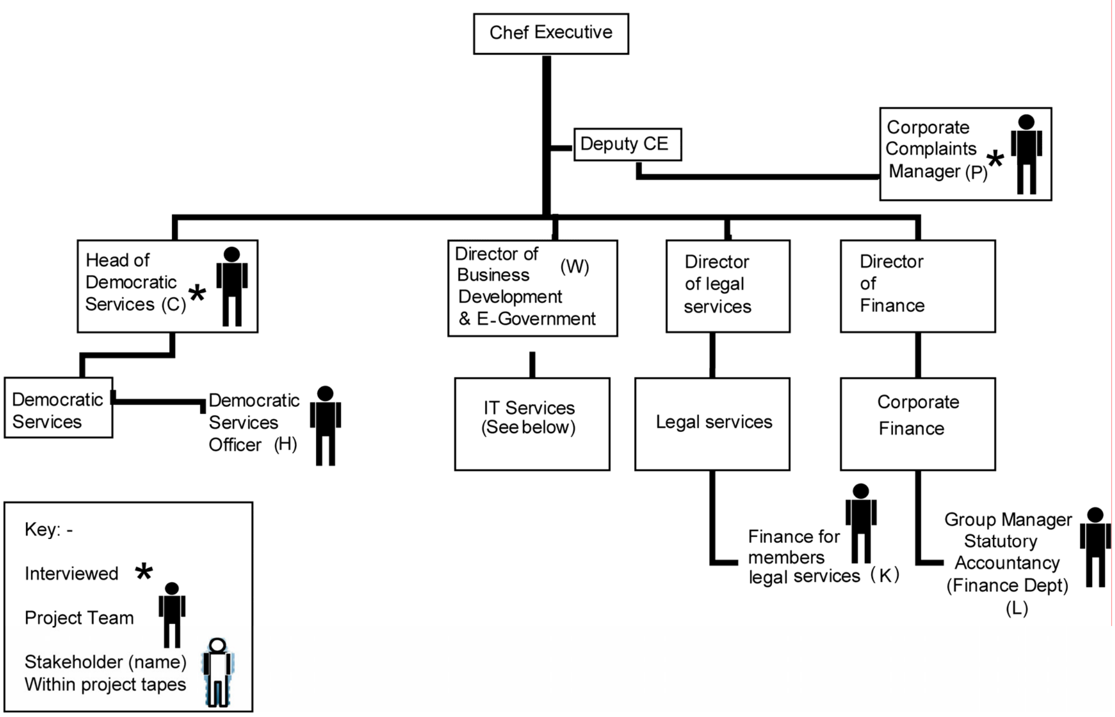

Figure 5.4: The Executive structure

[Note (X) x = name = (P-C-H-W-K-L all members of project group – W post was vacant at start of project – effective in last two months of project)

Secondly, it assisted in tackling the problem, which is that councillors' work is largely done independently of the central office. The project facilitated a valuable step towards co-ordinating the work activity of the councillors. There are some 'very' subtle reasons why this project received attention at a high strategy level. One suggestion 'could be' that the information concerning issues that the general public raise to their local councillor provides an invaluable information resource to the party that the councillor belongs to especially, in any future election campaign, both locally, or as a potential feed into the wider national politics arena. Each of the main national parties are currently building databases containing information about issues that 'concern' the local populations. The major parties collect data: "Now I would also like to get your views on some national issues that affect us all" (Malcolm Rifkind, 'Local residents' postal survey 2005). These are issues such as school provisions, hospitals and housing. These are the very issues that the local councillors address in their surgeries. Therefore, collating information from reports provides a perfect opportunity for political parties to centralise and build a core collection point to 'monitor' issues and assess target policies; note that this data collection is independent of the officially produced government channels, but is a 'party political' data initiative.

The third identifiable issue was that the leader was also addressing another organisational issue, in using the project as a test case, towards the strategic issue dealing with the changing nature of the work itself. With some 6,000 employees, most of whom have traditional type nine to five office based locations, what is required is for modern organisations to have a flexible approach to working contracts, and to include such issues as part-time working and home working facilities. This came up in one of the early meetings, and is reported here in the private minutes of the meeting.

..It was also pointed out, that by piloting such a model, would help to develop a remote access system to the Springfield network, which could develop a way of staff working from home…

Text Box 5.3: Project Committee - private minutes - Members IT Project Team

Meeting 5th September 9:30am Room 116

The home working issue was a potential problem for the IT department, providing two key antecedent conditions that directly affected the project. Firstly, the problem exposed in the debates was about security and access through the fire wall, and secondly, a complicated issue arose concerning the interoperability with the existing software.

As to generalizing the first point; at the start of the project the IT department was not in a position 'technically' and infrastructurally to facilitate a web based approach to home working for the 60 councillors, let alone to potentially extend the concept out to the workers of the council, potentially some 6,000 PC desktops. The people in the IT department recognised that this project was, in many respects, a stalking-horse. They recognised that the problematic question of home-working would have to be addressed in the future, and that the functionality of this project could be extended out as a facility to all workers of the council.

Q	… is that this model is also a model that can be applied to staff in general (.) when we look at the wider issues of remote working (.) things like that (.) this will be the way (.) again (.) that will allow greatest number of people to have that kind of remote working….

Text Box 5.4: [T04-B2-L177-181]

This source (antecedent condition) posed a potential problem which appeared in many guises. The main problems were technical, revolving around issues in terms of the infrastructural changes that would have to take place; of crossing the fire wall and of access to the software programs. This led onto the internal IT problems of implications for the whole of the technical infrastructure and application provision. Finally, with the issues of how managerial change, using IT as a strategy was intended to be integrated into organisational work-practices, something that the IT department was well aware of, as they were already subject to many restructuring programs, with the attendant problems that ensued. IT gave this researcher the impression that this was as essentially an IT problem project, that should have been solved internally, they did not want to 'air their washing' outside the small group of IT managers, for others of the organisation to comment upon. Unfortunately, as the IT department's director post was vacant, and the other management layers were being finalized into a new state of re-organisation, there was a palpable initial citadel entrenchment towards this particular project, which undoubtedly led to the fire-fighting tactics demonstrated in the later stages of the project.

The second complicated issue of interoperability, which although at first sight is a technical issue, opens up an entire vista of enquiries, and soon indicates that that the technical aspects of a project are heavily intertwined with organisational and other project initiative perspectives. The technical aspect is the third perspective and is discussed after a review of the project stakeholders.

The Project stakeholders - overview

Local councillors 'work' is part time as they often have another full time job. For their commitment, they get expenses and some limited support. Their job, in theory, is to be responsible for overseeing the council's work and this often means that they act as an interface, between the public who elected them and the council. The bulk of work comes from attendance of meetings, correspondence, and dealing with issues raised by the public. Councillors hold local council surgeries where the public come in and discuss (mainly complaints) their issues such as complaints about council tax, housing accommodations, planning permission and schools. These councillors also spend time attending local group organisations and local forum meetings etc. Often councillors have their own full time job; consequently they do their councillor work in the evenings and weekends for which they get attendance allowances and re-imbursements on expenses whilst on council business.

Currently, Springfield local authority only offers a mixed bag of support for the councillors, and part of the dynamics that the group have to deal with is the support for the councillors. The largest party, in power, with a comfortable working majority has a large group office which employs support workers who help in the coordination of the workflow of complaints. In this party office, there is a basic independent legacy computer programme, an old DOS system, on to which two party workers record the councillor's complaints and re-direct the work onto to the appropriate council workers, the majority of it being forwarded (internal and postal services) to the appropriate complaints departments. The larger two parties employ party workers to assist in communication; however, most councillors and independent politicians have to handle their own administration. In examining the workflow, the Councillors' work is generated by a surgery and a large percentage of that time is spent in dealing with the complaints made by the public, which is usually when the council's own procedures have broken down, or when decisions made have left people feeling aggrieved. The Councillors' work towards the complainant is autonomous, then with the local party position and finally to the council position. The councillor acts as a go-between and correspondence is maintained by e-mail and traditional post. Consequently, the council's business is largely handled by the attachment of e-mail and traditional post (e.g. receiving committee meeting documents) unless, that is, the councillor visits the office and logs into the intranet, or a computer in one of the party offices.

C	= and members manage their casework system at the moment (.) nobody takes any responsibility in the Council about how members manage their casework (.) the only interface is when this casework that members do becomes members enquiries or pick up complaints (0.5) that's where the interface is

Text Box 5.5: [T26-B1-L75-78]

A key issue is the hierarchal position of these stakeholders, the councillors; nominally, the Councillors employ the IT and all other council workers.

C	I think we do want to do this carefully because we want it to work and it's not any 60 people, they will be the most critical 60 people in a sense if we get it wrong in terms of the impact it has on IT and their perception of IT.

Text Box 5.6: [T21-B6-L135-138]

> *To summarise, the organisation does not and has not previously involved itself with the day to day work of the councillors, apart from the giving and receiving of information. The councillors are both recipients and initiators of processes in traditional IS systems thinking terms, standing outside the system boundaries. This proposed system 'is designed to' incorporate their working practices. This 'requirement', seen by the chief executive, is therefore fundamentally about bringing about a change to working practices, rather than product production. The task and requirement of the project group is to bring this about.*

5.2.3 Technical background aspects

The IT department organisation had been the subject matter of a previous research study undertaken by this researcher just over a year before the start of this case study, which had investigated the workflow of data in the help desk section. The previous research experience carried across into this piece of research, subsequently allowing unprecedented access and familiarity with some of the people involved. This inevitably gave insights and access to some background knowledge that would usually be difficult to obtain by a previously unknown stranger or researcher outside an organisation, yet this could also give the danger of familiarity and potential bias.

Restructuring, re-organisation and outsourcing decisions are no strangers to Springfield especially for the IT department. At the start of the case study period, the department had undergone its third re-organisation in five years. The Director of IT post was vacant, a new post of e-government had just been created, with the vacancy filled through internal reallocation, and staffed by reorganisation. Other IT sections had been reorganised into a central IT services department which was responsible for IT software provision, training and user support, with the IT infrastructure responsible for hardware, networking and back end provision.

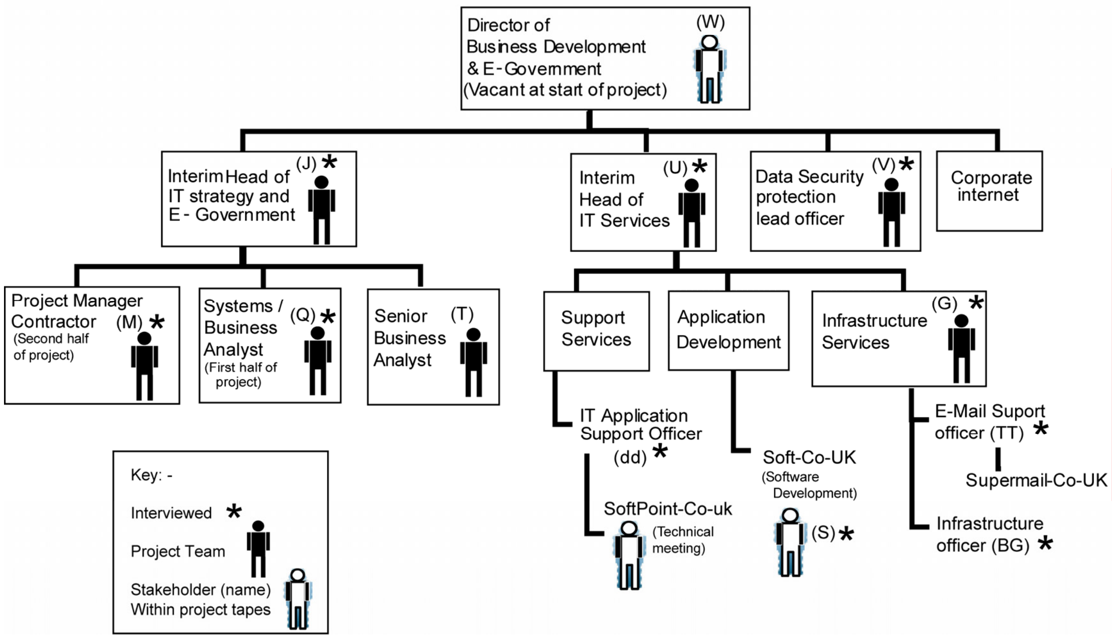

Figure 5.5: IT Organisational chart: In relationship to project

Previously large directorates were fairy autonomous, for instance, the housing department was responsible for their own part of the network, and one of the senior IT managers from this satellite IT department had just been appointed as the 'Interim Head of IT strategy and E-Government'. These re-deployments, changes, and structural reorganisations, changes in direct leadership, etc. led to an uncertain, palpable atmosphere that was often apparent, and this was perceptible in casual conversations during the first six months of the project, as people's working lives were being affected. All of this personnel change coincidentally occurred with IT infrastructural changes, IT servers were being replaced and front end operating systems were being assessed and rolled out. There was a general movement from UNIX towards licensing agreements with Microsoft. In management speak; the department, on the surface often gave the 'impression' of fire-fighting, of having to run to stand still, as the difficulties of handling different types of change were being accommodated.

The project, from a technical position, did not fail, yet it was not successful either. Being beset with ‘technical problems’ throughout the duration of the project framed many of the actions of the project group. The project’s own momentum appeared at times to be placing IT on the back-foot, with having to implement rearguard tactics; consequently, fire-fighting type manoeuvres framed some actions. It meant that members of the IT department were making decisions dynamically, responding to the events, as and when they occurred. These technical problems were breakdowns or other disruptions to the norms and they operated at different levels and with different horizons of interest.

The IT department strategic thinking towards e-government type projects was still at a very early stage, and was hampered by the post of the director being vacant. One of the interesting observations is the interplay between the potential implications, realized and unrealised, that the initiation of the project caused, and the difficulty of some of the work the group had to do in order to overcome the foreseen future difficulties. The action of working through these implications, as and when each issue dynamically arose, is one of the main contributing ‘background’ conditions that the project group had to deal with directly and indirectly, as and when the ‘issue’ emerged. This has huge implications upon the notion of being able to fix or freeze the requirements.

Amongst the many technical issues, three prominent difficulties for the technical department stood out, they were;

1. Technical access across the fire wall using web protocol’s,
2. Security identification access rights and,
3. Interoperability with other systems.

Any one of these issues is a technical difficulty in itself, and unfortunately, they all came together within the confines of this project and these problems were compounded by the tight, immovable timescale.

There were also issues that were ‘undoubtedly’ known early on in the project, and others that only appeared to ‘emerge’ after some other intervening set of actions and other events had taken place. The problems with the firewall and access led to the requirement having to have the back end server software changed, due to incompatibility of different applications; interfacing being one example of one of those issues that re-emerged.

M	what actually needs to happen is a change in technology because the technology they're using (0.2) is incapable of delivering it
C	I don't want to hear this (.)
M	that is (.) that is apparently (0.2) a policy issue

Text Box 5.7: [T35-B3-L113-118]

With one week before implementation, the issues of infrastructure emerged. This occurred, as an unforeseen issue, less than one week before the completion date of going live. Later on in the same tape in the example below Text Box 5.8 'C' the project leader asks U the acting head of IT services:

C	Uxxxx (0.6) when did you become aware that we needed to have this Apache thing put in for the intranet?
U	about two weeks ago
C	as recently as that (0.5)
U	yes
C	(2.0) OK

Text Box 5.8: [T35B-B8-L4-9]

However, it was not only a simple matter of just changing technology; there were other reasons that did not facilitate the change, which were, incidentally, known about by somebody else, but were not realized as an issue, as the following three way conversation between K the legal representative, M the project manger and 'C' the project group leader point out.

K	why don't they use something else, like Apache or something?
M	good question
K	why not?
M	people within Springfield IT have suggested apparently from last September to use Apache (.) but there is a policy within IT which says we will use [redacted] products
C	only?
M	yes
K	is that to do with the select agreements?
M	possibly yes
C	is there a way round it?
K	Springfield have bought into select agreements from [redacted] so I don't know what the (0.2) legal issue or the implication will be to use products that are not (2.0) [redacted]-based //

Text Box 5.9: [T35B-B3-L146-168]

This sort of topic example has many horizons of interest; the way in which the topic emerges, the way in which it is handled, the problem that it highlights, and in this case the potential problem with service agreements, the IT policies and the interesting question of who knew what, at what stage, and when etc. But, before this case study stage becomes carried away with analysis and the danger of retrospectively 'fitting' the facts, it is timely to reiterate that this is nothing more than an instance of one interesting topic among many.

As the example has shown there are Key themes that could be potentially developed as embryonic analysis topics, and some of these are; changing requirements, phasing the project and project management and the process of work flow around the Council Complaints system and finally, control and the role of governance of the IT department. Although these all have an effect upon IS-IT and the specific issue and the problems with requirements, with implications for the understanding of the requirements stage, it is not what the research approach of this thesis is attempting to do here. All of these 'interesting' phenomena that have tit-bits topics included, as causal components that could be related to the Requirements problem, from a Requirements perspective. But that does not mean that the rational explanations that could be put forward are necessarily complete, it is just to insist that this is not all there is to it, as rational explanations put forward are themselves set in the context perspective of Requirements. As such these explanations and reasons would produce pseudo "because" motives. Schutz draws an important distinction between the in-order-to motive and the genuine because-motive. The in-order-to motive of an action is projected into the future perfect tense (Schutz, 1967), while "the genuine because-motive explains the project in terms of the actor's past experiences" (Schutz, 1967). The importance here is to point out that there is an essential difference between these two perspectives; the backward glance sees both the motivated action and the experience of it. The pseudo because-motive then might not be genuine, as it might be attaching the wrong explanation of that which it seeks to explain. This shows that explanations and reasons are necessary parts of rational causes, but to say what it is about them that makes them rational is not the same thing as saying that it makes them causes.

Summary and postscript

The overview of the case study project has had as its aim to give the reader a brief insight into the convoluted, difficult background picture that frames the discussion about the context of the emergent requirements phenomenon.

> *The case itself is about a group of people that work for a large local government organisation who are putting together an IT project.*

The approach of this particular research aspect and its consequence forms a particular perspective upon it. Interspaced within the text are snippets of transcribed text that give the reader a feel and taste of the actual case.

The general points to summarize involve the antecedent conditions, whether technical, project group or organisational, all of which are intricately intertwined into the contextual conditions in which the process of Requirements is said to be taking place. The implications of this statement alone have profound meanings that could be directly related to the current thinking about requirements in IS-IT, however, leaving that point aside, the business in hand is to establish whether it is possible to recognise and have the chance to search for the meaning of a particular act as a type or as a construction in the course-of-action, which is congruent with typical in-order-to motives and intentions.

The strength and role of the project brief should be noted; this strategic mission statement focuses upon the events and the 'what and how' happening of the actions. This, incidentally, reiterates the research question about what the phenomenon of a Requirement is. The strategic mission focused statement poses a difficult question; was the mission statement the requirement, or at what stage did its realization become the Requirements. This issue is at the heart of the research question when asking the 'what a Requirement is' question. Is it what we need to know in order to build a system (which does not automatically imply that we know what a Requirement is). Or is it known, do we know what it is, implying that all we need is a method to capture it.

In conclusion, the case study offers an ideal opportunity to study the Requirements phenomenon in action from the perspective of a project board, specifically set up to oversee the administration of an IT web based project.

5.3 Data set sources; selection and Research discussion on methods

There were four primary data sources;

1. Ethnographic ‘hanging around’ (Miles and Huberman, 1994; Lynch and Sharrock, 2003), participating and listening to shop floor talk,
2. Documents and artifacts,
3. A set of semi structured interviews with the key participants of the project group, together with some other interviews conducted with other contributing people, and
4. The recordings of naturally occurring conversations of meetings.

The next section comprises of a discussion about what was collected, how data set materials items were organised, stored for retrieval and used by the research approach, together with a brief overview discussion and assessment of the validity of the research data artifacts.

5.3.1 Ethnographic ‘hanging around’, participating and listening to shop floor talk

The data collection period lasted just over one year. On average there was a weekly visit to maintain relations and review progress; during critical times the visits increased to cover the whole week, and in slack periods of inactivity, mainly around the holiday periods, a bi-weekly visit or telephone calls sufficed. The research approach adopted here echoes Psathas’s (1998) six point sensibilities:

- an openness to phenomena;
- a willingness to learn;
- a setting aside of pre-conceptions;
- a humility in allowing oneself to become a learner, taught by others;
- a willingness to examine and reflect on one's own experiences in the field, on how one came to know, not just on what one finally knows;
- admitting one's ignorance, mistakes, and blunders and examining how these are instructive and informing. (Psathas, 1998)

This was achieved by ‘hanging around’, ‘fitting into the landscape’, and ‘taking a lower profile’ (Miles and Huberman, 1994). However, studying work is an act of interpretation with particular sensibilities of its own (McCarthy, 2000). It also had to occasionally include having what Block (1983) in 'The Politics of Projects' called; 'good old-fashioned tenacity'; requiring some resoluteness, staunchness even emphatic understanding although this undoubtedly questions the ethical standing of the researcher's own sensibilities on the neutrality of this sort of approach. Notwithstanding the pangs of conscience, the research diary notebooks were filled with observations and interpretations.

Direct access to the systems of IT was limited however, despite a very generous amount of time given by the administrators of the systems in giving demonstrations, showing workings and in discussing the nature of the IT applications under their responsibility. An observation noted in the research books at the time remarked that direct observation, questions and demonstrations of software applications are not enough, the researcher needed to know some of the details of the workings of the applications from the personal standpoint of the workers involved, experiencing the 'feel' of the applications personally; but unfortunately with IT in modern organisations this is virtually impossible, and very understandably, being not practicable with sensitive live data, however, on reflection it turned out in this case not to be necessary. What turned out to be important was the "lived world of everyday life of persons whose ways of doing, thinking and being may be unknown or strange" (Zaner, 1970).

What the ethnographic 'hanging around' did pick up was the surprising number of different applications, the operational scale of the number of software applications that the IT department had to support, and the not so normally obvious resources that went into maintaining them, just to keep them up and running. The numbers of applications running on their systems was unknown.

C	…we've talked about making a list of the facility is that is available and what applications we do have umm ummm - on our system/systems because actually we did not have a list ……..-----
G	no no (.) there isn't one and it is something that we should have there are all sorts of things that are out there on the intranet of which people don't know what is there and it is a piece of work that ought to be done (.) it is a Dickens of a job to keep up to date

Text Box 5.10: [T01-B8-L22-30]

One of the issues that was highlighted by this aspect of research approach was that the interoperability of data and interfaces between IT systems is very poor.

Requirements for one system is difficult enough, however, when integration is called for across other systems the problems then escalate dynamically. The time talking to the administrators of systems was invaluable from a research perspective, as each one had their own individual viewpoint about the application that they were caretaking. The result was that the closer to the ‘coal face’, the more fragmented and specialized into silos everything became. There are interesting research links here to the issues of what Simon (1945) calls ‘organisational memory’, to the ‘Design school’ (Mintzberg, 1990) and the characteristics of bureaucracy (Weber, 1948).

The other major impact that came across from these field trips was the attitudes and frictions between the various camps, and the background positions that framed their context of operation. There was a huge mixture of skills and diversity of operations undertaken in this large IT department, mixed together with an extremely diverse operational position, which led to some interesting dynamics. In staffing, the mixture ranged from contractors to programmers, to maintenance to user support people. On the operational side, the applications ranged from outsourcing deals to bespoke systems, from COT’s systems to tailored software. During the department’s reorganisation, this fragmentation had been reorganised, causing a mixing up of the jigsaw pieces, and resulting in a separation between development and project management on the one side, and infrastructure and services on the other. This division undoubtedly had an effect on the latter stages of the project as boundaries became established, and as the case study fell during this transitional bedding down period, it contributed to the general background context conditions of ‘fire fighting’, as has been previously discussed.

5.3.2 Documents; the paper trail

Over 100 documents of the project group were collected, including items such as: agendas, presentation documents, minutes, specifications, reports, PRINCE2 documentation, user guides, induction packs, also drafts of requirements documents and final commissioning requirements reports. The main purpose of the paper documents and artifacts collection was to provide the material in the form of ‘props’ that supported the main action; they were the ‘records’ of what the group committed to paper. Although Springfield has an intranet document retrieval system, the bulk of the document management system for this project was via attachments to emails, which were printed and handed out during the meetings, facilitating a reasonable chance of research collection. But as a side issue, a note recorded in the diary pencilled in concerns over the future opportunities for researchers to collect and have access to paper data items when they are not directly a part of the organisation.

G	…..I think there's a broader issue here about how we actually produce documents and store them and convey them round (.) we tend to use the email system as a data transport system and I think that is totally wrong ….

Text Box 5.11: [T04-B11-L52-55]

The documents fell into two types; firstly as paper presentational items, providing a public face and information, which they presented as the outcomes of the workings of the group to 'outsiders' of the group, but who were internal to the organisation, and also public documents to those who were external to the organisation i.e. contractors. These reports and paper productions performed the role as "informational" and "publicity" outputs. Secondly, records such as agendas, project plans, minutes and emails; these documents were aids to work in hand, routine duties and services, these artefacts were utilised as part of the operationalization of the project. These types of documents were used for instance, as the minutes, together with agenda sheets and served as prompts for guiding the meetings.

J	= I think within that project plan you need to probably pick up all of the issues that we've picked up in the minutes previously and also the stuff that came out of the umm other session last night (.) yes if we take it through the agenda (.) that's probably easiest

Text Box 5.12: [T04-B1-L31-34]

Usually strategy documents, internal memos and reports and other artifacts are the preferred method of data sets in the research strategy of historic case studies, when there is virtually no access or control to a case study, so the researcher uses these documents and artifacts as primary data sources (Yin, 1994). The justification for this is rooted upon the notion that artifacts help to build up coherent evidence towards the questions of the how and why. However, some researchers have questioned this approach for research study, discrediting the retrospective documentary perspective (Priem and Harrison, 1994). They have argued that reports are rhetorical constructs supporting the legitimacy of social institutions, and extending the hegemony of prevailing system-supportive ideologies, and as such, can be described as exercises in power (Brown, 2000). Star (1993) similarly note problems with reports, maintaining that; in the work of doing scientific study, of placing results into categories, the work is often simplified, in that it gets reported in a fashion that deletes many of the work contingencies involved in doing the research. That is to say, when reports of results are made, qualifications and difficulties have often been jettisoned (Star, 1993).

Garfinkel (1967) refers to documentary artifacts descriptions as ‘accounts’; however for him the real importance in the phenomenon is the study of the methods for accomplishing the reports and the role that they perform. Garfinkel (1967) gives a graphic account of a coroner’s report that is worth briefly reviewing, as it neatly encapsulates the underlying approach that has been adopted in this research for understanding the role of artifacts and their interrelationship with the work practices.

The coroner’s work is justified by his skill and entitlement as a professional. The work undertaken is that of achieving practical 'decidability' upon an event; that of what happened. The work can be equated to that of 'office activities' which consist of methods for accomplishing reports that are scientific-for-all-practical-purposes. What is involved is: the investigator "does" a report for public record, explaining why or how or what happened in an event. The inquiry found, "writing" and produced a filed report on it for others. The coroner produces these records knowing that her/his report will be the subject of review, as the products of the scientific work of the coroner and his staff. In the ‘doing’ the report will perform the civic duty of informing a "review" for those interested. To see its scientific-adequacy-for-all-practical-purposes as professionals' socially managed claims of "What was really found out for-all-practical-purposes" (Garfinkel, 1967).

Garfinkel’s research showed how the way that people do their work activities, the example of the coroner, could also be applied to researchers, in the way in which phenomena are transformed during the actions of making documents, texts, and written reports, which are then used as evidence to characterize certain acts or activities that can be assigned to a category. For example, for Garfinkel (1967) the term “delinquent” is an emergent product, transformed over time according to a sequence of encounters, oral and written reports, prospective readings, retrospective readings of “what happened”, and the practical circumstances of “settling” matters in everyday agency business. The emphasis to make is that the actions involved contain assumptions that are easily incorporated into the way of doing. Actions of researching those activities of doing, can and do contain those same assumptions, and when looking for requirements; we naturally find the phenomenon of requirements actions. This is compounded in complexity by the researcher looking at documents that have been produced by the very processes under investigation. As a process of analysis, the approach of documentary artefact analysis is somewhat suspect. As an example, using the case study, a simple demonstration of these issues can be shown, in the way in which the group produced artefacts.

A significant key aspect for the Springfield project, in terms of the documentation was the change, half way through the project, that was brought about by the employment of an outside contractor, who performed the role of project manager. His impact was fundamental, and affected the workings of the project group by the use of the PRINCE 2 method. The change was profound, as the group responded to being 'run' by the method, via the project manager. Despite the vast increase in documentation and the subsequent extra activities of 'work' of doing the PRINCE 2 process, of producing documents, such as reporting upon risk logs, responsibilities assignments, document sign off stages etc, the *document artefact audit trail* process, as a research resource, still fails, as Garfinkel (1967), Star (1993), Priem (1994) and Brown (2000) have previously reported, as it does not give a research account of the 'doing' in the making of the document. The artefact is a closed, finished document, whereas during research the approach should be the same as the default position, as when reading a novel, at the start the reader does not know what comes next.

The interest here is in the method of production; consequently the need is to show the 'visibly-rational-and-reportable-for-all-practical-purposes' trail of the making of the artifacts documents. It is very difficult to reconstruct the process of the making of them, and of how the ambiguities involved in the decisions were dealt with, from just the retrospective reconstruction viewpoint of what is finally presented in the documents, as the document represents the output of the process, or the resolution, and is the authorised version of the issue that has been already assigned to a preformed category. The particular importance for this research is the emerging phenomena and the methods for accomplishing the reports including any subsequent role that they perform as antecedent initiators or justifications for the current project action.

5.3.3 Interviews; what is said to have taken place

In ISR one of the primary data sources and methods of data collection is the use of interviews within a case study (Yin, 1994; Walsham, 1995; Myers, 1997; Silverman, 1998). The interview is so commonplace that Silverman remarked (2000) 'we all live in what might be called an "interview society," in which interviews seem central to making sense of our lives'. The history of interviewing has its qualitative and quantitative origins, and qualitative interviews are regularly employed for the understanding of a person's personal experience. The method of discussion of the interview is to elicit personal insights of the interviewee's views and experiences

(Darke, et al., 1998), the main attraction is that the interviews incorporate a self reflexive element (Schön, 1991). It is generally considered an excellent method for 'capturing' actions and events which have happened or which are taking place, with the views and aspirations of them-selves and other participants (Walsham, 1995). There are, 'seemingly', many advantages here for the researcher, for the 'capturing' of an experience, or for getting a 'snap-shot' of a perspective and supplying validity from professionals working in the very context of the enquiry investigation (Miles and Huberman, 1994; Yin, 1994). The research process is relatively quick and easy to collect with modern recording equipment, as is data that has already been semi organized by the construction of the research framework and questions.

But, there are un-stated assumptions, easily skated over by the unwary, "somehow, the skills for doing good case studies have not yet been defined" (Yin, 2003). One of the issues revolves around the analytical problems about the status of interview accounts (Silverman, 1998; Silverman, 2001).

There are a growing number of scholars who increasingly question the traditional assumptions of the interview (Fontana and Frey, 2000), and dealing with these assumptions is quite problematic. The concerns revolve around two key issues, firstly about the interaction between interviewer and subject. For some, the problem of interviewing is seen as unethical, whether wittingly or unwittingly. Walsham argues, that the "Key issue for all interviewers is the balance which should be adopted by them between excessive passivity and over-direction" and this revolves around issues of trust. A further issue concerns the validity of the data, which is the particular interest here, particularly to this research approach.

Interviews seek information about attitudes, decision methods, values or other theoretical phenomena which are of interest to the researcher. The interviewer researcher has designed the question not just to get a personal preference, but with an orientation to getting agreement (Sacks, 1987) and even when it is not structured, the content is re-thematized by the analyst, who typically chunks the data, categorizes it, moves it around and rearranges it into a different formation (Silverman, 2000). Establishing validity in the eyes of a reader becomes for Walsham (1995), in part, the art of persuasion, it is "as much a matter of rhetorical style and flair as it is of accuracy and care in matters of theory and method" (Walsham, 1995).

Unpicking these concerns and problems further, Suchman and Jordan (1990) point out that the interview is essentially an interactional event. They point out that the success of the interview as an instrument turns on the premise that (a) relevant questions can be decided in advance of the interaction and (b) questions can be phrased in such a way that, as long as they are read without variation, they will be heard in the intended way and will stimulate a valid response. Validity is not assured simply by having interviewers repeat the same words across different respondents (Suchman and Jordan, 1990). But even if these research issues can be addressed, this research takes the argument a step beyond and challenges a fundamental claim of the ability of the interview method to overcome the temporal distortions that the reflective attitude imbues. This fundamental issue, as repeatedly made throughout this thesis and restated here, is that there is a difference between the act of the project in hand and the act of reflection upon the project.

The method of interviewing, unstructured and structured, promises that it can provide a greater breadth of data than other types of data collection. Given its qualitative nature an interpretive interview case study “'captures' people's interpretations in as effective a way as possible” (Walsham, 1995). What is debatable here is not the greater breadth of data, but the recall process involved in reflection, given its qualitative nature. For example, in decision-making it has been established that steps can be biased by inaccurate recall due to self-justification, memory lapses, and logical inconsistencies (Nutt, 2002). Garfinkel’s (1967) Studies in Ethnomethodology found that in interviews jurors masked, through the devices of myth, the actual extent to which ambiguities were part of the situation.

The problem is not just the masking of information that has been potentially leveraged but also the question of when that knowledge of information was obtained, and from which stage of the project the information comes. Each moment can give a very different impression upon a project. A short epistemological trip around a simple example taken from the case study can demonstrate these difficulties by comparing three segments of conversations. Of course, this is just three very small segments and the issues escalate exponentially when expanded out to the entire tabulated data set. The first segment is taken from a meeting, approximately one third into the project term, the second segment taken a week later in a one-to-one taped and transcribed interview with the researcher, and a third one is taken from the transcripts a month later, again from a committee meeting. The selection specifically focuses upon requirements, in an attempt to tie down the exact point that requirements is said to have emerged.

In the project group meeting, T14, 'Q' the project manger / systems analyst, gave the impression to the project board that the requirements were a very nebulous entity.

Q	a lot of casework err err umm system that other projects are using are essentially getting either complaints or ::: when you talk to them they are really talking about committee systems (.) what there doesn't seem to be a lot of information on is actual casework management for members ……
Q	//// …..the actual casework a management system itself not so much simply because what they actually mean by it isn't clear…..
Q	/////……mean we have struggled to actually get a definition of what our members mean by casework management system

Text Box 5.13: [T14-B6- L22-34-35]

In the interview, one week later, 'Q', gave the impression to the researcher, in the interview, of being in control of the requirements needs.

Q	So I'm very reluctant for Casework Management System to become – to be seen as more than it is and I know that we're not giving them everything they want, I know there are features that they'd like to have, but they're just not getting it, you know, simple as that. …and certainly from the meeting with the leader, when I actually started that meeting with a list of things that we were not going to do, …… So if I have anything to do with it there will be a simple list of functions and that's what they'll get and, you know, they can like it or lump it basically because it's just to get them on-line with an application they can use remotely. Then after that we can talk again, we can talk about resources, we can talk about timescales and they can have whatever they want, whatever they're prepared to pay for then. But in this phase of the project no, because we have these, you know, the time isn't there and the resource isn't variable in this case, so the functionality has to be the variable.

Text Box 5.14: Interview with Q Tape_15ME_14-12-01

One month later, the next meeting of the project board, 'Q' had produced a provisional requirements document for the purposes of estimating.

Q	what I did and the thing I circulated (.) I don't pretend that it is a detailed requirement but we wanted to produce something that we could basically show to people to get them to give estimates (.) costs and times to produce (.) also I was concerned when we were doing the original requirement exercise that there were things going in there which we weren't going to be able to develop and was very conscious of the fact that we were limited in what we could do (.) so basically what I have tried to do is to set out the basic system (.) and most of this is just taken from a very fairly brief look at what the (.) the [redacted] group are using at the moment (.) saying that this is the core of what we are going to try and give them and if we can put in additional requirements for reasonable costs and in the timescale then that is fine (.) but if not then they will have to wait for a second phase (.)…..

Text Box 5.15: [T16-B2-L9-20]

The analysis of just these three sections could be extensive and is well worth a reflective thought about the IT attitude towards user requirements, but it is still does not address the issue in hand, that of data collection and the analysis issues, using the analysis approach, based upon the use of interviewing. The difficulty is that we are unable to address which of the inter-subjective moments would reflect an accurate picture of the construction of the in-order-to displays of the actual doing of a project. What results from interviewing studies is a secondary recall inter-subjective moment about the about-ness. A second-hand already reconstructed, sense-made-of, because-motive account. This temporal slip masks the phenomenon under investigation.

Taking the above three segments examples, the table below extends the discussion on the issues involved, of data comparisons between the interview and the transcripts, compared with the analysis problems of the temporal slip into the potentially incorrect reconstructed because-motive, taking each issue in turn.

The Qualitative Problems of Interviews	
1. Self reflexive element – 'a' personal preference	
Interview	**Transcripts Tapes**
In the interview (Text Box 14) 'Q' reveals a 'strong' personal preference; "I'm very reluctant ---to be seen as more than it is" - "we're not giving them everything they want" – "So if I have anything to do with it" – "that's what they'll get" - "they can like it or lump it" – "after that we can talk again" – "whatever they're prepared to pay for then"	Whereas in the naturally occurring meeting conversations (Text Box 15) a gentler, considerately approach is demonstrative: - "I don't pretend that it is a detailed requirement but we wanted to produce"
Comment:- The qualitative issue here is of the different personal preferences. There is no doubt that in the interview 'Q' is giving a personal preference reflectively made; however, in the project meeting a more conciliatory approach is evident. The qualitative levels are different, with different strengths of feeling and the impression given is difficult to gauge without the reference of the naturally occurring data sets. Although 'Q' comes across as robust in his approach towards the requirements problem in the interview, this is not so	

<table>
<tr><td colspan="2">evident in the actual meetings. The problem is the matter of which is the level that gauges the strength of feeling.</td></tr>
<tr><td colspan="2"></td></tr>
<tr><td colspan="2">2. The nature, that it 'captures' people's interpretations</td></tr>
<tr><td>Interview</td><td>Transcripts Tapes</td></tr>
<tr><td>From the interview the researcher could be left with ‘Q’ interpretation; -

“But in this phase of the project no, because we have these, you know, the time isn’t there and the resource isn’t variable in this case, so the functionality has to be the variable.”</td><td>From the transcripts the researcher is left with a similar ‘Q’ interpretation

“when we were doing the original requirement exercise that there were things going in there which we weren’t going to be able to develop and I was very conscious of the fact that we were limited in what we could do”</td></tr>
<tr><td colspan="2">Comment:- The claim being challenged is that the interview 'captures' the interviewees ‘interpretation’. In the interview ‘Q’ gives the impression of his interpretation that the project’s ‘time and resources’ are fixed, so therefore, functionality has to be the variable.

Whereas, in the meeting the expression is “there were things going in there which we weren’t going to be able to develop”. But the interpretation aspect of “were things going in there” gives a subtle different connotation to the problem of Requirements. The expression “there were things going in there which we weren’t going to be able to develop”, refers to the scoping of the Requirements, development of the functionality problems, rather than highlighting and categorizing it as a ‘time and resources’ issue, which it wasn’t, necessarily.

There is little evidence that the interpretation given in the interview has confirmation in a wider spread of viewpoints. The ‘nature’ is of his viewpoint, and it’s mis-capture leads, potentially, into the giving of a false impression. The evidence he gives – that they (referring to who?) were ‘limited’ is a self-reflective interpretation putting a self-imposed constraint upon the project that refers only to his own interpretation. And this is made from the perspective of the prescribed construct of placing the issue as from a requirements perspective of his perspective.

The problem for the researcher is that he/she is left with the problem of having to differentiate ‘Q’’s interpretation compared to the researchers ‘other’ available evidence interpretations that could confirm or deny ‘Q’’s statement. (interpretations of interpretations of interpretations) Collaborative evidence - starting from - such a source of an existing constraint upon a project is par to chasing ghosts, impossible to prove or disprove conclusively and empirically with just this instrument. Hence, the reliance upon other research additional material such as documents.</td></tr>
<tr><td colspan="2"></td></tr>
<tr><td colspan="2">3. Content is re-thematized by the analyst</td></tr>
<tr><td>Interview</td><td>Transcripts Tapes</td></tr>
<tr><td>From the given interview the possible themes developed could have revolved around

‘resources’
‘timescales’
functions – ‘features’
resistance - ‘reluctance’

and the justification quote would possibly use;

“So if I have anything to do with it there will be a simple list of functions and that's what they'll get and, you know, they can like it or lump it basically because it's just to get them on-line with an application they can use remotely”</td><td>Taken from the process temporal perspective

“we have struggled to actually get a definition of what our members mean by casework management system”

in Tape 14 to a position one month later to –

“the thing I circulated (.) I don’t pretend that it is a detailed requirement but we wanted to produce something that we could basically show to people to get them to give estimates (.) costs and times to produce (…”

of Tape 16 This was based upon

“so basically what I have tried to do is to set</td></tr>
</table>

<table>
<tr><td></td><td>out the basic system (.) and most of this is just taken from a very fairly brief look at the the Labour group are using at the moment”</td></tr>
<tr><td colspan="2">Comment:- comparisons between the two methods produce different results; the thematization process from interviews abstracts into concepts, whereas the transcription produces and exposes the emergent process at work. The dispute here is the re-thematized content analysis of interviews consisting of counting the number of physical occurrences of a given symbol or term, involving simple perceptual discriminations. But, this doing hides the extremely complex metalinguistic discriminations that the researcher makes in the doing of the categorical process. As the interviews are already interpretations the second hand re-categorising does little to confirm the reliability of cross interview analysis consistency. People use different words to ‘mean’ different things, especially when dealing with nuances of meanings which is exactly what is at stake when discussing what a requirement is.</td></tr>
<tr><td colspan="2"></td></tr>
<tr><td colspan="2">4. Promises that it can provide a greater breadth of data than the other types of data collection</td></tr>
<tr><td colspan="2">Comment:- a questionable claim in comparison to the breadth and depth of naturally occurring recorded material.</td></tr>
<tr><td colspan="2"></td></tr>
<tr><td colspan="2">5. The analytical problems - Establishing validity</td></tr>
<tr><td>Interview</td><td>Transcripts Tapes</td></tr>
<tr><td>“So if I have anything to do with it there will be a simple list of functions and that’s what they’ll get and, you know, they can like it or lump it basically because it’s just to get them on-line with an application they can use remotely.”</td><td>“what I did and the thing I circulated (.) I don’t pretend that it is a detailed requirement but we wanted to produce something that we could basically show to people to get them to give estimates (.) costs and times to produce…”

“most of this is just taken from a very fairly brief look at what the the Labour group are using at the moment (.) saying that this is the core”</td></tr>
<tr><td colspan="2">Comment:- the transcripts consistently provided direct pointers to secondary data sources, whereas the interviews produced vaguer references. The validity of the transcripts is direct, with indisputable brutal factualities of the event, whereas the interview has data that has been interpreted.</td></tr>
<tr><td colspan="2"></td></tr>
<tr><td colspan="2">6. The temporal distortions, the act of the project - the act of reflection</td></tr>
<tr><td>Interview</td><td>Transcripts Tapes</td></tr>
<tr><td>“So if I have anything to do with it there will be a simple list of functions and that’s what they’ll get and, you know, they can like it or lump it basically because it’s just to get them on-line with an application they can use remotely.”</td><td>“we have struggled to actually get a definition of what our members mean by casework management system”

“so basically what I have tried to do is to set out the basic system ….. saying that this is the core of what we are going to try and give them and if we can put in additional requirements for reasonable costs and in the timescale then that is fine”</td></tr>
<tr><td colspan="2">Comment:- At first glance the two types of data material could be said to represent the same thing. However, the transcripts preserve the natural temporal flow, and an accurate description of a sequence of events and interactions in a richer detail. ‘Q’ is giving a report to the project board; this is the state of play, at this (date - time). Whereas the interview is nothing more than wish list, indeed this is what he may – or would have liked to do, and has maybe done, but, as he was speaking to the interviewer who asked a question on requirements the reply returns back a viewpoint made at that time. This leads onto a further issue of the reliability and of the nature of recall for the interviewee and the validity of the actions taken.</td></tr>
</table>

Table 5.2: Comparisons of Interview and Transcripts

The conclusion that can be drawn is that taped interviews cannot be used independently. Interviews have to be used in conjunction with other ‘valid’ sources, which gives further problems of triangulation. Raising the question of what is the exact relationship between different data sources, and crucially of whether these other collaborating data sources adequately capture the phenomenon under investigation. The question of what is important and what is not would be dependent upon the researcher’s ability to be unbiased and unmotivated. But this position is questionable, since the researcher has implicit reasons and assumptions for the investigation in the first place.

The three out-takes address the qualitative nature inherent in reflection, which, questions validity. The problem is of validity in asserting and holding onto a second-hand viewpoint. Comparisons between transcripts and recorded interviews reveal different research findings and connotations. The difference of approaches would lead to different interpretations, but which viewpoints would be correct? Despite the fact that they are all direct quotes; the interview in the middle (text box 5.14) gives a different perspective than the two transcript quotes taken on either side. There are three distinct issues at work here, firstly, the question about the ‘capture temporal perspective’ of the interview, because if the interview had taken place in the first week a different research perspective would have emerged. The second issue concerns the addressing of the audience; as the manner and position taken in the interview could give an impression of an analyst who is in control of the situation. The impression given from the interviews would concur with most conventional perspectives found in literature accounts on IT projects. The comments and replies given are from an IT perspective about functions, scope, requirements and project logistics. Thirdly, there is nothing extra revealed in the interview that the actual transcripts do not expose. The analysis shows that ‘Q’ produced a document showing what it was based upon, and what the purposes of the document production were, together with the fact that he was looking to phase the project. Finally, another temporal aspect here is that there were still 5 months of meetings to go of the Requirements process before reaching the design and implementation stage, during which time a lot more things happened.

Using such abstracted quotes as an explanation of the instrumental exposition of Requirements theory would leave a vague and metaphorical dis-attachment. By using interviews and establishing validity in the eyes of a reader would, as Walsham (1995) remarked, be in part, using the art of persuasion. This leaves reliance on interviews suspect in terms of the reliability of empirical evidence, and also the danger of leaving the basic phenomenon concepts of Requirements still shrouded in mystery, as the disposition would be to use existing constructs of theoretical thought upon Requirements. The consequence is that the review, via a temporal span displays that there are different perspectives at work here, as in the span of three consecutive tapes, produced one month apart; there emerged three different uses and purposes. The upshot of this downgrades the interview status as the primary data source and gives cause to distrust the interview as a reliable method of data collection as there are validity issues that need to be confirmed, not with the actual actions and events, as these can be shown to have happened, but with the validity of the interviewees being able to accurately report reflectively upon the events themselves, and the ability of the researcher to challenge their perspective. Apart from these issues, the interviews undoubtedly have a valuable role to play in the research approach, but only as background information to assist the researcher to establish the positions and attitudes taken, also as an enabler to 'decode' and interpret the positions taken in the project meetings.

All of the interviews were tape-recorded and subsequently summarized or fully transcribed. The list below shows that all the major participants were interviewed, and that they were interviewed at different times throughout the project. The duration of each was between 30 and 40 minutes. The interview format was based upon a semi structured approach and the choices of timing, person and the nature of the questions of the interview were primarily driven by 'what was relevant to the goings on at the time'. All the interviews were conducted at their place of work, in their office or in a private meeting room. The generally relaxed style of the questions was designed to elicit their individual perspectives upon the problem as they saw it at that stage in the ongoing project. The last interview was with the one of the participatory users, and was used as a reflective piece to leverage out whether or not the system as supplied, did what it was supposed to do.

Tape No	Date of Recording	Interview with	Recording Length
02ME	29-08-01	J	00:26:46
05ME	05-07-01	JG	00:32:03
06ME	12-09-01	‘Q’	00:37:50
07ME	20-09-01	GG	00:40:60
08ME	24-09-01	U	00:30:04
09ME	02-10-01	‘Q’	00:35:53
11ME	08-11-01	V	00:36:43
13ME	23-11-01	DA-P	00:21:08
15ME	14-12-01	‘Q’	00:34:13
18ME	30-01-02	‘C’	00:19:53
20ME	06-02-02	P	00:31:01
22ME	08-02-02	GB	00:30:46
30ME	11.03-02	P	00:35:21
32ME	05-04-02	M	00:40:04
38ME	14-05-02	P	00:36:23
39ME-A	29-07-02	M	00:15:00
39ME-B	29-07-02	Councillor	00:32:00

Table 5.3: List of tape recordings - interviews

5.3.4 Naturally occurring conversational tapes

These are recordings of naturally occurring conversations that form the basis of this research approach. This re-engages a fundamental argument employed in investigating the ambiguity of the ‘What-How’ debate of previous chapters. The previous subsections of this chapter have discussed the research issues of data collection, concentrating upon the predominant case study research approach of documents and interviews methods. This discusses the issues with post-constructions of events. The basic discussion highlighted and differentiated between the thinking involved with the process of actions, where ‘how’ is ineluctably intertwined in supplication of the process of ‘what’, and is additionally containing it’s understanding. This is what is meant by endogenous production of local order, whilst simultaneously working on a project. It is the contrasted conventional research approach of the classical theory of scientization, the act of stopping and thinking about the phenomenon of an event, and the thinking involved in post project recollections, with reflections upon it, including the act of researching, and then making an understanding of it all. For this research thesis, the highlighting of this difference is essential, as it is a potential source of multiple ambiguities, as discussed in previous chapters (culminating in section 4.2). The endeavour later is to hold the latter to account.

The research approach of emergent thinking of actions re-connects the proposition that there is no termination point; it is a continual movement of process, never arriving but always in transit (Baskerville et al., 1992). Behind this concept is the understanding constructed while engaged in on-going sensemaking acts in the various everyday activities and projects. For the techno-rationalists, the doing action is subsumed automatically in reflection of an objective reality, and there is no reason to think otherwise. For the interpretive researcher the interest is in how the agent felt, so retrospection needs to take place for the research to collect this feeling. In this thesis, as already discussed in previous chapters, the emphasis is upon emergence and the 'doing' by people in the normal activities of doing things, which endogenously makes the production of local order, and that the outcome of this action is formed spontaneously, according to actions and interactions with the rest of the world, which is not the same thing as stopping and thinking about the rest of the world. This can be simply 'proved' by attempting to think about what we are doing whilst simultaneously engaged in the doing of a project. The mind consciousness is always elsewhere, as it has to stop the doing and think about, what-it-is- or was-it-that-we-were doing. Giving a running commentary on what 'we-are-currently-doing' is a report upon the immediate past actions and this soon breaks down when an interaction with another person takes place. Whereas, in the visualisation or conception of an initiator in the projection of an action, the looking-forward-to is always carried out in accordance with a plan more or less implicitly preconceived (Schutz, 1967) thus exposing the in-order-to do motivation that now can be collected in its realization.

The 'naturally' occurring data sets of recordings form the main core data set for analysis. A total of over 26 Hours of recordings were collected, collated, tabulated and transcribed (see the list below). The transcription and annotation varied according to the interest (the transcription symbols provided in appendix 2). Some sections took a considerable amount of time, with particular passages of interest minutely annotated. One particular 30 second interaction of real time took in excess of three days to get-to-grips with in the understanding of what was said, of the way it was spoken, and what the intersubjective meaning inferred, both for the participants and for the researcher. Other sections were glossed over and only casually reported upon, as they were not central to the investigation in hand; these sections are held in reserve awaiting analysis. The development latitude of analysis is a judgment call, and is discussed in the next section with the tabulated list of recorded (table 5.4) naturally occurring tapes that form the core data set. This section discusses the time line of the project, what was and what was not recorded, and which tapes were initially selected for stage bracketing with the reasons for this.

Finally, notice that at Tape 28ME the title changes as this reflects a change of style from a personal conventional system analyst project management style to the co-opting onto the project board of a contracted Project Manager who proceeded to run the project using PRINCE 2.

Bracketed Tape	Tape No	Date of Recording	Title of Tape	Time
[x]	01ME	05/07/2001	1'st Meeting of Project Group	01:13:00
	03ME-A 03ME-B	04/09/2001	Councillors meeting	01:14:53 00:28:10
[x]	04ME	05/09/2001	De brief meeting – post Councillors meeting	00:44:43
[x]	10ME	02/11/2001	Meeting of project Group	00:52:45
	12ME	15/11/2001	Demonstration of RXXXXXX	01:14:59
[x]	14ME-ab	07/12/2001	Meeting of project Group	01:09:59
[x]	16ME	11/01/2002	Meeting of project Group	01:04:01
	19ME	30/01/2002	Meeting with CEO	00:51:05
[x]	21ME	08/02/2002	Meeting of project Group	01:06:14
[x]	23ME	13/02/2002	Project Board Meeting	00:54:40
	24ME	14/02/2002	Meeting with RXXXXXX	00:51:10
	25ME	26/02/2002	Technical Meeting with Pxxx	01:02:44
	26ME-A	28/02/2002	Sub - Meeting with CP - M T	00:57:00
	27ME – A 27ME - B 27ME – C	06/03/2002	Sub - Meeting with S & 'C' & JM	01:12:12 01:03:00 00:17:19
[x]	28ME-A	08/03/2002	Project Board Meeting	01:05:24
[x]	28ME-B	08/03/2002 P	PBM - with Pxxx the software development company	00:53:02
	29ME	11/03/2002	Technical RXXXXX Meeting	01:07:34
[x]	31ME	05/04/2002	Project Board Meeting	01:09:21

	33ME	05/04/2002	Demo at Councillors House	00:51:40
[x]	34ME –A	26/04/2002	Project Board Meeting	00:53:41
[x]	35ME-B	26/04/2002	Project Board Meeting	00:46:14
[x]	36ME	17/05/2002	Project Board Meeting	00:59:18
[x]	37ME	29/05/2002	Project Board Hand Over	00:38:54
			Time total	**26 Hours**

Table 5.4: List of tape recordings - meetings

In research practice, the 'amount of data collected' is dependent upon the extent to which additional data can achieve change in the existing data (Sarantakos, 1988 pg, 205). Conventional research is iterative in respect of data collection, and is based upon saturation and completeness. In Requirements, achieving completeness is also a major concern (Lamsweerde, 2001), along with consistency, and correctness (Thayer and Royce, 1990). This is to ensure the validation of Requirements process that which is intended to be built corresponds to what is actually required (Thayer and Royce, 1990) and which is also enhanced by the process of objectives analysis (Yeh, 1990). Closure, for both Requirements and research, is based upon the saturation point, which in turn is based upon the validating correctness of the objective model. Both research and Requirements approaches apply the concept of saturation completeness resolution by abstraction. Both draw a boundary around research in the context of investigation. But this conventional approach has as its aim an abstract objective model, within a tightly controlled domain of understanding. This piece of research therefore requires a different type of validation process.

Empathic understanding, Verstehen understanding, of actions, events and situations about the people involved in the scene and their constructions of the project demands an iterative approach. The phenomenon is not, and never can be, perceived in its completeness; it cannot be grasped adequately in its full unity. Schutz (1967) uses the expression, "It is essentially something that flows, and starting from the present moment we can swim after it, our gaze reflectively turned towards it, whilst the stretches we leave in our wake are lost to perception. Only in the form of retention or in the form of retrospective . . . [recollection] have we any consciousness of what has immediately flowed past us".

5.4 Discussion

The focus of this chapter has been to firstly, structure the subsequent analysis research, breaking it down into two phases, phase one, the subject of the next chapter and phase two, chapter 7, the analysis of Requirements. Secondly, to give an overview of the case study and some of the salient features that inform the contextual detail. Thirdly, to give a critical research discussion overview of the dataset collection, the means of it's collection, and the reasoning for the concentration upon the naturally occurring data tapes.

The work of the analysis is to leverage understanding of concrete locally produced order through understanding 'what-is-done' and 'how-it-is-done'. That 'A' conversation is about this, made with the constituent phenomena and how they went about making inter-subjective meaning. The specific aspect addressed in this chapter was an assessment upon the surety of the research approach, and the research processes that control or assist in the collection of the data set.

It has been established that the research has to begin with a pre-suppositionless state; it cannot assume the known background theoretical assumptions of Requirements, as these contain the attributed variants of the Requirements phenomena and form the subject matter of the investigation. The need, which is taken forward into the next chapter, phase one is; firstly to identify the nature of the 'aboutness' in the construction of concrete examples of naturally occurring conversations, and then, secondly, to associate these 'tokens' of processes, without necessarily knowing exactly what the belief system is that lies behind them, and to be able to say that the topic of conversation is about X subject, referring to and utilising the stocks of knowledge which we all carry as baggage, and use in the normal course of activities to, among others things, negotiate, project ideas, and achieve our objectives.

The initial positional statement was that the research collection of data cannot be about boundaries; as it (data) has relationships to different horizons of interest. The only clear boundaries are the start and finish dates, which are marked out by the first official meeting of the project group and the handover at the last meeting. The horizons of interest revolve around the depth of the interest found in the data, that is, asking what is necessary for understanding beyond the collection of material found in naturally occurring conversations. How does the supplementary data concur with the actions found? Some of the insightful aspects for ‘understanding’ came through ethnographic ‘hanging around’, catching basic undirected conversations, and in having an interest in the work that the people were doing. Some of the most difficult aspects to deconstruct and make sense of came from interviews and documentary evidence, traditionally the mainstay of IS research procedure, but which produced stories and perspectives that sometimes distorted the picture of interaction.

A prominent feature in the design of the research approach is to fundamentally question the difference between the methods employed in the 'context of discovery' and the methods employed by reflective inquiry, and identifying the method that emerges after the discovery and constructions made, in the accounting for the previous actions. Further, this research is also sceptical about the role of researchers and their involvement in the activity of Researching, and the undue influence of existing frameworks to ‘fit’ data into prescribed domain specific categories. Consequently the main thrust of the approach advocated here is to remain chained to the original data-moments, in doing so repudiating all abstract meta-physical constructs.

The overview of the case story is not a simple one, and the thesis purposely does not attempt one. The work of notating the visibly-rational-and-reportable-for-all-practical-purposes (Filmer, 2003) is a provisional task without an end. The research question is normally to find how much more is needed; usually the task of research is to extrapolate, to abstract the variables out into an abstract concept for the purpose of giving consistency over time. However, here the research approach concatenated upon the life-world actions, finding that it was a continual process of [Bracket-ing] off and dissecting, breaking apart into ever more fragmentary pieces, and each [Bracket] opening up ever more, new horizons and of possibilities. The increasing amount of the richness found in the detail, results in an exponential amount of complexity. Yet this approach also has its own break-point, since some of the subject topics that emerge from the analysis can be set aside for another day, since they are not the direct subject matter of Requirements, temporarily it is enough to just say that they are there as topic matters, and that we can list them as such.

This research approach takes the opposite direction to other research designs. The starting point is with of the naturally occurring data set in concrete frozen temporal moments, the [Bracketing] fragment the conversations cross-sectionally as the natural temporal flow is dissected, proceeding down into the detail, following the maxim; ‘the devil is always in the detail’.

Chapter 6

Workbooks and analysis of phase one

"well, ill eat it," said Alice, "and if it makes me larger, I can reach the key; and if it makes me smaller, I can creep under the door; so either way I'll get into the garden, and I don't' care which happens!"
Alice's adventures in Wonderland; Chapter 1

6.1 Introduction of Workbooks and analysis

The aim of this chapter is to give an overview upon the production and output analysis of the Workbooks. The Workbook method is a structured approach exploring the constitution of phenomena by lifting out and [Bracket-ing] the normal 'spontaneous' activities that make an endogenous production of local order. The notion of the Workbook has its derivative in the film industry, where the workbook is an adaptation of the story board; it is the analysis of each shot and sequence on a frame-by-frame basis. The analogy applies to this research, as it is about analysis of the various scenes, events, shots, perspectives, camera angles as viewpoints, actors, and people. It is a device, used by a director, for co-ordinating the story board with an analysis of each shot and it notes the sequence of events if necessary, sometimes down to the detail on a frame-by-frame basis. The simile applies to this research project, but as a mirror transformation that is, in reverse, instead of building the story, the Workbook is a device for deconstructing an existing given complex body of an event and fracturing it down into topics of phenomena by using [Bracket-ing].

This phase of analysis is about obtaining the ability to recreate, replay and pause the various scenes, events, shots, perspectives, and camera angles within the given time frame. Consequently, the aim of the Workbooks is to plan and organise this stage of the research analysis approach.

The aim is to facilitate and furnish an 'understanding' of the phenomena through deconstruction of the key [Bracket] topics of conversation. To be able to explore multiple potential meanings, found in the 'content of discovery', that is, to investigate the endogenetic production of local order, and it's formation in the execution of social interaction. This is not about interpreting subjective meaning as found in the intentions of individuals by collecting statistics and facts about the behaviour of groups of individuals, but is a study of the construction of an empirical rationalisation of account, and of how the workings of the group are going about constructing, what is for them, the phenomenon of Requirements. But starting from an analysis perspective of a presuppositional method, the objective, at this stage is to attain, get, acquire an understanding, or Verstehen, as previously discussed, to comprehend “the meaning” of something or the ‘about-ness’ of a phenomenon, located as a continuum that stretches from the basis of interactive subjectivity and ends in the meaning imputed to the conduct of a person by an observer, with pre-established generalised, typified conceptions, that can be packaged and rolled up into intersubjective representations.

The structured approach of the Workbook breaks the analysis into two stages, illustrated in the diagram below. Stage 1 formats the data for presentation; it involves two steps, firstly, the preparation of the data material and secondly the [Bracket-ing] of the topics of conversations. The aim at this stage is to provide a clear audit trail for the subsequent stages. Stage two provides the vehicle for the ‘sense making’ by means of viewing [Bracket] through five perspectives. The outcome of this stage produces a [Bracket] title, or designates the name of the phenomenon of the key sequences. The Key Sequences help in the intermediate stage of formulating and identifying actions that belong to processes.

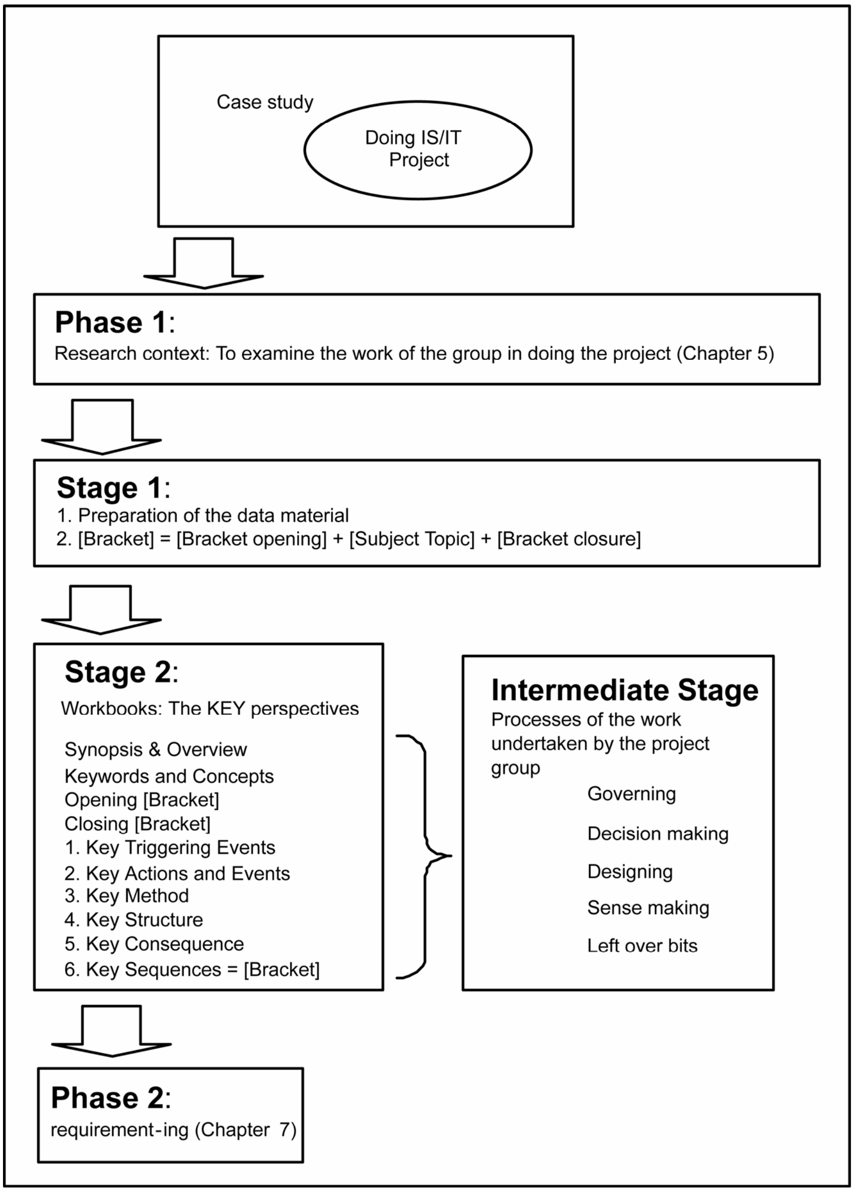

Figure 6.1: The phasing of the enquiry

6.1.1 Stage One: The preparation of the data material

The core material for the data analysis is based upon tape recordings of naturally occurring events; these recordings have been made without any direct interaction by the researcher. However, they were augmented with field notes, part ethnographic embedding, documentation and Interviews. The collection of secondary evidence was necessary in order to help in the understanding of the context and the dialogue.

The goal of this stage is to produce a detailed transcript reference document from the tapes, using the notational format layout, see appendix 4. The depth of the required detail of the notation is dependent upon the analysis strategy which is discussed next.

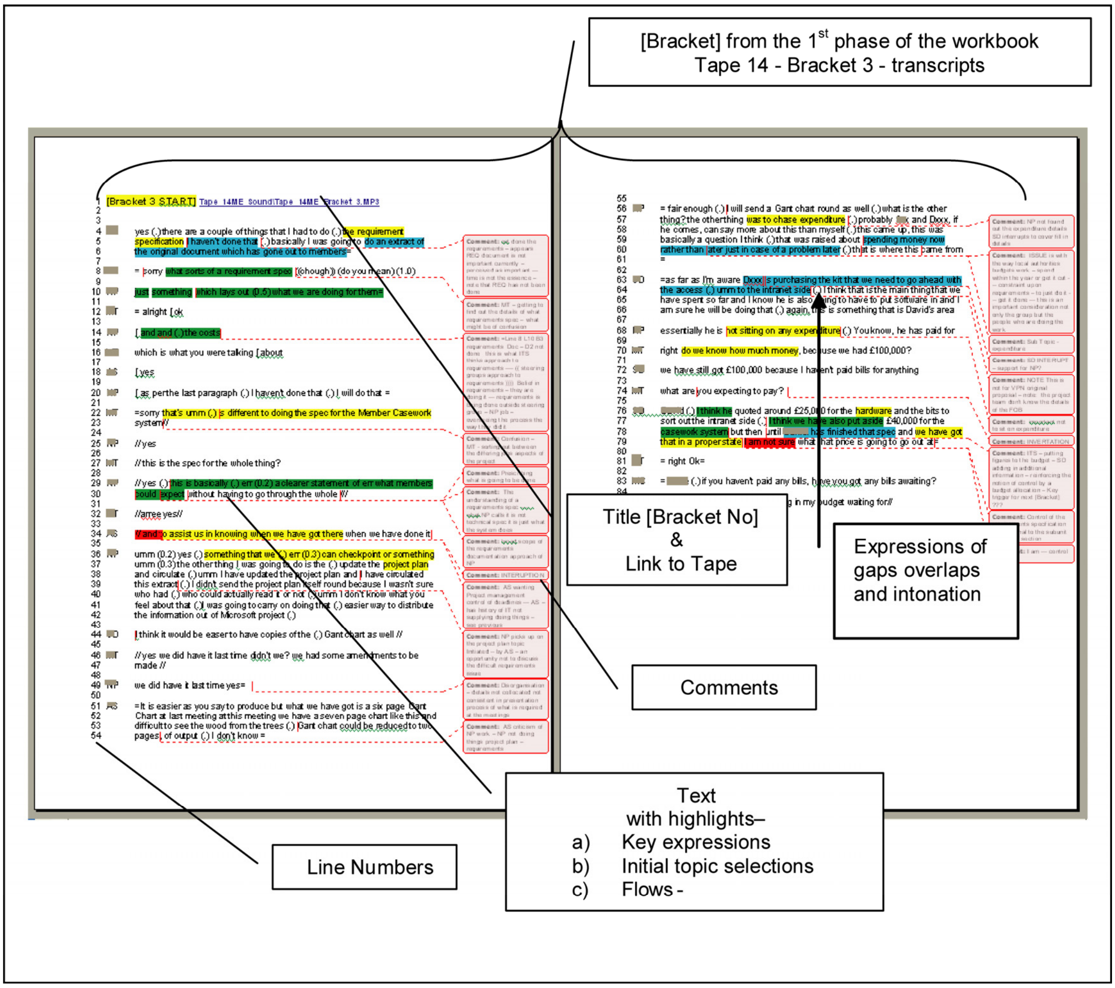

Figure 6.2: The transcripts: Phase One preparation

Notes on figure 6.2

1. Line numbering; to aid location '[Bracket X] – Line Y', this links the transcripts to the next level of analysis, the 'key operational phases'. The line numbers locate analysis to the bracket and the position of raw data.
2. [Bracket X]; these are markers and locators of the text segments that enclose key actions and events; this part relates to and is the direct link to STAGE 2 of the analysis.
3. Highlighting and marking up text for future analysis, through the use of highlighter and comments capturing initial thoughts and interesting passages.
4. Expressions and use of the intonations of the speaker to give the feel of the

terms of the language used (see appendix 4 for the notation).

The main aim of stage one is to convey the necessary, essential and ‘key’ information of the story as it unfolds in a textual form whilst not losing the flow, the authenticity and the originality of context of the actions and events that took place. The aim of data transcription notional usage is to keep the material true and fresh, by the removal of any attitude or inclination, leaving only the mere predispositional interpretation of words and meanings. The applied notation method avoids over embellishment and the ultra fine detail often found in CA, the rule here is ‘adequate’, where necessary, and when required. The notation style has been based heavily upon Silverman (2001) and augmented from various other sources. However, the process of representation is not straightforward; as Lapadat and Lindsay (1999) have argued, the role of transcription is problematic both theoretically and methodologically, the problem is that empirical examination of transcription processes, products, and their implications is singularly lacking in the research literature (Lapadat and Lindsay, 1999).

However, the background concept of the Workbook is not to produce, or reproduce the finished product; the analogy of the Workbook is to maintain the sketches, notes and provisional ideas. It is a resource collection depositary to show the workings of the analysis, the temporal key stone being the original tapes or the reference library, based upon recording and listening to the resource. The applied ‘adequate’ notation method avoids over-embellishment of unnecessary marking-up; the rule is to do so only where necessary, and depending upon the focus and the perspective taken in the enquiry. The purpose is to produce voice to the utterances of the group and represent their expressions, tones and intimations as accurately as possible. The emphasis is upon the amount of notational detail necessary to assist in revealing the subtle nuances that people use in normal conversation. These are delicate and exquisite moments; they are not composed of just a collection of words. They consist of pauses, overlaps, inclination umm’s and interruptions; they are marks that the inculcator, receptor, passive participant, observer etc, make in utterances, and they reflect the moods, inclinations and expressions of in-order-to in an anticipated future project.

The extract below gives an example of the detailed notation and the reasons for its use to show how the temporal moment is key to the expansion of ever expanding horizons of interest. The Bracket identification shown in [-] square brackets locate the material; Tape number, Bracket, and line numbers, so that the hyperlink provides the accessible auditory tape file. The original interest here was to look at the problem of changing Requirements and give an example of the process of 'realizing-a-change-to-a-requirement'. In the following text box 'C' (the leader of the project group) invites 'R' (a leading councillor and a party whip) to speak, 'C' does this by asking a question, then, after a pause of 2 seconds silence 'C' repeats the question but this time elaborates upon the problem with a supplementary question. The 'umm' of 'R' and the long delay of over 3 sec is recognising that a reply is needed, which 'R' gives "= terrible". 'C' then repeats 'R''s words without hesitation, 'C' is in effect repeating, so as to recognise and realize the implications of 'R''s reply.

C	umm (0.3) I wouldn't have thought most of the cases that you deal with now are so sensitive (.) are they Zxxxx? (2.0) say on a random basis say if A P was to see one of your cases (.) what kind of mischief could she do (3.2)
R	umm terrible =
C	= terrible
R	= yerr
C	>right (.) SO (.) its high (1.2) ok
M	OK

Text Box 6.1: [T28b-B8-L193-205]

What 'C' was looking for in the first question was confirmation of her current understanding about the sensitivity of other councillors from other parties having the possibility of viewing their workload cases. The two second pause is not insignificant,; if 'R' had agreed with the first question he would have (or might have) continued the flow, worked with the grain of the topic flow and said yes or 'umm uh' without a little pause. However, there was a gap and 'C' was attentive, and quick to elaborate upon the original question with a supplementary one. After a three second pause, which is a long pause in a fast flowing conversation, 'R' challenges 'C's assumption. The net result was that 'C' had to change her position, consequently the knowledge that she had previously held about security was now altered. This may appear to be a small point, but setting this in context has extraordinary consequences, in that nobody else had previously considered that data contained in cases was in fact politically sensitive. Taking that this is Tape 28 and the software is nearing completion stage it represented a major change in the Requirements specification. A point luckily not lost by the project manager M, who had picked this up as noted in the conversation, "OK".

The second aim of the transcription process is to provide the foundations for traceability in the production of an audit trail. Although the transcripts are considered the textual resource and material artefact of the research, they are secondary to the understanding that is achieved through repeated listening of the original tapes, now broken down into [Bracket]s. So, the work of the transcription process is to support a new reader to the text so that they should 'feel' that the text they read is a faithful reproduction. This means that they should be given enough clues to have the ability to read it as a flow of conversation, in the same manner as that of the original taped conversation, labelled 'agile CA'. The granularity of the conventional Conversational Analysis (CA) transcription notation is too fine for this task, although it may give the full resonance to a reader; however, the aim is for the researcher to use transcripts in conjunction with listening to the tapes. The notation used in this analysis is usually at a coarser level than CA, but not necessarily. The objective is to display 'just' enough of the core main features, giving the feel of the conversation without the reader 'inserting' their own thinking, or emphasis, and so avoiding any false interpretations. The aim is to give the feeling, a reasonably, justifiable accurate representation of expressions that the original speakers gave in talking, so gaps, pauses, overlaps, particular stresses and emphases, together with other associated speech noises are all considered relevant to fill in the detail of a textual representation.

Lastly, it is important to note that the transcriptions process is never finished. This is a continual iterative process as new aspects emerge from repeated readings, and with the analysis stages at a later date. As such, there is a continual re-visiting of [Bracket] phenomenon, of having to return to the raw data, as it is often necessary to revisit the notation, adding in more and more detail as new understandings emerge. The whole research design is one of a holistic approach, with organic research, and with the origins of the data continually displayed and carried forward, and as the unfolding process of analysis emerges there is greater need for the tethering tie to be strengthened between the data and the concepts.

In using this agile method, '*less is often more*', hence the prefix to all levels of analysis is 'Key'. Key, meaning giving access, using the necessary effort to unlock the phenomena that would make available, the leveraging that is hidden in the detail, and which can easily get lost in abstracted thinking, without losing the physical location of the door that needs to be opened.

The method of [Bracket-ing] an overview

A [Bracket] is composed of = [Bracket opening] + [Subject Topic] + [Bracket closure]

A bracket is a mix between a decomposition and a fracture of the data, having the aim to lift out the topicalized topics of conversation. A 'topic' of a conversation has a beginning, middle, and an end. The initial work is to go along, by re-listening to the flow of the conversation, looking to spot the natural breaks and changes in conversation.

The advantage in recording a meeting is that very often these changes are punctuated by the structure and the use of the agenda in running the meeting. However, there are often sub-topics within the conversation that are not constrained by the agenda items, so the first consideration is to follow the agenda only as a rough initial guide. The key is to pick out the topic and spiral outwards, spooling the recording forwards and backwards, iteratively expanding and contracting, following the breathing of the topic, until the opening and closing moments are recognised. The rule is, that if the conversation becomes too complicated the need is to investigate more fully, to find if other sub-topics of conversation can be highlighted, and having identified that this is so, to then make a decision whether or not to fracture and decompose the phenomenon into the new emerged topic. That is, to subdivide or divide it into a new [Bracket]. The rule of thumb guide is, to fracture when it could potentially reveal more phenomena than is currently revealed.

Having prepared and assembled the data transcripts, the last step of this first stage is to collate any other reference material together, as an appendix to the workbook. This may be any documentation, such as the agenda, the reports and the field notes made at the time.

When Stage one is completed it becomes the reference document for stage two. Stage two is a new document and the link between them is the [Bracket]s as discussed below.

6.1.2 Stage Two: Establishing the operational phases

The second stage 'crosscuts' the temporal data stream. This stage has been labelled 'the [Bracketing] of the 'key operational phases'. The aim is to facilitate an understanding; that is, how 'actions and events' and then 'processes / methods' etc lead to emergence through the analysis of focusing upon each, in turn, of the following perspectives:-

The structure of the method uses the following five perspectives:-

1. Key Triggering Events
2. Key Actions and Events
3. Key Methods
4. Key Structures - Key Resources
5. Key Consequences

These five aspects are then summarised into the phenomena of the [Bracket]:-

6. Key Sequences which equals the meaning to the [Bracket]

The approach structures the analysis from perspectives, from the ‘what initiated the [Bracket] through to (6) the titled meaning, echoing the borrowed concept of the film industry workbook. Each perspective is a reflection upon a different viewing angle and with it, all of the subsequent associated equipment, in order to make the camera angle. The triggering (1), actions (2), consequences (5) and sequences (6) are easily accommodated, however method (3) and structure (4) often require more work and may even be impossible or unnecessary steps for the analysis. The emphasis is upon providing the structure and location in order to do the work if required.

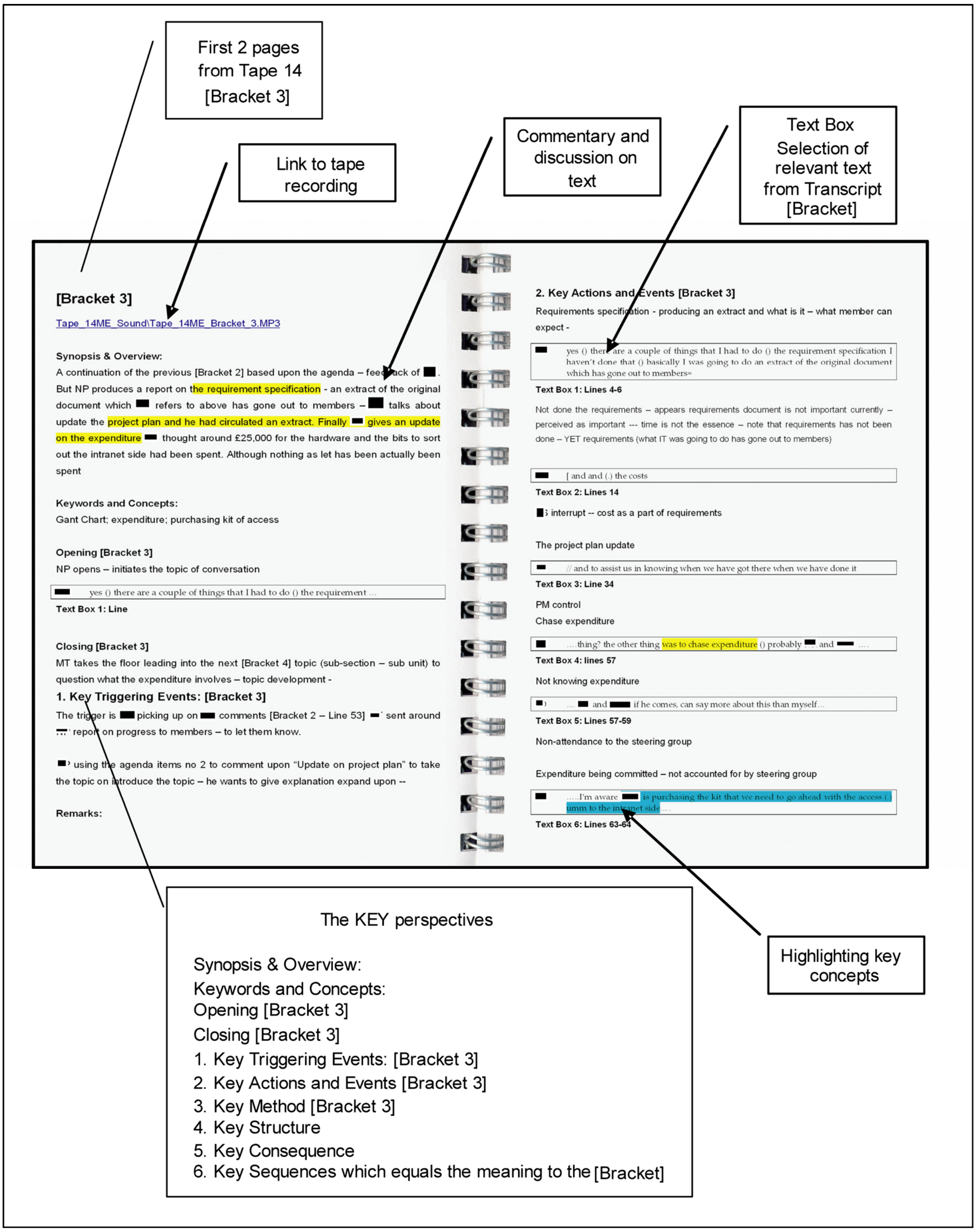

Figure 6.3: Page layout of Workbooks

The method here is structured and systematic in approach, ensuring that:

1. The use of the research design promotes an internal consistency of approach to the analysis which is maintained throughout the whole data set, and is achieved by using the template.
2. Context is maintained, by the selection and the use of natural occurring data and ensuring that the analysis remains fixated on the local production of

orderliness.

3. To facilitate the construction of reasoning to the analysis, it is essential that small incremental steps are made so that each of the steps taken are traceable, and auditable in a clear 'research audit trail'. To spot the creative leap, whether it is contained in the work of the people as subjects, or in the researcher's own imagination.

The advantages to the research design are:

- The ability to see patterns of key sequences at micro and macro level of detail
- To be able to look at aspects of how structure is used, created and consumed
- To be able to examine verbal actions at work and assess their implications
- To examine the background and environmental influence upon the process
- Facilitate re-opening of new enquiries and questions
- To be able to list the outputs of the events and the possible consequences
- Although not specifically designed for establishing categories, predicates, reliability statistics or open coding, this method could provide data for research methods
- The method is repeatable across the naturally occurring data sets, providing consistency throughout
- The chronological story is maintained

6.2 Analysis outcomes of phase one

The overview of this section covers the presentation of the 'grouping' of 'key concepts', derived and abstracted from the analysis undertaken in the workbooks. The groupings are an assemblage, a collection of like minded 'processes', interpreted retrospectively and reflected on by the researcher's own sensemaking upon the about-ness of the individual [Bracket]'s. The key concepts originate from the [Bracketing] work in the Workbooks and are arrived at from the research process called 'naming of the phenomenon', which is a sub-process of typifying the workings in the [Bracket] and giving them labels, called the 'Key sequences' (Key Sequences, which has similitude to the 'meaning' is analogous to the 'about-ness' given in the interpretation of the [Bracket]). The 'Key sequences' is the output of an interpretation process upon the emergent sensemaking process of intersubjective communication, as made by the people involved in the work of the case study.

The purpose for doing this grouping is to establish 'if' it is possible to identify the relationship of the [Bracket] phenomenon together with it belonging to 'a' process. And if this is so, if it is possible to identify the typified process title. The exact allocation of a category is not necessarily important or necessary at this stage. The quest is to be able to say that this [Bracket phenomenon] 'could be', or that it is typical of doing this sort of process "thingy". The next stage of the research, phase two, is in the next chapter where the Requirements theory will be tested with the key [Bracket] actions in a framework. However, at this stage it is about identifying the [Bracket] actions in terms with some sort of recognisable process names.

The question of recognising processes extends beyond the properties that are explicable in terms of the understanding imbued by the laws of physics. This stage is not about a taxonomic analysis or a tabulation of variables and representations in respect to a system of names. Rather, it starts from the basic premise of recognising that there is something more to it than only that of a functioning organism. Humans in life produce and use process in thoughtful, artful arrangement. This predisposed arrangement is situated before language identification and classification in the terms into which languages usages are analysed. The basic premise starts from human understanding, beginning with consciousness, in short, data plus meaning, and in Foucaultian (1970) dialogue is the 'position of reciprocal borrowing and contestation' between life autonomy and the concepts of classification. It follows that the research approach is not a category assignment that is inexplicably referenced to an abstract context, and is also not just about the validity of using a secondary interpretation method made by the researcher. Rather it is about reaching an understanding of Verstehen understanding of the production of what Garfinkel has called the 'empirically specified constituents of the 'Shop Floor Problem' (Garfinkel, 2002). These are nothing more than locally produced, everyday practices, or what Garfinkel calls the "real-word phenomena", made in locally witnessable, naturally accountable coherent substantive, materials (Garfinkel, 2002). It is also subject to the analysis of what constitutive part is of knowledge, and the discourse made in relation to the Requirements theory, which is referred to the subject matter of the next chapter. At this stage, no assumptions can be made. To reiterate, the interpreted, analysed meaning, or 'about-ness' phenomenon of each [Brackets] throughout the tape collection can facilitate the grouping of key sequences throughout the workbook collection.

The [Bracket] phenomenon protracts the natural span of time, yet maintains the original inspirational spontaneity. The [Bracket] is a facilitated approach towards diagnosing the assumptions that are made about extemporaneous intersubjective activities that occur in temporaneous moments. Phenomena become recognisable as they become lifted out [Bracket-ed], and as they are understood, or as they reveal themselves, by the awareness of the researcher's sympathetic and reflective attitude that follows from the prescribed series of identification steps taken, as outlined in the preceding research approach.

The outputs of this latter stage of phase one analysis produce phenomena of interest. These can also be characterised as essential building blocks or tokens, or as basic executive units of intention and are recognised as individual phenomena, pulled out of the [Bracket], that depict key moments of interaction in the construction of that [Bracket]. Any of these tokens or any specific instance of intention is a highly structured phenomenon arising within a highly structured system (Boden, 1973). The analysis approach at this later stage is to take these pithy tokens and examine diagnostically their possible interrelationships, and to associate them with any possible underlying concepts.

These loosely re-formed or re-grouped piles of tokens create web like formulations of processes of systems. This has been without the necessity of directly looking for the Requirements phenomenon, yet in asking the question, it was possible to typify the process as a part of six key processes identifiable as; governing phenomena, decision making process phenomena, designing phenomena, and sense making process phenomena. The sixth process was a collection of specialised process tools phenomenon, labelled as the 'left over bits'.

As these processes are temporal forms of production, and are thus subject to the motion of emergence, it means that the viewpoint is always one of the unfolding of proceedings, plans, actions, intentions and projects and the like; it follows that when these are presented here as a collection of grouped activities, they are working in different analysis horizons than that in which each individual phenomenon originally occurred. Each [Bracket-ed] phenomenon is made up of largely self contained units of action, consisting of; an initiation sequence, a middle and an ending sequence of topicality, and is endogenously engaged in the intersubjective reasoning activity that is undertaken by the people themselves. The question being addressed here is the recognition of the research activity in operation. It is suggested that that the [Bracket] phenomena themselves are adequate re-presentations and that selecting a key moment of the event itself is adequate, without having to resort to higher horizons of analysis. The analogy to use is the same sensemaking attitude as when recognising the first few notes of a tune or melody. The genre is instantly recognisable as belonging to a collection or of types of a music collection; it may even resonate in such a way that we know the title, but that 'bit' of further information is not really important, as it is just a title, and is not the meaning that the work imbues. Vagueness is not an issue here as it only means that the Verstehen iterative cycle needs to be repeated, if that is what is needed, as these analysed parts are not parts of the original whole; as in a composition, but these new parts are 'new' creations and incarnations made from the scraps of fragmented phenomena, and these [Bracketed phenomena] are temporal forms awaiting the unfolding of new horizons by the researcher and by the reader in the making of something that is understood and meaningful.

As these are process of frozen temporaneous moments, they belong to that moment of original production and not to any imposed, transposed interpretational research schema; to reinterpret as such is a misinterpretation. In keeping with the detail of the highlighted action, directly lifted out of the [Bracket] phenomenon, we can find a validity audit trail at hand by defrosting the temporaneous moment.

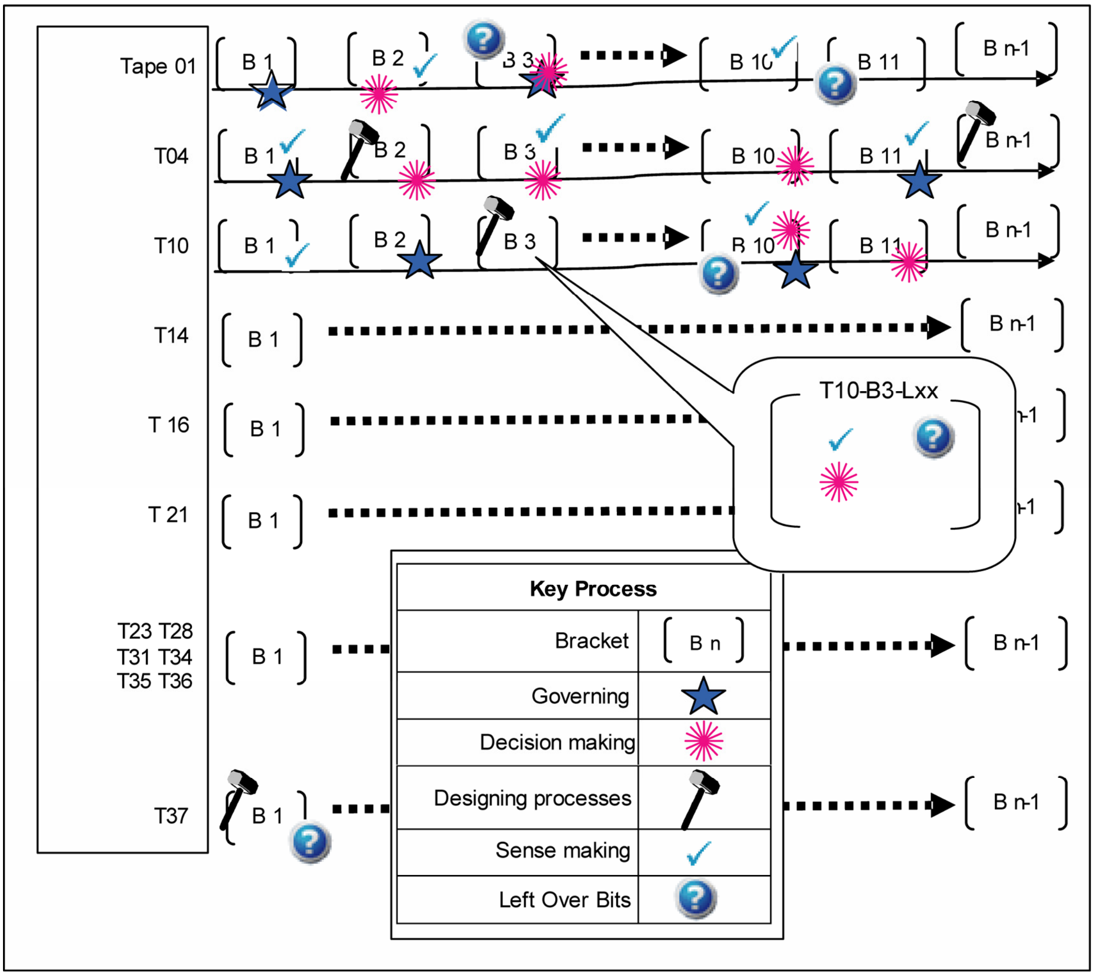

Figure 6.4: The bracket phenomena

The final section of this chapter starts with an overview which is pictorially demonstrated in the Figure 6.4 above. The Diagram overview shows that within a [Bracket] several perceived phenomena are work, while others can show a single dominant process at work. Individually or collectively, it is the people involved in the construction of the topic of conversation that make the topicality of the intersubjective conversations that use these identified processes, although there are some processes that just do not appear to fit and these have been labelled ‘left over bits’. On the surface these left overs appear to defy process labelling, however on closer inspection they can be shown to be a rag bag collection of process tools used that were made inspirationally for the local production of order. These ‘left over bits’ are possible avenues of further analysis, as they only appear occasionally and are easily overlooked or missed out when employing a less detailed traditional type of category assignment process.

Summarising, the Workbook’s aim at this ‘phase one stage’ is to expose noticeable repeated, recurring themes. Events that can be easily grouped into recognisable typifying processes while still keeping an audit trail of original occurrence. But the emphasis is not on categorisation, at least not in the conventional way of the “importance” of belonging to some conceptual and structural order (Miles and Huberman, 1994). But the aim of this research design approach is to demonstrate that snippets of conversation are readily recognizable in this case study as; governing phenomena, decision making process phenomena, designing phenomena, or sense making process phenomena. Together with a collection of specialised process tools phenomena, labelled here as the ‘left over bits’. All of these phenomena identifications have been made in a common-sensical, practice based procedural way, not by comparing them to a given category, firstly, because no theory identification a priori has yet taken place and secondly, there is a fundamental disagreement proposition taken by this thesis that rejects the premises that “data collection is inescapably a *selective* process” (Miles and Huberman, 1994) as a justification for coding analysis. These phenomena types occur because the people themselves are making and doing things that are recognisable and this invites, through use of the method, while acknowledging that the researcher is a third party, people to retrospectively ‘stop and think’ about what it is that ‘they’ were doing rather than what the researcher is attempting to achieve.

Processes of the work undertaken by the project group

6.2.1 Governing

As expected, in reviewing the progress of a project board many actions can be grouped together as typical events of the process of governing. Also, some sort of governing process appears to be at the heart of the process of IS-IT. From the given literature perspective; “Historically, IT governance has been strongly associated with the structure or configuration of the IT function, thus reflecting the locus of responsibility for making IT management decisions” (Schwarz and Hirschheim, 2003). However, the ‘locus of responsibility’ cannot be automatically assumed, the question here is how is IT management able-to, and how does it go-about making the locus of decisions involving governing. How is the legitimacy and authority of the IT function able to happen? In chapter three, the bases of the Requirements assumption involved the concept of idealizations, governing all conduct in the ‘natural’ sphere. This is also reflected in the idealized thinking about planning a system of how ‘the system should work’, however, as noted, for example, by Rittel (1973), such a planning system is unattainable. One possible proffered consequence and explanation for this state of affairs is that organizations can be also regarded as 'ensembles des jeux', collections of power games (Rodrigues and Hickson, 1995), where it is not at all obvious which ‘social rule’ is being applied in the participants’ actions and in which instance. The resultant problem academically is that the governing process lacks explanation and prediction, and these are two necessary conditions for it to be a good theory. But the connection of this sort of conclusion lacks clarity; it lacks the connections with the empirical evidence. To test the research approach out, as a pilot, it is worth briefly perusing this line of enquiry as a precursor pilot trial test of validity to the next stage, that of phase two.

The wider traditional view would say that norms play an essential role in governing people's behaviour, Giddens (1984) calls these the modalities of structuration, where Norms are the rules governing sanctioned or appropriate conduct, and as such, the governing processes are often thought about in terms of ‘social laws’, for example the requirement in England to drive on the left. However, under the commonsense constructs in looking at the actions, within the [Bracket] of the actual use, a much richer and deeper set of web like interactions takes place, which defy a simplistic categorisation post-box approach. Indeed, in the empirical research actions of abstraction the spontaneous richness of the moment would be lost to the generalisation, repeating the problems of ‘glossing’. The meaningful relationship loss of the phenomenon would be reduced to cause and effect relational constructs and the explanation would be predicated on the notion that interaction is both rule-governed and motivated.

The following table demonstrates that If the research drops the attribution notion of states, mental or otherwise, and reports and reflects upon the intentional concepts, with the action concepts (Hughes and Sharrock, 1997), and concentrates on the fundamental 'observational datum' where circumstances may well be ambiguous, nevertheless, actions and their descriptions are conceptually tied to reasons and motives such as in the actions of rule making, rule following and rule applying, all of which would fall under the scope and remit of governance. Therefore within this process group, what is expected and shown are concepts, such as how some people controlled the project, and by what mechanisms (did they have and use), what structures did they have at their disposal and how the group, or individuals, accounted for their activities.

The thesis perspective of 'Governing'	Description	Examples
Managing	Overseeing practices such as introducing project management such as PRINCE into the second half	**T34-B5-L27-28** [C on Monday we had a meeting with Wxx Wxx and Wxx Wxx made it very clear that he expected it all to be delivered and working]
Regulating	Setting up norms and rules such as control of materials and meetings, who gets invited to talk.	**T16-B6-L11-15** [C: so you let us have Xxxxx's paper Q: yes (.) I can send that out C: we will then have a look at this paper and if anybody has got any comments on this to let me have them (.)….]
Assigning responsibility	Who does what and where	**T16-B11-L88-92** [G: no it is their responsibility but if they are anything like the other users we have got that work for the Council they will never think about doing anything until the disk blows up and they have lost all the information and start screaming and shouting. (…..) you are right (.) we need to raise awareness and set out who is responsible to what] **T21-B3 - L17-22** [T: I think Qxxx Qxxx (0.2) was down on the action plan as picking that up and obviously Qxxx's no longer with us // C: // that's right yes T: I think somebody needs to be assigned to those Qxxx Pxxxxx tasks]
Placing strategy	Placing Scheduling and budget from strategy making	**T34-A- B3-L12-24** [L: that's all contained within the 100,000 C: the problem is that we're in the new financial year (.) does that matter or not? L: for the tape (.) yes (laughter) C: but we'll sort it L: I mean there are issues to be discussed (.) yes C: right (.) OK (.) It's just that I don't want to get into a situation where we're seen to be over-spending (.) when actually we're trying to contain it within the 100K that we were given to do this piece of work]
Strategy making	Allocation of budget, who does what work after implementation of project (change work practice)	**T21-B1-L51-63** U: ....we just had to request through J and W signed it off the other day (0.2) the servers for running the e-mail system (.) SuperMail did the work and they proved it worked basically on a PC and we now need a server to run that and he's signed off (0.2) £10,500 for the servers to run that system (.) that will be the totality of the costs C: so it's about £45-50,000 altogether// U: // yes (0.3) and J apparently has a budget on IT strategy (.) so you know all that (.) he's been sort of aware of these costs (.) I'll copy them into you and Cxxxx as [well C: OK] (0.2) right (.) is that it or do you think there is some more//

Table 6.1: Governing Perspectives

The next stage of analysis in this pilot is to examine some of the [Bracket] phenomena processes that belong within a zone of an interception between processes, or that lie at subsections of other processes. These open up opportunities upon different horizons of research interest, which are of use for an example of connections to the underlying concepts; in the text box below the phenomenon has attributes of a perspective of an intersection between a governing process and part of a designing process.

C	oh that's still on red (.) but we're hoping that the work Uxxx's doing now will take it to amber and hopefully green

Text Box 6.2: [T34-B15-L11-12]

However 'if' it is examined from a given perspective framework where the practice is 'organised', then the phenomenon is an example of a generative intentional perception that is ordered. That is to say, the token can be considered to be more like a pattern of movement involved in a process, rather than like a solid separate thing that exists autonomously. And by temporarily focussing in, or [Bracket] out, on the phenomenon from the temporal flow, the technical arrangement of the process concept is demonstrative, and in this case, the ordering and method being used is the process of PRINCE project management.

The example of using the method PRINCE to govern the process in the text box 6.2 demonstrates that it is possible to show the corresponding phenomenon activity with the 'text book method' of PRINCE. This unidirectional coterminous connection of the dynamic connection between the beliefs in the system of the method of PRINCE and its operationalizable actions and events that is exposed in the phenomenon [Bracket], is the same relationship that is exploited and further articulated in the next chapter on the Requirements theory. But the attention here is focused on the governing aspect of the PRINCE method. What 'C' is iterating in the analogy of the red to green traffic light sequence is an example of the idealized thinking about a planning system of how 'the system should work', that is, in the terms of systems of project management, that it's key theoretical construct process in PRINCE is to itemise by means of highlighting the 'issues' that need attention. This now begs the question; what is the delegation of technical code (Feenberg, 2000) or "technological rationality" (Angell and Straub, 1993) that is at work here and hence the legitimacy of that which is being applied in the concrete token example.

What is being questioned is the PRINCE 2 approach of 'Embedding the Method' and whether the method will supply any more 'information' over and above that which the conventional IS-IT approach of 'testing the system' has already given, which highlighted the problem, and has already been previously assessed in a commonsensical way:

C	so we're pretty much sort of there (0.5) if Uxxx delivers on the work that he's done so far…which we need to chase Uxxx and Wxxx Wxxx on ….when I spoke to him ….the staff were 110% that they would deliver and he was 85% that they would deliver (.) so I think we just need to plug that gap there (0.6) OK

Text Box 6.3: [T34-B5-L110-114]

The research problem is that; in order to discuss the dynamic interplay relationship between the PRINCE method and the operationalization found and realized in tokens of the case study practice activities, it is necessary to connect the instances with the theoretical constructs of the PRINCE method.

In conclusion, examples of the phenomenon concept and of tokenised process examples can be identified. In the above example, this was associative with the activity of governing. Furthermore, the token examples are demonstrative in this case, with the ordering, method or the technological rationality being used in the process of the PRINCE project management method.

Having tested the research procedure with this example, the next stage is to return to the thesis issue of the phenomenon of Requirements. Which is the objective of the next chapter, phase two; meanwhile it is worth noting the other prominent noticeable phenomena processes, those of decision making, designing, and sense making process.

6.2.2 Decision making – defective and proactive

The challenge of aligning IS decisions with business needs was uncovered in the early 1980s (Salmela and Spil, 2002). Even with today's internet-based applications, the conventional thinking is that every organization has to make decisions about the proper application of engineering principles (Pressman, 1998). But exactly how these decisions are made in the first place, as Klein (1993) points out, not so well established; "The underlying intent and logical support (that is, the rationale) for the decisions captured in these documents is usually lost or, at best, represented in a scattered collection of paper documents, project and personal notebook entries, and the recollections of the artifacts designers" (Klein, 1993).

The importance of decision making in IT, and of designing in decision making at the Requirements stage is one of the oldest basic tenets of IS-IT, however there have been different interpretations placed upon decision-making, for example Ackoff (1967); "the manager needs the information that he wants - most MIS designers 'determine' what information is needed by asking managers what information they would like to have. This is based on the assumption that managers know what information they need and want it" (Ackoff, 1967). Alternatively, Mumford and Pettigrew (1975) extensively, and pre-eminent IS studies discussed the importance of recognising the political behaviour involved in strategic innovative decision-making. For Mumford and Pettigrew "decision-making has to be considered within the framework of an organisation responding to its environment by developing policies for innovation, and then implementing these policies through the design of plans for action" (Mumford and Pettigrew, 1975).

The decision-making literature is in a confused and ambiguous state, little is actually known about how decision-making is fostered and their associated outcomes (Sutcliffe and McNamara, 2001). Little is actually known about the decision making routines (Mintzberg, 1976), it is often difficult if not impossible to identify when a wrong decision has been made (Mumford and Pettigrew, 1975), little attention in the strategy literature to issues of political decision-making (Eden and Ackerman, 2001). IS decisions follow the same messy and difficult path than other (strategic) decisions follow (Boonstra, 2003).

The literature given in decision theory literature is of a prescriptive approach, based upon the analysis of pre-specified alternatives (Easterbrook, 1994). The classic addendum of this is to represent organisational choice as a simple extension of decision-theory of individual choice (Feldman and March, 1981). This single viewpoint perspective 'fits' neatly with the aim of an information system as a computerised set of organised procedures that, when executed, provides information to support processes, decision making and control in the organisation (Lucas Jr., 1990). Sauer (1993) recognised the limits to decision making in IS, that are characterised by the high degree of uncertainty that is prevalent with innovation; he suggested that by definition, new problems will not have pre-existing programs. Others in recognising this state of play, re-conceptualise organizational IS decision making as a political process (Franz and Robey, 1984; Land, 1985; Hirschheim, 1986; Mumford, 1998) as such, one of the predominate modern claims is that IS needs methods that recognize the emergent, historically contingent, socially situated and politically loaded changes (Walsham, 1993; Hirschheim, Klein et al., 1996) or as Walsham and Waema summarized Pettigrew (1990) and (Pettigrew, 1972); content, context, and process, used in political action (Walsham and Waema, 1994). But, power is the ability to make things become taken for granted (Sillince, 2000) 'organizational innovation often if not inevitably involves obtaining the power and influence necessary to overcome resistance (Pfeffer, 1981; Markus, 1983). Originally, Weber characterised legitimacy as the "organized domination requires control of the personal executive staff and the material implements of administration" (Weber, 1948). In that the decision making influences, are in part influenced by the process and tools of influence, such as the use of organised methods, procedures, protocol and the like. Giddens expresses these as; 'types of resources involved in domination' (Giddens, 1979).

> *In this case study, Decision-making was also one of the primary activities recognised in the process perspective analysis of this chapter, as expected from a project group, but it was accompanied with political action which noticeably interacted with the processes of decision-making, designing and policy implementation.*

As with governing processes, the approach adopted is one of understanding. These decision making processes emerged as a group of tokenized segments of sensemaking of the local endogenously produced order made in the 'context of discovery'. The interest is in how the decisions are made, who makes them and the reasons why some decisions are taken. In the example below.

M	if you want this to happen then someone needs to define what it reasonable (.) find out what the implications are and cost it
C	we'll wait for Uxxxx to come and check that with him (.) that's it then

Text Box 6.4: [T34-B14-L102-105]

U is supposed to be at the meeting but he is not there; the non attendance at meetings delays and interrupts the flow of the decision making process here and shows the interdependence people place upon assigning the responsibility of decisions to be made. But this interruption is a 'political activity', in that 'C' is deferring that 'U' should decide, making this 'U's responsibility. Mintzberg (1976), hypothesized that interruptions of a political nature significantly delay strategy decision processes, which the text box appears to confirm, as 'C' closes off any further discussion with "that's it then". Mintzberg (1976) defines a decision as; 'a specific commitment to action', and 'a decision process as a set of actions and dynamic factors that begins with the identification of a stimulus for action'. The data found in the case study would strongly support Mintzberg's analysis. Adding that the 'actions and dynamic factors' of the process are brought to a closure sequence, and only after that, is the decision said to have been made. However, Mintzberg also suggested that little is actually known about the decision making routines, suggesting that the notable ones were; diagnosis, design, and bargaining.

This observation upon the process, a 'specific commitment to action', brought to a 'closure by a sequence' born out of 'dynamic factors', requires further expansion and explanation as it extends the postulate and the research difficulty of capturing the extemporaneous life-world intersubjective moments of emergence which are found in abundance in the 'context of discovery'. This needs contrasting with the traditional approach of ascertaining with intent to infer the 'true' nature found in cause and effect models, demonstrated in the example of decision making figure below (Figure 6.5 - Tape 01-Bracket 6-a – see also appendix 5 for full transcription and Workbook extracts).

> *In this short bracket, endless worlds exist. No simple thousand words could ever paint this picture with the subtle hues of inter-subjective, ingenious interaction made in the temporaneous emergent projection of sense-making. Yet this is a 'simple' decision about who is going to do the Requirements elicitation. Notwithstanding, a decision emerged from an interruption which dissected the future projections of intentionality. The forced opening of the interrupt brought a decision point into the central play of action. Creating something that was not there before. Up to the interruption, everything was simple and obvious; the interruption disrupted the intended course of action. The point of this exposition demonstrates the difficulty of understanding decisions.*

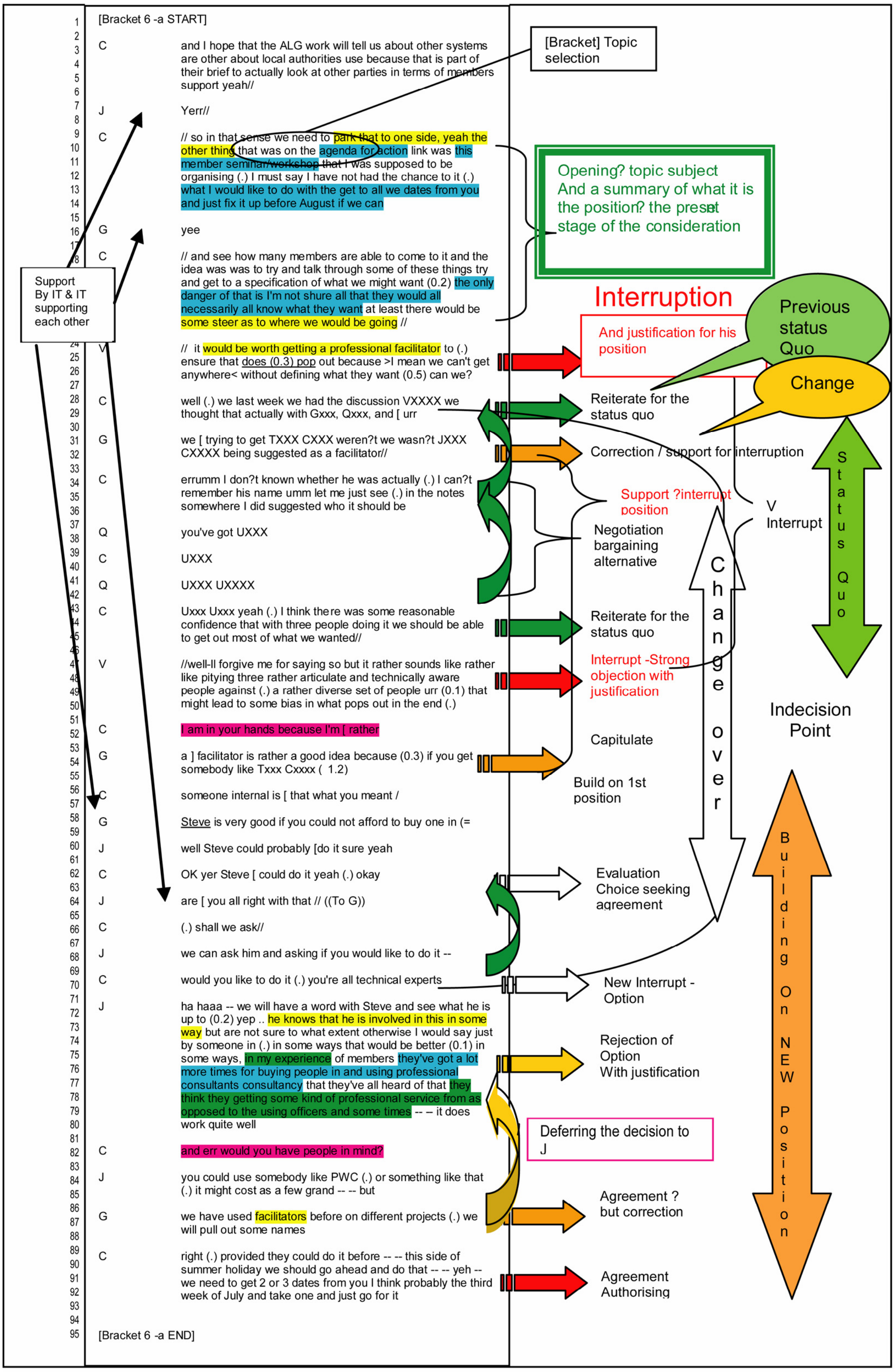

Figure 6.5: 'A diagnosis of a 'simple' decision process – [Tape 01-Bracket 6-a]

‘C’, chair of meeting, was following the agenda

C	…..the other thing that was on the agenda for action link was this member seminar/workshop that I was supposed to be organising……

Text Box 6.5: [T01-B6a-L11-12]

‘C’ continued to expand upon the intended course of actions by giving out further details; the opening of the bracket was about - ‘C’: “what I would like to do is to get all the dates from you and just fix it up before August if we can” [T01-B6a-L13-14]. That is all, the initiation of the [Bracket] was raised just to the arranging of a date that every body could get together to ‘meet’ the stakeholder user group. Note the ‘if we can’ is the holiday period, and the need to arrange around the holidays horizon.

But the fault line that developed, and went on to reveal a canyon was V’s reflection upon the original intention of ‘setting up the meeting’. ‘C’ in the explanation – of projecting forward the intended plan “talk through some of these things try and get to a specification of what we might want” [T01-B6a-L19-20], reflects the intention and motivation to uncover the stakeholders needs and requirements. During this ‘C’ highlights the very issue that the concept of Requirements elicitation methods seek to do; “I'm not sure that they would all necessarily know what they want” [T01-B6a-L21-22], leading to the setting up of the method control, “at least there would be some steer as to where we would be going //[T01-B6a-L22]”.

However, this extended last expression “at least there would be some steer” may have sparked a fuse, causing an interruption to stop the flow by V.

C	…………at least there would be some steer as to where we would be going //
V	// it would be worth getting a professional facilitator to (.) ensure that does (0.3) pop out because……………………..

Text Box 6.6: [T01-B6a-L21-25]

The interruption stops the planned future projection. The exact reasoning for V’s concern was provoked by; ‘steer as to where we would be going’, and acted as a trigger in the mind of V to interrupt, to stop this flow, now, and there. This trigger was based upon an experience, a sense that employing the method of control, as proposed, was not going to result in finding the Requirements, thus opening up another horizon and so on.

V anticipated that the current direction was NOT going to

V	……ensure that does (0.3) pop out because >I mean we can't get anywhere< without defining what they want (0.5) can we?

Text Box 6.7: [T01-B6a-L24-26]

And was somewhat justified in his reasoning as what was being proposed was that members of the IT (Uxxx and Qxxx) were going to do the Requirements elicitation.

C	well (.) we last week we had the discussion VXXXX we thought that actually with Uxxx (.) Qxxx (.) and [urr

Text Box 6.8: [T01-B6a-L28-29]

The issues that emerge when explicitly questioning the 'cause' of the interrupt are multitudinous; the research aspect is that; any if not all explanation capabilities of inference research that are based upon the model of cause and effect, which attempt to re-specify, abstract, reflect or construct a representational categorizing that leads on to a translation into an objective accurate description of the manifold flow of inter-subjective understanding, even about something as simple as 'a simple' decision is totally inadequate, if not impossible without inter-subjective understanding; research into the life-world without starting from this alternate position is doomed before it even starts.

As to the story of the bracket 6a, later on, the idea of the external facilitator changed before the meeting with the stakeholders; and was replaced, as originally intended, by the IT people who gave a demonstration, which was a vision plan of how the 'new' infrastructure was going to extend the concept of home working, and this was followed by a question and answer session. In the end IT still got their own way, and circumnavigated around the interrupt decision made by the committee to hire in a facilitator to elicit the Requirements. V fears:-

V	// well-ll forgive me for saying so but it rather sounds like rather like pitting three rather articulate and technically aware people against (.) a rather diverse set of people urr (0.1) that might lead to some bias in what pops out in the end (.)

Text Box 6.9: [T01-B6a-L47-50]

This actually turned out to be an accurate foreboding or prediction.

These, and other such routines, can easily be found in instances of the data. In the table below are examples found throughout the tabular data set. The context bound process orientations of emergent, 'actions and dynamic factors' means that very little agreement can be found between the data and the 'rational formal modelling' approach, as found in the literature. The linking commonality with the literature is found in the strategy literature “little attention is paid to issues of political decision making” (Eden and Ackerman, 2001). The table shows various types and descriptions of decisions ‘being-made’.

The thesis perspective of ‘Decision making’ (defective and proactive)	**Descriptions**	**Examples**
Resolution-ing	Decision reached or not	**T01-B9-L160-162** [C: …kind of (.) get an understanding of what the options are (.) and whether or not we can make a decision today or whether we need to do any further work before we can make a decision…] **T21-B5-L78** [C: well that’s what the leader wanted]
Optioning	Choice of option given, discussed or not given, not discussed or left out. Make, buy or adapt system.	**T34-B5-L4-10** [C:…they will have access to their e-mails … access to the service directory (.) the consultation diary ………E-casework ……the only other thing they wanted was electoral register (.) but that’s to be done M: yes (.) that’s out of the scope of this project]
Processing decision	How it was decided e.g. through non verbal sign, voting, argument, confrontational. Agreement	**T21-B5-L137-141** [C: ...(.) the only big question there is whether we need additional server capacity (.) but we’ll need to come back to that (.) what we’ll do is we’ll have this meeting after this meeting today and then I will probably just e-mail to people about the direction we’re going in (.) providing we’ve got everybody’s support (.)...] **T1-B9-L335-338** [C : brilliant (.) so (.) the first decision of this project team that were going to spend £10, 000 right okay (.) okay thank you very much Lxxx and we will send you a note to whether or not we spend any more money (Lxxx leaves the room) or not Okay] **T21-B6-L32-33** [C: we should] circulate this (.) right (.) OK (.) so when we have the discussion later today we will then wrap it up and circulate what we’ve done together] **T21-B6-L67-73** T: [.... I mean from a project management point of view obviously if the date is the key thing that you must hit then really unless extra resources will cure the problem (.) and in this case they won't (.) really the only way you're going to achieve a successful project is by sort of reducing the scope of [the==]
The thesis perspective of ‘Decision making’ (defective and proactive)	**Descriptions**	**Examples**
Decision timing	Time frame, delayed,	**T21 B5 line 85-89** [C: no we haven't because this has only just come up from

	put off, deferred or made on the spot. Snap decision. fire fighting,	yesterday's conversation with Jxxx (.) which is a bit late I have to say (.) but never mind (.) we need to deal with it ....] **T28A-B8-L179-184** [S: Yes (0.8) there is no way we can include in the revised Phase 1 (.) potentially not in Phase 2 (.) I think to be comfortable I would like to say the 3rd phase which is August/September (.) obviously subject to your approval of cost which is not a factor (.) maybe talking a weeks programme of work is £2000 so (.) all these are small things but they add up but if we can say that would see it as a 3rd Phase then subject to approval of works and cost and proper discussions…]
Initiating decision	agenda item, responding to external stimulus, initiating the topic	**T16-B2-L3** [C: umm shall we go on to talk about the Member's Casework System?] **T21-B1-L11-17** [C: and in the end it was just me who went but Jxx came to join me (.) which was very good (.) to kind of cover the techcy side really (.) if the members asked any questions about that and the other person that was there was ((xx)) so We'll pick up any further progress on the project plan when we get to it (.) OK. (0.6) and I suppose the casework management is also on the agenda so I can update you on the action points that were there (2.0) from the last meeting and I haven't responded to Councillor Fxxx e-mail but I will do]

Table 6.2: Decision Making Perspective

6.2.3 Designing processes

This is inclusive of design of IS but how they went about to, production, design approach.

The thesis approach to designing process	Descriptions	Examples
Using tools and methods	Using project management PRINCE, mixed methods, contingent methods in bits for part of project. Use of consultant	**T28B-B5-L8-23** [M: well (2.0) if I can explain the purpose behind it (.) basically what happens every time anyone has an issue about the project or any of the products that are being delivered or any of the documentation that's being delivered (.) umm I will log it on the issue doc and I will document the fact that someone has raised it (.) what the description of the issue is (.) it then needs to be (0.5) analysed by someone (.) preferably the owner (.) so an owner of the issue needs to be allocated and an analysis of that issue needs to be carried out (.) Then the status says what we're going to do about it or what has actually happened (.) so some of them you can see have got (.) analyses and owners and (.) in fact there are some statuses that are completed (1.0) so sometimes the issue I'll be able to deal with I'll be able to take ownership of and I'll be able to do something about it (.) but sometimes the issue will be (.) err a broader issue that can only be addressed by the subject board (0.5) in which case I will take a decision from Cxxx or how it's going to be handled (.) so essentially I will log the issues (.) if they don't get addressed (.) they don't get addressed=]
Analyzing	System analysis, system design, requirement design, function of system, understanding constraints of system.	**T34-B15-L80-86** [M: …I'm not at all encouraged that any of these things will change before 7th C: right (0.5) // OK M: we // will just have as far as I can see what we've been shown working (.) which is not the same as what we've been asking for =] **T21-B6-L21-22** [U: ....and also have you actually done the comparison of functionality of REACT to the casework management functional needs?]
Defining quality	Security, interface, style, fit to other systems	**T34-B10-L11-13** [M…the initial system and it didn't look like anything that was specified so we went back to AxxAxx and said can you make it look like what was specified (0.2) which is what he's done] **T16-B13- L23-25** [V: it is not that I think that there are some obvious changes to be made (.) it is just that I would like to be confident you are aware of the address standards and the potential National naming standards]

The thesis approach to designing process	Descriptions	Examples
Knowing how	Appropriate technical knowledge	**T28A-B5-L36-49** [C: give you a rule or an address? S: a rule C: what is a rule? S: like (0.5) C: I know what a rule is but is this an IT technical term? S: no (0.5) where there is some logic we can apply (0.5) if there is no logic from the data available in the Service Directory or DCD (0.5) I think DCD probably has it actually but there if is no logic we can use from the Service Directory to ascertain what the Ward is it would need to be keyed manually within your department]
Envisaging	Seeing how it will look	**T34-B14-L23-25** [M: well basically as far as Uxxxx is concerned basically the helpdesk will coordinate support calls through the helpdesk (.) but then they will be escalated to SOFTCO-UK]
Making artefact	Making user diagram, making document,	**T14-B3-L37-54** [Q:....I didn't send the project plan itself round because I wasn't sure who had (.) who could actually read it or not (.) umm I don't know what you feel about that (.) I was going to carry on doing that ..... J: I think it would be easer to have copies of the (.) Gant chart as well // C:// yes we did have it last time didn't we? we had some amendments to be made // Q: we did have it last time yes= V:=it is easier as you say to produce but what we have got is a six page Gant Chart at last meeting at this meeting we have a seven page chart like this and difficult to see the wood from the trees (.) Gant chart could be reduced to two pages (0.8) of output (.) I don't know =]

Table 6.3: Designing Perspective

6.2.4 Sense making

How people communicate, how people make sense through inter communication, of the aim of the project etc.

The thesis perspective of 'Sense making' process	Descriptions	Examples
Recognizing problem	Brainstorming, announcing the problem	**T21-B5-L31-32** [U:= so I don't know what XXXXX are going to do when somebody rings up and says (0.2) sitting in their office (0.2) I can't get access =] **T16-B6-L3-5** [Q: = I mean It does but the key thing here is if they are sticking to what they are saying about their security and how they want to arrange the privacy then you will probably not find anything out there that does what they are asking]
Comprehending	Repetition, learning, Observing, awareness, Realisation of meaning of what's involved.	**T34-B4-L14-24** [C: I thought maybe I was typing in the wrong// M: //No, they've made a change to the system C: And buggered it up// Others //(laughter)// M: //Technical jargon he may be working on it = C:= Maybe Uxxxx's working on it (.) Let's hope he's working on it! **T28-B7-L28-29** [C: right (0.5) page 6 (0.5) the diagram (0.2) I assume that makes sense to everybody (0.8) yes (0.5) page 7 then (0.6) any questions on that? (0.5) No =]
Communicating	Verbal, drawing, utterance e.g. OK, gestures, jock making, document, artefacts	**T34-B5-L74-75** C: .. (.) they wanted to be able to communicate with e-mail from their offices (.) home and any location in the world (.) so hopefully we will have that **T28-B8-L168-170** [M: sorry (.) before we move off that can we just clarify what we are going to do about it (0.5) there are two issues that we need to know what we are going to do about (0.2) one (.) do we....]

Table 6.4: Sense-Making Perspective

6.3 The implications of the output of phase one case study

The analysis revealed a rich and diverse set of interrelated research topics that influence the requirements process. The project data analysis has the potential to tell many different stories about the management aspects of an IT project and its scoping and defining of the elicitation stage of Requirements. The project cut across many organisational structural silos, suggesting many themes open to exploration such as the IT infrastructure changes that are needed to accommodate web technology, the changing working patterns, the changing of the process of the work flow in the council, coordination of information sources, home working issues, strategic issues about the process of the changing nature of work itself, the changing of Requirements details and functions throughout, with the phasing of the project, project management, and the process of IS work flow. Then there is the role of governance in the IT department, the question of integration with other systems and Council work-flow processes, with empire building and the desire for independence from a central IT department, and the effects of reorganisations during the project life cycle. Then there is the effect of personnel change and of what happens when one project manager leaves midway and the replacement manager introduces new project management systems for the controlling of the project. The briefing of contractors, the scoping of business analysts and the control and use of information given out in the briefing sessions to the analysts, who go on to – what they believe to be -the scoping of the Requirements specification. The list of interesting prospective topics is endless. All of these key phenomena exhibit politicking with empire building and technical bamboozlement. All should be considered as major factors, with underlying variables that could influence the scoping and defining stages of Requirements. Taking any one of the perspectives would have given a rich picture model capable of revealing the characteristics of communication networks, existing control processes and how these change over time. But none of them individually appears capable of helping to formulate what the Requirement process is. What it does reveal is the amazing complexity involved in the components that are at work in the context of discovery.

The Workbook approach and its step by step iterative analysis examined the essential building blocks. This was composed of the executive units, and of displayed intention, recognised from the individual phenomena, which were extracted by Bracketing out key moments of 'emergent interaction'. These were deconstructed in the Workbooks in seeking to understand the inter-subjective sense-making construction of a topic. This developed method was undertaken pre-suppositionally to that of holding a theory of Requirements, maintaining a research methodological approach with a rationally defined method of data collection for the purpose of theoretical building, since there was a suspicion of ambiguity in the use of a method that separated out how the 'What and the How' is found. Instead the research focus and fixation was on the 'readily visible orderliness' (Sharrock and Anderson, 1986).

Working as an inquisitive researcher, from an assumption that within the act of the doing-of-the-work-itself is the strange phenomenon that appears to work; thus conflating subjectivity and the metaphysical objectivity to a temporal flow. The implications of the approach facilitated a detailed examination of the phenomenon in a local situation. The importance of recognising this for Requirements has often been referred to in the wider IS literature as the 'many other' factors which are observably taken to be found somewhere in the context of the social situation, as Galliers (1997), argued that the Requirements analysis is a process that is socially mediated (Kling and Scacchi, 1982; Hirschheim et al., 1995; Flynn and Jazi, 1998; Schultze and Orlikowski, 2004). Yet despite that for some time, the literature has recognised and understood that the process of early Requirements gathering is embedded in human communication (Edstrom, 1977), and that it is complex and is subject to many social, conceptual, organisational and individual factors (Urquhart, 1999). The detail of the process in the literature has always appeared to leave a gap. For instance, Jones and Walsham's (1992) investigation into the organisational context, found that the Requirements process for the Requirements analysis is 'always incomplete', because many influential factors emerge continuously. Consequently, this research has attempted to fill-in the missing detail. But in doing so the conclusion finds that there would appear to be indications that there is a problem with the theory of Requirements, that it may be underdetermined, that is, that something is missing from the theory that needs to be accounted for in the practice of doing; that the Requirements approach only caters for analysts to speak of; 'specifying' the 'systems behaviour', whose structure and behaviour must be understood (Finkelstein, 1994) as technical systems which have behaviour (Land and Hirschheim, 1983).

The expected outcome from the analysis should have supplied all of the component parts of data capable of being used to tick the appropriate boxes as being recognisable by the IS domain as Requirements. Alternatively, the findings should be able to use the extrapolated data sets as a resource to form into groups, types succinctly labelled and reported upon as the-actions-of-Requirement-ing concepts, thus producing a model able to identify individual or groups of actions as a distinct process that reflects the 'Requirements phenomenon'. Either way, what was hoped for were process parts that could be easily mapped onto the ideal Requirements IT components; the decision-maker or stakeholders, objectives, the system or environment, together with alternative courses of actions. As these are the divisions used in the assemblage to formulate the problem that the Requirements process presumptively claims to solve. However, undoubtedly, there were these things called Requirements that could be found, itemized, documented and labelled as such, but what principally stands out is the missing production process or method of requirement-ing in the process of elicitation. The process to compare with the idea should have emerged out of the data like a phoenix. But, as the discussion below explores, the process phenomenon did not emerge as a distinct process, rather the first problem was that the Requirements had arrived as a rubber stamped conclusion, or that a Requirement appeared as stated propositions from a given perspective, or from a positional standpoint. The second problem was that the component parts of the process were an assortment of jig-saw pieces belonging to different pictures that did not fit or hang together without the additional actions of the people to put the parts together. It is impossible to explain the process without including or taking account of their actions.

The Requirements specification document arrived, the provisional objective was met, the system or environment changed and a choice was made from alternatives. ALL were reported, re-told, announced and heralded in a fanfare of produced paperwork. But working backwards, two prominent concepts clearly stand out about how-it-is-that, we-are-able-to-say, how it was that a decision about a requirement was reached: Requirements 'emerged' from interruptions, opportunistic topic agenda grabbing or through authoritative pronouncement, of having the responsibility, or of holding a position or role. To be brutal: It is a requirement, because "I" can say that it is. That a requirement is a requirement; whether or not it was collected from a user is irrelevant, although it helps. The evidence for this is the ability of the key people to select a fact, from a context of facts. The classic typifying example of this was given in an interview by the systems analyst contracted to supply the main software for the system who likened his role to that of a benevolent dictator.

systems analyst contractor SOFTCO-UK…….but you know I feel I, to some extent with any system and particularly here where you've got so many players, you have to have one person who's a sort of … dictator who ram roads through something and builds in as many requirements as possible. But if things complete ultimately, well makes a decision as to what is good for the client that sounds horrendous but effectively I think that's what we did. Because I don't meet the design … by committee …

Text Box 6.10: Tape 38 _Interview

Although, interviews were eschewed as part of the main data-sets, this personal perspective supports the finding here of Requirements being supplied by a benevolent dictator. The process appears to be simply that: ‘A’ person makes the Requirement, it emerges from awareness for the moment into which to place opportunistic spontaneity of the “I” position, which satisfies their particular project. The proof is found when the negation of this position takes place; “I” only act when the project is going against my interest. Hence the use of the interrupt, or holding the position in terms of the role of responsibility, to be able to interrupt, to alleviate this disruption, and the counter claim would be the call to an adherence to a method. The analysis of the transcripts did show a remarkable drop in interrupts after the imposition and the running of the project using the PRINCE2 project management method. But, there are factors that could easily counter the calls for more project management; in that all of the scoping of the project will have already taken place, and that the meetings agenda was more about the monitoring of the progress of the project advancement, in which it still failed and problems remained hidden. Secondly, the strict project management approach introduced recognisable occurrences of the symptoms of the phenomenon of groupthink (Janis and Mann, 1977; Janis, 1982). Thirdly, the attitude that is demonstrative in project management is that it is a convenient legitimising control to use to set boundaries. The best example is when it is used in an attempt to de-scope and control the project against the time scale available. The classic typifying example of this was given in a heated moment by two members of the IT department in Tape 21 of the project meetings

U	you're changing the scope of the project (0.1) <u>again</u> (.) we said we’d do casework management (.) no problem with that (.) fully endorsed//
T	// as a phase two (.) as a phase two
U	but not bolt it into the current plan and project timescales (.) it doesn’t even appear on our plan
C	well actually it [does
U	well it] does (0.5) as lines (.) which mean nothing (.) because it’s just a line that fills the time between now and the end of the project//

Text Box 6.11: [T21-B6-L81-94]

The data analysis would appear to confirm the previous suspicion, that a requirement is a post-hoc account constructed for the purposes of being able to say that a requirement is a requirement “because of ‘X’”. The account ‘is’ constructed to appear rational, in that it results in something that can be measured somehow in respect to a rule.

This latter account uses rationalization as justification for the purposes of producing documents that show that; this-is-the-decision-after-due-process-was-followed. Whereas; the actual process of requirements elicitation is based upon endogenously produced, local order constructs of production, that also contain imagination, artistic ability, and intelligence, which are used in improvised methods of assemblage, while working to a rule-of-thumb and being involved in the movement of a continual flow of dealing with matters in hand.

Yes, they demonstratively showed beliefs at work that are undoubtedly informed by a baggage of how-to-do this or that. But, this informing process is composed from a description of six key processes that were identifiable; governing phenomena, decision making process phenomena, designing phenomena, and sense making process phenomena. The sixth process was a collection of specialised process tools phenomenon, labelled as the 'left over bits'. But these were always made and selected from the context of facts and called upon for the purposes in hand. Within any one [Bracket] there exists multiple actual worlds, the consequence of this is to see the world under different frames of reference (Goodman, 1978), which leads to ambiguity when reviewing just from an IT perspective, resulting in parts that will not fit together without a glossing-over and the losing of the constructive act in the transcendent process of researching. This is in effect saying that actions do not get their goals from without, and are not being determined from the context of prior formulations. Concurring with Bittner, "no one has ever succeeded in the objective study of society without relaxing canons of objectivity" (Bittner, 1973). If this is so, and in this case if the cannons of Requirements are shown to be unproven, then the strict formalization of rules, with the concept of following nothing more than a set of operations, is highly questionable.

The problem still to be accounted for is whether or not the Requirements concept is a reliable abstract process that has been adapted and co-opted into the contingencies of the localized service. It would apparently appear not to be the case, since requirements did not appear as a distinct process.

6.4 Conclusion

The subject matter of this chapter, six, phase one, concentrated upon how the people in the project group went about producing an IT project, where the-doing-of-Requirements-is-said-to-be taking place and where the phenomenon of Requirements is occurring. This chapter employed the developed analysis approach without the assumptions of the given Requirements theoretical framework. The aim and output of this chapter was to produce a body of reference material about the people-doing-an-IS-IT-project, with specific interest upon the process of how-it-was managed, and in eliciting the products of what-was-done.

This phase one had two stages; stage one, in which the topic selection is labelled [Bracket-ing], and stage two, which concerned the development of workbook analysis to uncover the "about-ness" of the phenomenon. This developed research approach of the Workbooks explored the constitutions of the phenomena by lifting out and [Bracket-ing] the sense-making moment, the reproduced quiddity, of the mundane actions of a group of people who were undertaking a project with the phenomenon of Requirements, to make an endogenous production of local order. In summary a [Bracket] is composed of = [Bracket opening] + [Subject Topic] + [Bracket closure].

The temporal flow workings [brackets], or topics of conversations are frozen real-time recorded events; they are, 'brute facts' of 'observational datum'. Three secondary data sources supported the natural recordings of conversations of the meetings of the project group; these sources were; firstly ethnographic, 'hanging around' which revealed many of the background influences, secondly the documents and artifacts, the 'accounts' of the project group, and finally, the semi structured interviews.

On examining, the detail of the [Bracketed] process construction several outcomes can be observed, the two main ones being; firstly, the identification of the main processes involved in the phenomenon of Requirements and secondly, empirical units of actions, or tokens that can be used as data currency to test theoretical concepts.

The phase one analysis outcome produced four key processes at work; Governing, Decision making, Designing and Sense making. However, the finding of these dominant processes have implications for the concept of Requirements, as they facilitate alternative valid accounts to explain the process of scoping and defining an IT system without recognising 'a' specific Requirements process. This leads some

Requirements thinking into question, for example, whether the warranted Requirements domain encompass the 'whole' process. The difficulty here is explaining the whole case study actions within the boundary context of the phenomenon of requirements as currently portrayed, as the advocated approaches would appear to miss-out some vital aspects or steps involved. But the case study also revealed that the Requirements contained identifiable post-hoc accounting practices. This would infer that the Requirements process exists only as parts or as outputs of other processes and not as a complete entity concept in itself. The drawing together of the Requirements by the project group was a conscious decision to bring about a closure, and not that of 'finding – discovering – or selecting' the Requirements. This is a provisional conclusion that needs further testing, as the identity of the Requirements phenomenon remains an assumption, consequently the subject matter is further developed in the next chapter.

The phase one analysis outcome also established whether it is possible to identify relationships of the [Bracket] phenomenon together with the machinery of that process; that the output could be identified with belonging to 'a' theoretical process. This phase tested this part of the research design, expanding upon the example of PRINCE2 project management. Found within the 'Key sequences' of the 'governing processes' empirical actions could be clearly identified as belonging to PRINCE2 project management; these could also be associated with the theoretical formulations of the method. Thus actions can be seen that connect up the links between separate causes and result, the facts, the force invented for the purpose of project management. Because these links can be clearly shown, the enquiry becomes a matter of questioning the established doctrine and the authority of the existing beliefs.

In the next chapter, seven, a Requirements framework examines the work of the theory requirements. The objective is to examine the key actions produced by this chapter, in conjunction with the theoretical 'work of Requirements' using the theory of requirements from chapter two.

Chapter 7

Phase Two: Operationalized [phenomenon of Requirements]

Capturing a requirement is like capturing a butterfly, once it's pinned down it's no longer what you chased, it's dead.
Button and Sharrock (1994)

7.1 Introduction

The preceding chapter, phase one, analysed the detail of work undertaken in the project group meetings. The Workbooks furnished and facilitated discussion points of 'Verstehen' with the topicality of the conversations, the 'creative acts' of making and projecting plans into future potential actions. The research approach focused upon the in-order-to motives, the looking forward actions 'what-is-done' and 'how-it-is-done', making a distinction between the actions made at the edge, in moving the project forward, and those actions produced for the accounting of previous actions, and the making sense of their because-of motives reasons.

These case study actions are also contrasted with the actions of the research itself, which has the luxury of organizing and abstracting reflective and objective thought to create a scientific character of an account, consequently, research can compare the phenomena with the pre-conceived concepts that are within its domain boundary. The aim of phase two is to find, through using a research method framework a correspondence between the token expressions used by the people doing Requirements, the [bracketed] phenomenon instances, and that which is presumed to be the inherent structure of the formal order that the Requirements method prescribes in its operationalization of the laws of Requirements.

Phase two now starts by sifting through the workbooks of the case and to study detailed actions to examine what could be interpreted as a correspondence, found in the belief structures, with the reasonable act of Requirement-ing, and detaching it from that which is unreasonable. This is effectively testing the Requirements theory by examining its effects, also gaining an increased understanding of the theory and of its relationship to practice.

The previous chapters' conclusion left an initial cursory diagnosis that revealed that there appears to be a strange problem emerging; which is that an artefact, that can be labelled Requirements was produced, in the form of a specification, and in the form of implemented programs, but the Requirements process still appears, at first glance, as hidden. 'If' the researcher was directly looking for it, finding the Requirements elicitation moment would require a lot of local, researcher's artistic intervention, 'to solve' the riddle of the Requirements phenomenon. The provisional conclusion reached infers that to isolate, or frame the Requirements process, as a single phenomenon, would require cutting the data with the pattern to make the fit, and this would leave quantities of waste material, which in itself would be of considerable interest.

The Requirement of the research approach of the previous chapter was to capture the mundane activities, and preserve the phenomenon of the actuality of doing (Sharrock and Anderson, 1986). However, all this has done so far is to increase sceptical doubt, promoting further questions about what and where exactly the Requirements theory is in the operationalization of an IT project. This re-evokes the two initial research questions, a) what is Requirements, and b) assuming that the concept Requirement is a phenomenon, how does it become operational.

Chapter six concluded, with three possible explanations;

- Firstly, the assumption that the whole case study bounds the context of the phenomenon of Requirements, and that the boundaries of Requirements extend to all the actions from conception to closure.
- Secondly, that the Requirement process is an assumption. Requirements exist only as a part, or as bits of other processes and is not a complete entity concept in itself.
- Thirdly, that those Requirements exist, as a distinct process, but still remain hidden somewhere in the results and are submerged beneath the plethora of detail.

The enquiry cannot assume that the entity of the object phenomenon of Requirements process does not exist; the research focus is to hunt-out the ephemeral quarry. Still assuming that it is necessary to stalk ‘the animal’, with the assumption that it will be found in the re-currencies of described empirical details (Garfinkel, 2002).

7.1.1 Looking at the problem of adoption of the Requirements theory in practice

The Requirements theory, defined as a rationalist specification process offers certain beliefs, based upon the truthfulness of its application of method, given in the consistency of its foundational ideals. The Requirements theory (Section 2.6.4) extends its rationale to encompass the ‘problem’ found in the life-world in an essential belief that the Requirements process can rationally described and formalise the methods, processes and procedures that have been captured, or framed in the life-world of practice.

The idea is to “provide those in control of the operations with optimum solutions to the problems” (Churchman et al., 1957 pg, 9). However, in practice the application of the Requirement belief is interpreted ‘artistically’ (Ciborra, 2002), design will always have an artistic component (Fitzgerald, 1996), practice is an art more than a science (Lee, 1991; Paul, 1994; Davis and Leffingwell, 1999), “Systems engineering is the art and science of creating a product or service” (Sage and Rouse, 1999), “quality products are an artistic blend of needs and solutions, requiring harmonious teamwork between the users and the software engineers” (Humphrey, 1989). Consequently, Methods are adapted (Mathiassen, 1998), for in-house use (Avison and Fitzgerald, 2003) used contingently (Avison et al., 1998; Beynon-Davies and Williams, 2003), according to problem situation (Avison and Taylor, 1997), thus, leaving the impression that IS is not a science but a creative profession (Lee and Baskerville, 2003), and implementation of the stricture is inconsequentially the responsibility of a qualified practitioner, or some sort of despair in that, that ‘there is growing support for the belief that IS development is essentially amethodical’ (Truex et al., 2000).

But this ‘artistry’ is unsatisfactory; people doing Requirements, call them Requirement-ists’, are operationalizing the belief through the theory of Requirements, although they could be likened to using the conception through anarchy (Feyerabend, 1978). If the relationship between the theory and practice Requirements requires ‘artistic’ interpretation, and artistic is taken to mean having to improvise, as social law lacks preciseness, the ideal of objectivity fails to do justice to cultural reality (Bittner, 1973) in that governing laws have not been discovered to the same extent, and the physical world is viewed as indeterministic and it follows that Requirement-ists are acting upon the world, in making IT systems without true reason. Worse, the Requirement-ist could also be acting randomly or from using trial and error methods. Then there are serious questions about the role of the objectivistic theory, and about its ability to hold explanatory powers. Indeed, it opens up questioning that a Requirement has any base theoretical position, and that therefore the belief might be misplaced, and that the process of Requirements may be accidental. On the other hand, what is to stop the academic theorist from saying that the Requirement-ist is failing to apply the theory 'correctly'; that anarchy is no practicable long or short-term solution, "look, in not applying it correctly it inevitably leads to failure", or alternatively of finding weasel academic excuses such as political expediency to discount empirical findings, or decrying the method adopted, such as the epistemological charges against Ethnography as secretive political usages (Vidich and Lyman, 2000). Besides which, most theorists have little respect for "case studies", in large part because of the a-theoretical character (Janis, 1982).

Unfortunately, as chapter three pointed out, the background justification principles behind the academic, epistemological theoretical standpoint is also unclear; it is not without its own internalised issues concerning the relationship between 'truth' belief and what counts as knowledge (Gettier, 1963). Behind the abstracted concept of thinking about the rational application of the Requirements theory are issues of a methodological debate that has become obscurum per obscurious and embroiled in academic arguments, namely, made in ISR and given in the intractable epistemological claim of pluralism, or in defending the citadels of the qualitative versus quantitative methods by strictly controlled academic boundaries of what counts as being academic. Febrifugal of that, chapter four, five and then six adopted a particular research stance, that of phenomenology. From this philosophic position, the claim was to start afresh with a pre-theoretical disposition in order to investigate the phenomenon of the doing of the Requirements process in the wild, so to speak, with a particular philosophic attitude of questioning.

This has resulted in two clear distinct ways of looking at the problem, one from the theoretical perspective gained from chapters two and three, and another from the alternative understanding of the intentionality given in intersubjective actions and taken in practice perspective, as given in the previous two chapters. The successive refinement of the enquiries investigation to date now facilitates a clearer picture upon the research objective. But the research question remains the same, consequently the aim of this chapter, seven, is to develop phase two and to formalise the research framework steps as discussed in section 7.2.2. The framework is required to analyse the phase-one case study findings, with theoretical alertness to the Requirements theory, as was identified by chapter two and three. This starts from the adaptation of a formal model developed from decision-making, and then the realignment of the framework to address the issues of the phenomenon of Requirements and after testing, to run through a selection of the data set to facilitate an interpretive output stage.

7.2 Phase Two: adaptation and development of analysis framework to examine the Requirement theory

Chapters four and five, adopted a commonsense, pre-suppositional philosophically loaded approach. The issue of the research design addressed data capture and representation. It also questioned the validity of the 'traditional' research approaches towards data collection and analysis, and the claim 'to accurately capture' the life-world, especially when the objective ideal held in the minds eye of the researcher was already pre-theoretically assigned. However, the research problem here is not the same as the enquiry into the case study. The problem here is of the questioning the validity of the Requirements concept; the question being, whether the theory of Requirements can be found in the actions and behaviour of the people doing the task of scoping and defining Requirements.

In order to analyse the phenomenon of the Requirements process, the investigation of phase two seeks explanation in terms of the operationalization of the Requirements theory which is that a theory should be able to explain the justified belief in terms of inference or better still, non-inferentially via a reliable method. The reliability of a method is in the tendency or disposition of the method to give the right answers in general. Despite issues with the notion of a 'reliable method' (Everitt and Fisher, 1995), the problem that the framework is being asked to solve is not a vague problem, and the simplicity of the framework of Requirements is not one that questions knowledge directly, as it is a careful examination of causal structure with clear and conscious choices regarding the causal structure and of the theory (Markus and Robey, 1988). Consequently, an adaptation of the Janis groupthink framework emerged from the research process, as a possible solution to the need for an analytical research framework, discussed in section 7.2.1.

The purpose for the use of this modified analytical framework is to follow the causal connection that is assumed to exist, and that needs to be tested, by looking at the captured actions through the lens of the Requirements theory. This follows the rules of science, in that science knows only that which has been admitted to the body of its findings by the appropriate procedures (Sharrock and Anderson, 1986), namely that the method of achieving the results has been proved to be reliable. The examination is made starting with the assumption from the body of knowledge of the domain Requirements, that has been previously compiled into a Requirements theory, as found and described in the earlier chapters of two and three. Consequently, the perspective of this phase two starts with the assumption of a Requirements concept, with the need of for it to be tested.

This is a change of research perspective, from descriptive to explanatory, from building to testing, and as such it starts with a hypothetical outline with a theoretical draft plan, with which to test the Requirements theory, which is; that a Requirement is, x definition, but noting that there are known deficiencies in its explanatory powers, and with not knowing exactly what the problem is with the theory and the belief; leaving a starting proposition that the theory is underdetermined. It is therefore necessary to test the constructs and the use of the theory, rather than the definition. The form of the argument discussed and used later on in the framework is explained as; S knows p, if and only if (i) p is true, (ii) S believes p, (iii) what p is about is causally connected in the appropriate way with S's belief. The phase two is a forensic examination of a directed theory and on how it launders the brute-facts. After which, a comparison of the disjuncture is possible, to pose the question of; what else does the work of the theory of Requirements have to do. Or rather, question the work of the theory of Requirements that it does not do.

7.2.1 Selection of a Framework for Requirement analysis

The developed theoretical framework, phase two, has the aim of exploring the theoretical concept of Requirements and it’s operationalization in the Requirements process. Following Yin’s (2003) research design model of operationalizing the practice by placing the actions and events into a logic model framework (Yin, 2003). The employed framework analyzes the case study by focusing upon the understanding of the relationship between the operationalization of the theory of Requirements processes and the given context of the case study.

The application of a process-based analytical framework treats the work of Requirements as an ordered process, underpinned by the three Requirements laws, thereby restricting the framework to a set of highly constrained limits for the testing of a causal model of Requirements against the empirical findings of the case study. This is a head-to-head confrontation between the empirical [Bracketing] of the case study and the propositional construct laws of Requirements.

The empirical data, is a re-use of the analysis of [Bracket-ing] found in the workbooks, differentiated here by precision into a focused, sub-bracket extract by a circumscribed interpretation given by the original [Bracket]. The constituent substance abstraction, being tightly focused, avoids incorrect attribution by making direct reference only to the surrounding text. The predicates are authenticated by virtue of the previous analysis work. This approach avoids the problematic clustering issues associated with levelling up as found in qualitative antecedent matrixes such as found in Miles and Huberman (1994) Qualitative Data Analysis approach. The sub-unit-Bracketing directly provides the variables to interact with the Requirements theory to asses its viability.

The main activity of Requirements concerns decision making, confirmed in the multitudinous occurrences that were captured under the broad process, as found in the previous chapter. Also reflected in the literature is the perspective of deciding the question of 'what to build'. In this chapter it is possible to put aside whether or not it involves a conscious mental effort to come to a decision (Nguyen et al., 2002), which translates intentions into plans. The interest in the framework is in the 'guiding' belief at work. Consequently, it is sensible to select an analytical framework that caters for decision making processes.

Unfortunately, the literature on decision making upon decisions is very fuzzy (Janis, 1989). For instance the literature still lacks a single acceptable theory to describe how decision processes flow through organizational structures (Mintzberg, 1976). There is a growing disenchantment with theories behind decision making as rational adaptations to technical and environmental conditions (Barley and Tolbert, 1997), and reliance on prescribed decision practices can have untoward consequences for the organizations (Sutcliffe and McNamara, 2001). Mintzberg perceived many gaps in the literature that seriously block even an elementary understanding of how organizations function in decision making. Unfortunately Mintzberg's (1976) own framework on the strategic decision process does not postulate a simple sequential relationship, instead he identifies twelve basic elements, and the framework sets out to analyse the interaction between these. Another model that is often quoted in literature is based upon March (1994) where he related decision making to garbage cans, where problems and solutions are attached to choices bounded by temporal proximity (March, 1994 pg, 200). These decisions, like Mintzberg's, are set in highly ambiguous settings which March recognises as a central feature of decision making in organisational life. March recognises that the theories of decision making almost always underestimate ambiguousness in organizations (March, 1994), and he recognises that ambiguous decision making involves symbols, myths, rituals, and stories in the development of meaning (March, 1994). Unfortunately the garbage can model lacks the rigorousness that is required of an analytical framework for testing.

At the other extreme the analytical normative models of optimal choice, such as models that search for an ''optimal'' solution to the problem, such as inventory models, allocation models (basement of alternatives, resource allocation), waiting-time models (queuing, sequencing scheduling), replacement models (renewal, prediction, risk) and competitive models (games and bidding) cannot specify what information is required for decision making until an explanatory model of the decision process and the system involved has been constructed and tested. This would require the context of a tightly controlled setting, where the task is for the subject to arrange the information that has been given. This is treating Information systems as subsystems of control systems. The reliance on heuristics probabilistic phenomena as a model to test could be satisfactory in a carefully controlled experiment, but, firstly, the information given as an input could create an infinite regress and may render meaningless the calculation of optimal choice. Secondly, what is being tested is the analytical normative model; for which the Requirement is a meta-model of the control system. The analytical normative models of optimal choice would have to be taken as a given, and that is not possible since the analytical models around are about decision making and not 'of' decision making, it would be a case of treating the symptoms but not the root cause.

Janis is an influential author on decision making, similarly recognising that the scientific knowledge about the basic processes of policy decision-making is in a fragmentary and chaotic state (Janis, 1989). However, his psychological interpretation and theoretical conceptions postulate a hypothesis of the concept of 'Groupthink', whose characteristics have already been identified as occurring in this case study. But crucially, his framework model concerned the categories and characteristics of the antecedent conditions, consequently his model appears to be an appropriate candidate.

Groupthink is a concept that Janis termed (Janis and Mann, 1977; Janis, 1982; Janis, 1989) after studying a number of strategic decision situations by the government of the United States on foreign policy decisions. The Groupthink phenomenon arises when group members place more emphasis on maintaining illusions of consensus and cohesiveness than they do on a full and complete airing of possible differences about a particular issue; it is where organization members go along with what they think is the will of the group. Groupthink is a concept that needs to be avoided in decision-making and the Janis framework sought an explanatory correlation between the symptoms of groupthink, the antecedent conditions and the symptoms of defective decision making, which were shown as the observable consequence.

Following the advice of Miles and Huberman (1994) to ‘change the model’ to accommodate information when using causal modelling, the Janis framework was adapted to test the explanation of the theory of Requirements. “The construction of an 'interpreted diagram' or model articulates the relevancies under which theoretical expressions are brought into correspondence with empirical properties” (Lynch, 2003). But there is a different research usage between this thesis and the Miles and Huberman (1994) qualitative approach, which is about deriving explanations to assist in the production of theory building. In Miles and Huberman (1994), the research approach is made from a data matrix which is grounded by inductive sense-making processes and methods such as factor analysis or clustering procedures. Whereas, the adoption and alteration of the Janis causal model is to ‘test’ the very assumptions of the invariant and the variable constructs of the Requirements theory. This thinking and process of adaptation for this research purpose is the discussion of the next section.

7.2.2 The frame of reference for judging activities upon the Requirements theory

Janis (1989) Groupthink syndrome drew to attention some of the causal sequences that lead to defective policymaking procedures in government and business organizations. The use of the adapted framework for this thesis is for the testing of the Requirements theory operationalization. To examine the antecedent conditions, the causal context with the Requirement remit has influences upon the consequences. Noting that, the goal of every scientific enquiry is “defined exclusively in terms of deductive logic and empirical procedure” (Kaufmann, 1944). The meaning of a test is not understood unless the ‘what’ can be determined unambiguously (Kaufmann, 1944). The foundationalist, Requirement-ing-science concept of a rationalist specification process states; “Each Requirement should be defined in such a way that it’s achievement is capable of being objectively verified by a prescribed method, for example, by test, demonstration, analysis, or inspection” (Thayer and Dorfman, 1990).

The underlying foundationalist Requirements method suggests that a connection is supplied by an intermediary acting between reality and our beliefs, an intermediary called "experience" or "perception", where experience is something which does not in itself consist of beliefs, but which may be caused by the external world and which can supply justification for beliefs (Everitt and Fisher, 1995). An aspect found in the behaviourist assumptions that underpin the theory of Requirements, discussed in chapter 3 appendix, pointed out that what is only subjectively given cannot form the object of scientific inquiry (Kaufmann, 1944). The testing of a ‘true belief’ has to have the right sort of causal connections and only then it will count as knowledge. The general principles of foundationalist theory are the same as with the empirical beliefs (Everitt and Fisher, 1995). The IS-IT Requirements claim is that the belief in the method is ‘in control’ of the consequences. This is starting from the proposition that Requirements is a scientific rationalist specification process. The aim of the process is to get the Requirements right and complying with the appeal of the normative approach of Requirements engineering, where the corpus of the belief is reflectively followed in particular rules when following the theory.

7.2.3 The propositions being tested

The framework’s starting point is a reiteration or a reprise of the two sceptical argumentative constructions proffered within previous chapters. Both, from a Requirements domain position will need to be rebutted. The first argument contends that the theory of Requirements is too incomplete to produce consistently successful results in an organisational setting while the second maintains that a Requirement, or rather the process of Requirement-ing, is a post-hoc rationalisation of itself with the inherent pitfalls of reflective accounting.

7.2.4 The first proposition; the Requirements theory is underdetermined

The first proposition challenges the Requirements belief that it is a theory to-be used in the social life-world world, in that it has faults; while a theory aiming to be a useful theory has to be complete and has to be able to explain and predict, abstract, universalize and systematize the phenomenon that it is suppose to represent. If, therefore the theory cannot adequately explain the phenomenon, then the question is, what is it about the theory that is incorrect, and why might this be? One possible answer is that Requirements do not fully recognise all of the conditions and the full context antecedent conditions. From this perspective it is about questioning the Requirements foundations, arguing that it is the context domain in which Requirements is used that is important, and as such the conclusion might be that we are not building IT but should be doing IS; that the concept may well be good one, but can be used in the wrong domain of context; that it is not just a case of a mis-applied theory but also conceptually has been defined too narrowly. If this is the case, then there is a strong and a weak Requirement-ing-science specification position.

Firstly, if the concept itself is wrong then the strong rebuttal version will have to argue that the specification position would parallel the same analogy as science or mathematics, in that the foundational concepts will eventually synthesize, through analysis of the linguistic relationships, into a set of rules that will capture intelligence that could be compiled into an expert system. The eventual appeal will be to one of the materialists' alternative to the Cartesian dualism, as discussed in chapter three, that of Behaviourism, Functionalism and Cognitivism. The weaker defence appeals to some form of relativism, but this returns the problem, questioning the foundational principles, also whether or not Requirements is a concept from the inference logic of deduction or induction.

The advantage for the first strong rebuttal to succeed would be to rule out the third propositional condition of Requirements being present as parts of 'other' sub-processes, since it might be possible to have a Requirement-ing-science with a specification process of everything, or a Requirement-ing-science as a sub-domain as a speciality. But it would not make sense to have parts of a Requirement-ing-science acquiring a specification that exists, in atomized bits, of every possible domain of intelligent thought. For a full explanation of the issue that is behind this we find the same problem that Dreyfus and Dreyfus (1990) discussed when examining the difficulties of the approach in looking at computers as the basis of a way of looking at minds.

The weaker version of defence, for the Requirement-ing-science specification process would start from the position of saying that this is just an instance of the law of Requirements. This argument is in effect saying by inference that what is right for one world would be logically equivalent for all other possible worlds. The underlying principle being that there is uniformity, and that by using inductive principles of the Requirements theory it extends outwards. But this is weaker because it depends on the method reliably inferring that this is the case.

Following on, there is the subsequent problem of the scoping of the boundaries of the Requirements process and the question of at what stage it can be said that Requirements, as a process, takes place. The problem with defining boundaries is that they often fail to capture important social relationships (Kling, 1987; Goguen and Linde, 1993) there is a lack of clarity regarding the content and boundaries (Mumford and Pettigrew, 1975) as projects are not fixed or static (Orlikowski, 2002), have intervening organizational boundaries (Curtis et al., 1988) require shifting and reshaping (Lanzara, 1999) that documents are 'Placeless' (Dourish, 2003) as the boundaries of the computerized system grow (Kling, 1980).

7.2.5 The second proposition; Requirements is a retro-perspective accountancy act.

The second proposition produces the claim that the literature does not reflect the actualities of the doing, that the method is a post hoc rendition, "an act of ex post facto reconstruction" (Schutz, 1967; Vidich and Lyman, 2000). That Requirement-ists rationalize the events from the given framework, in effect, 'fitting-up' of the facts. The construction of the specification is an act of giving and using justification of the Requirements label. This could also apply to both the act of researching from the Requirements perspective, and the acts of doing the Requirements process from the Requirement-ist perspective. This is the applying the methods, procedures and approach in a logical way, with pre-conceived concepts, and consequently it will 'fit the justification' by using the authority of the process as the legitimisation of the reasoning to explain the condition. This reflects the fitting of the rational explanation and the abstraction of events in practice in order to conform and account for their decisions, in retro-perspective terms of the belief and theory.

The problem for the theory is to be able to explain creative acts of the people doing Requirements and Requirement-ing'. The retro fitting is a serious allegation, fundamentally challenging the position of Requirements altogether as a conceived concept, and as it is currently understood. The finding of the previous chapter went towards supporting this viewpoint of the phenomenon of Requirements. Chapter five proffered evidence that Requirements was a post hoc construction, but that still does not necessarily question the Requirements belief itself. However, the proposition can now be formed that questions it's justification for the use of Requirements, which is, that the rationalist specification process should be able to mirror the actual process of Requirement-ing itself.

The method of doing Requirements should be a complete description of the behaviour in doing the Requirement-ing, with the Requirements operationalization method, and should yield a methodical set of instructions guiding the actions of the processes, and, taking that Requirements is systematic method, it should be a method that eliminates the need for reflection and further inquiry as the Requirements claim is to be a method for solving the problem, in that it gives correct procedures of analysis which are accredited as 'good reasons' for knowing, in terms of cause and effect, whether Requirements, or rather the act of Requirement-ing, is a post–rationalisation conceptualisation, and is not actually the method used. Rather it is used as a rationalization process, as a form of legitimacy and justification for the actions that should have been done, and to justify the actions undertaken that have been done in accordance with this way of working. This is in effect saying that the method is achieving the wrong target. It is in effect, a misplaced method, for the process of Requirement-ing, that requires more than reason to discover what is Requirement is and therefore it cannot be completely rational. Thus explaining the post-hoc proposition.

If the charge is proven that it is the use of a wrong process, then the Requirements will be able to rebut this by saying that it is a complete process, that everything is coherent, that the actions of the method are logically consistent and coextensive in use but the Requirement-ing itself was inadequate. The rebuttal of using the wrong method leads to the conclusion that the method procedures or laws have been circumnavigated, badly or incorrectly done, although still within the sphere of commensurability within the domain of the theory. But, just showing that the doing was incorrect is an insufficient rebuttal. The Requirement-ist position should be able say which of the correct rules should have been applied at the instance of the deviation.

The argument can be simplified into a formal statement in relation to the problem in hand; S knows that p if and only if (i) p is true, (ii) S believes that p, (iii) what p is about is causally connected in the appropriate way with S's belief.

The first proposition challenges the belief, questioning if (i) p is true, p being the belief in the theory of Requirements. The challenge is not that p is not true, but that p is misplaced, this is saying that Requirements is true as a concept, but is using the wrong selection from a universal context for the job. It must be taken as an assumption that the connecting condition (ii), ‘S believes that p’ is correct, since that is what the project group believed that was what they were doing, in the doing of the project. The second proposition is testing the method, the causal connection; for a belief to count as knowledge it must be engendered by a generally reliable process, also that Requirements gives a method that is accurately prescriptive of the worldly condition. Conceptualised in the last part of the statement, is that what (p) Requirements is about is causally connected in the appropriate way with S’s belief.

Summarising the two sceptical arguable constructions, the first one supplies the belief (theory of Requirements) [A] with in a context of [B]. The second part investigates the question of how Requirements gets to be a Requirement, and the process by which it happened, which is shown on the adapted framework below shown as observable consequences [C-D].

7.2.6 The composition of the framework

The framework is composed of two parts; the antecedent conditions and the observable consequences, with the intervening process, named ‘the project group’s scoping and defining process’, the assumption being that it is the process of Requirements, the doing of Requirement-ing which is based upon [A + B], the belief [A] and the Provocative context [B].

The working definition of Requirement-ing is; Requirement-ing is a process of actions in the producing of a specification for a system. The title of the process reflects the project group’s aim that they are doing an IT project. This process was studied in the previous chapter, albeit from a presuppositional position and many activities were found that grouped naturally into various combinations. Governing phenomena, decision making processes, designing phenomena, sense making processes and specialised process tools were labelled as the ‘left over bits’. The objective is to take the local spontaneous endogenous production of order, the empirically factual datum, as key actions and then judge these key activities in the frame of reference of the Requirements theory. The act of this judgement is the adjudication of a Requirement-ist, as an independent observer, assessing the actions against the rules of

Requirements. The following sub-sections of this chapter review the work of the framework.

There is a full discussion of the Requirement-ist role, the research issues and the research framework in the appendix 7a.

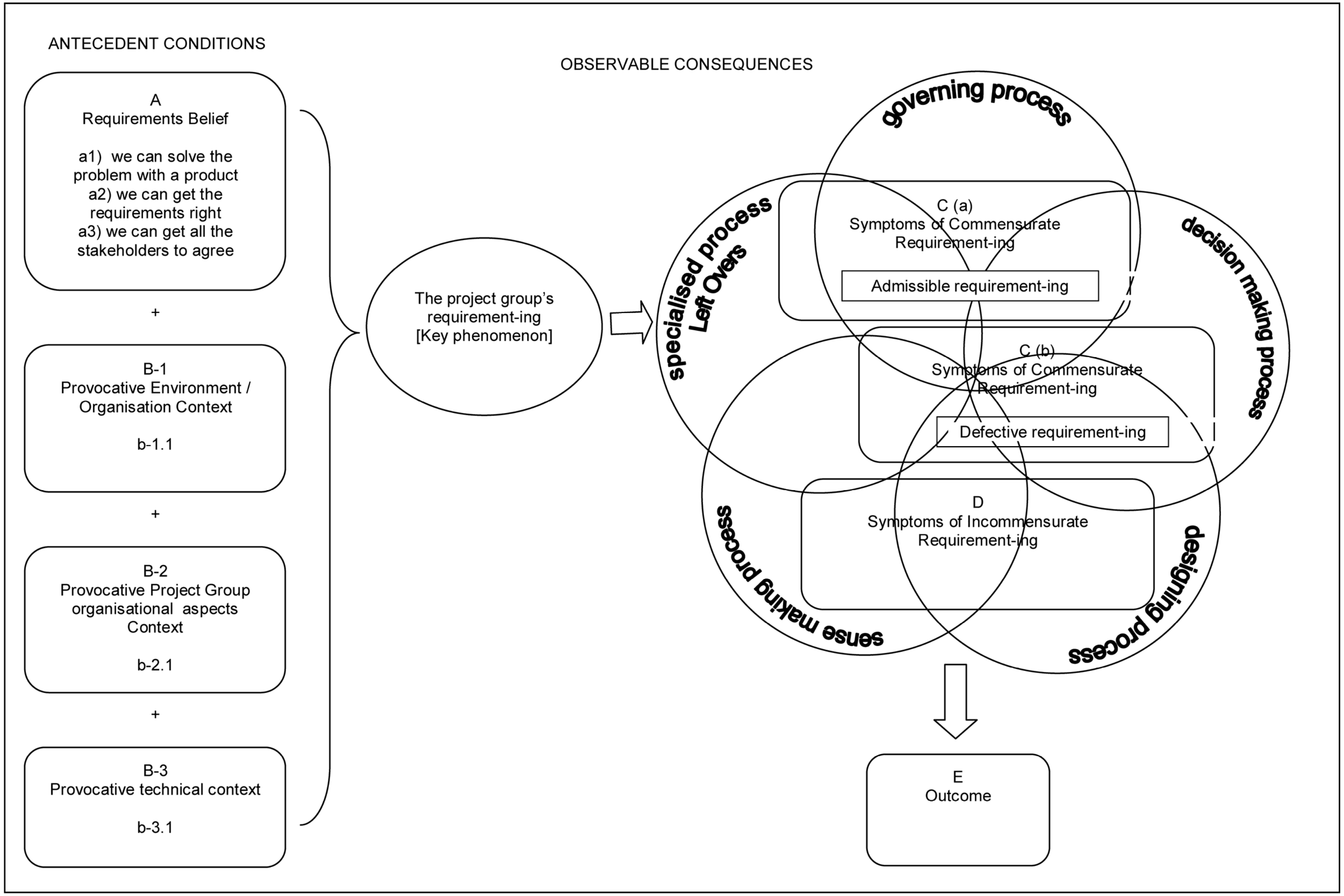

Figure 7.1: The framework of requirement-ing

7.3 Application and Operationalization of the framework

7.3.1 Introduction

The raw data of the work undertaken by the steering group was obtained using transcripts, documentation and with the use of ethnographic methods. The selected key meetings were the main meetings of the steering group. The data was then systematized into [Bracketed] phenomena via the workbooks, which acted as a resource and an audit trail to the discussion on the phenomenon, and the about-ness of the [Bracket] topicality.

Each workbook furnished an 'understanding' of the phenomena through [Bracket] topics of conversation and all 14 key tapes were analysed to give the longitudinal project life cycle perspective of 'what' happened and 'when'. The workbooks recorded and reflected the story of the project, giving the context, actions, events and the different inter-subjective perspectives that were at work, in an analysis of the discussion, with finely detailed interaction.

Random samples of work practice actions were then transferred, acting as the input, into the Requirement-ing model discussed above and in appendix 7. The random sampling found a consistent output of phenomena fulfilling the criteria, as anticipated, in constancy and with validity and the same veracity as the Requirement-ist applies in the operationalization of their profession. "To avoid confusion and minimize the amount of implicit assumptions ….the analyst should avoid narrative and develop a formal system of notation that presents information in a rigorous, consistent, and complete manner (Yeh, 1990) in line with the IEEE standard as it demands that the "specification must be unambiguous, complete, verifiable, consistent, modifiable, traceable and usable during operations and maintenance" (IEEE Std. 830-1984). As these are the standards by which the application of the practice is understood, then these are the necessary constraints to apply.

After some testing and reflection, the model underwent some further minor mechanical framework modifications that clarified the interactions of the components and the categorical assignments. Firstly, it was decided that the quantities of each category of commensurate and incommensurate activities were not important, as the framework was designed to 'empirically test' (Lee, 2004) the Requirements theory and not the case study itself, which should be considered in the wider context as a part of the same system. It is the consistency of the systematic statements working within the operationalization of Requirements that is the first consideration of this framework, as true propositions cannot be proven as true within a given formal system (Lee, 2004), however, running the tests will return results that are consistent or inconsistent with bad Requirement-ing. Incommensurate activities are those that do not belong to Requirements, are outside the operationalization of Requirements and therefore outside the formal system, and it follows that Requirements is either underdetermined or that there are incompatible processes, and these processes have already been identified in the previous chapter. The debate will determine whether or not they are catered for within the remit of the theory.

Two further aspects of refinement also clarified the role of the Requirement-ist, and these have wider research implications. Firstly, the zone, or boundaries of the Requirement-ist, was further restricted to just the action [Brackets] presented to the framework. Originally, it was anticipated that the audit trail would have had to spiral outwards, encompassing ever greater horizons of data from the workbook, in order to assess the actions in terms of the Requirement-ing, with the attaching of data trails to the meta levels of relevancies of the Requirements domain literature, however, it turned out that very little engrossment was necessary. But, the problem of the cause presented a difficult and unresolved issue, as knowledge of the background casual influences [B] is needed, together with a decision, that makes it a cause. However, this aspect needs further investigation, and the test would be to have an independent Requirement-ist or a group of experts examine the data set, independently of the author. The suspicion is that the author is so familiar with the data that the framework operationalization is reduced to ‘shelling peas’ and that ambiguities could have been glossed-over, thus making exactly the same mistaken research approach of re-description.

Secondly, the stricture of Requirements law was loosened, a slightly wider weaker, more sympathetic, interpretation ‘had to be used’, as so many actions in the test run were considered to be incommensurate. Instead of a harsh regime of purist Requirement-ist that was harshly judgemental on the actions, the law of Requirements was weakened to include some ambiguous actions as being commensurate. This is a reflection made from operating with the confines of a ‘true’ law with rigid conventions, and the counter claim would assert that a true law cannot be negated. The practice of Requirements is social but the world under social laws has yet to be determined. Two points emerge; firstly, that this latter view does not mean that it is indeterminate, and has a feebleness of free-will, as Requirements, the claim goes, is applied deterministically, albeit retrospectively. This follows on from the second aspect; which is the difference between applied and pure, and is an old argument dating back to Descarte's arguments on the 'degree of perfection' (II, 113-4); he argued that the principle of sufficient reason applies to ideas as well as to physical objects; that it is just a matter of degrees of objective reality. That something as impure as finite substances is derived, or extended from, the ideas of external substance. As Kaufmann (1944) points out, similar observations hold for the simplicity of social laws, in that research should be "beware of exaggerating the contrast between social laws and physical laws" (Kaufmann, 1944). Rather this expansion now increases the claim that this significantly diminishes the case for Requirements, in that the pure imposition cannot meet necessary criteria, and also that the derivation of a 'true' law is only a deviation from a norm and as such, could be falsified.

Having tested the model, three key tapes were selected from the timeline of the project; the beginning phase, the middle and just before implementation, marking the end of the group's project work. From these three workbooks, the actions and events were then treated as input subjects of the Requirement-ist model, the Requirement-ing actions and outputs of which are the main subject matter of this chapter's section.

The layout of the rest of this section proceeds with an 'overview', or the story line, of the three tapes, setting them into the background context. The difficulty is in displaying the paradoxical nature of the re-telling of a descriptive overview; the previous chapters' work would have considered the re-specification strategy of giving a generalized discussion to be inadequate. The narrative description is to aid the reader in the location of the brute data items that follow on after.

• Tape 04 – De-brief meeting

This tape is from an early stage in the project. It occurs the day after a long evening workshop meeting with the user group of members, the councillors. In the previous project group meeting the decided action (antecedent condition) discussed that the user group meeting should be facilitated with an outside independent consultant, to 'find out' and explore exactly what the 'users' Requirements were (as these have yet to be found). However, on the day preceding the arranged user group meeting, key people in IT decided that a presentation would be the appropriate form. Consequently, a presentation on 'how' Springfield was going to meet the central government e-governance strategy was presented, and was followed by a presentation on the web infrastructural changes that would be taking place to facilitate 'a' web based councillor system. Of note is the subtle change of emphasis, from the previously agreed strategy of facilitation to one of presentation. From moving from description to prescription, both could be considered commensurate with Requirements, but in the broader picture however, the detailed recorded actions demonstrate an ambiguous state of affairs, as user needs did emerge and these needs, for the rest of the project group, needed to be considered, but for IT, some of these needs were seen as ‘additional Requirements’, something to be worked out, while others were not considered as IT needs, an example being the demand for paper copies of a directory. From a Requirement-ist point of view these other needs were not absorbed adequately into the holistic overview of the contextual understanding. The key points of this tape were; the proactive plans of the IT people in promoting firstly, a verbal IT strategy plan and secondly that IT should ‘go away and project plan’ the model. The IT strategy perspective was given from the point of view of supplying infrastructure access, and it is in this light that the details of the actions and interactions become incommensurate as they are adding constraints of implementation details to the project, which is transgressing the rule of “what not to do” in the how of Requirement-ing.

• Tape 16 – Midway point in the timeline of the project

This tape antecedence started with a progress report by the systems analyst (Q) from the IT strategy department. Q had “written the rough and ready spec” because he “wanted something to tout around and show….to people to get them to give estimates, costs and times to produce”. He had sent this out to some developers asking them to ‘give estimates in cost, and say how long it will take them to produce’. The “guestimate” being asked for is upon what Q thinks as ‘a proposal that meets the members’ initial needs’. But, ‘C’ (project leader), has meantime been in discussion with the head of the council complaints department, further, has also had discussions with one of the principal users, and was given a demonstration of a COT’s software package that currently handles the complaints process. The company that supplies the COT’s software is developing a web based front end to the software package, and they are keen to test the new product out, and this culminated in their offering to the Springfield complaints department an incentive to pilot the new software, for a reduced fee. The offer, as ‘C’ presents it, would be “a good deal financially with the Council”. Consequently, ‘C’ would like to explore the possibility of using this software as a part of the councillors’ work package. ‘Q’ (IT) reiterates the position about the “vagueness of what is really meant by Member's Casework Management System” and after some discussion ‘C’ tries to resolve the difficulty with an action plan, requesting Q to look at the list of the functions that Members want to look at in what IT is proposing here in terms of a phased development, and at what SOFTPOINT can offer us immediately, so that the project committee can then make a judgment on the basis of that information. This prompted some further discussion about the meaning of ‘case work’ and security. The project plan occupied the last third of the discussion, together with the project group trying to ascertain project IT achievement to date. This tape reiterates and reconnects two previous themes used in previous sections as examples; firstly, the ‘interruption’ by ‘U’ example of Tape 21 (next tape in the sequence), identified above as an antecedent provocative condition, changing the direction of the project, and which doesn’t appear so innocent, granted that the interrupter ‘U’ was not at this meeting, but it did mean that ‘U’ was ‘perhaps’ forewarned by ‘Q’ of the project direction, although, if he was not forewarned then serious questions arise about communication difficulties within the IT department. Secondly the undue influence of non-attendance, a theme that can be clearly seen in the next tape selection.

• Tape 34 – Just before implementation

With a week to go before the implementation date, the project, depending upon who is talking, seems to be in deep trouble. Since the previous tape (16) the systems analyst ‘Q’ has left the organisation and has been replaced with an outside project manager contractor ‘M’, who has implemented PRINCE 2 project management with a classic textbook approach. Consequently, the ‘manner’ and conduct in the work approach of the group has noticeably changed. The meetings are now characterised as ordered and business like, since ‘M’ has brought in a project management structure, and it is noticeable that the contributions, interruptions, and general discussion points around difficult issues occupy less time. In this meeting, of particular note is the lack of attendance from the IT department. ‘U’ the head of IT provision and services, does briefly appear, midway through the meeting, but departs to attend to a raised technical issue, and the meeting closes before his return. The tape theme is summarised by transition, a gradual dawning upon ‘C’, who opened the meeting with optimism about the impending launch of what she thought would be a successful IT system for the councillors, turning to a mood of worry and concern when ‘M’, aided by an IT lack of attendance, launched a devastating critique upon IT’s inability to deliver the infrastructural changes. At a key moment of transitional concern, ‘C’ resorted to “just looking at the leaders vision again and what they wanted”, as an antecedent position to what must have been the beginning of a contingency plan, if, which was looking very likely at one stage, the project failed and a salvage face saving operation had to be put in place. Fortunately, the PRINCE project management process provides ‘the perfect tool' for apportioning the blame, as it assigns the responsibility. 'C' took particular interest in reviewing the 'risk log' with M and the responsibility assignment to the aspects, marked up as red. The gist of the problem, as 'M' summarised was that the infrastructural changes that facilitated the access were "Working by accident", for 'M' "not by design - they have not delivered any access to the intranet AT ALL".

The following section is divided into three sections as follows: -
7.3.2 Commensurate Requirement-ing
7.3.3 Commensurate Requirement-ing – defective, not doing it properly
7.3.4 Incommensurate Requirement-ing
The layout of this section has the following convention. The three tapes, one from nearly the beginning, one from the middle of the project and one near the end of the project. The examples from each of the tapes demonstrate a key token moment for a [Bracket] of conversation about a topic.

[Key phenomenon] [Key Bracket]	**[A]**	**[B]**	**[C a]**	**[Cb]**	**[D]**
	Req. Belief (a1- a2 – a3)	**Provocative Antecedent Conditions (B-1)(B-2)(B-3)**	**Commensurate Req.-ing**	**Defective Req.-ing**	**Incommensurate Req.-ing**
TAPE 04					
TAPE 16					
TAPE 34					

Table 7.1: Layout of Requirement-ist analysis

These key tokens of brackets were analyzed through the Requirement-ing lens, using the Verstehen understanding of the case study. For Miles and Huberman (1994) verification in Qualitative, research concerns 'matching interpretations', an interpretation, an empirical judgement made from and with experience. The logic of how the analysis in this part of the framework can judge the action and say whether or not the theory can be seen, with judgement upon it, is in its operationalization in the application of the law, and the answer lies in a simple testing of the programmable operationalizations of the theory, is it there, yes or no, and what is the belief in Requirements.

7.3.2. The aim of this section is to find the realisation of the Requirements theory; this section shows that there is a belief, and which law is being applied.

7.3.3. Shows the analysis of operationalization of Requirements theory (the analysis demonstrating defective Requirement-ing)

7.3.4. Shows the operationalization of other beliefs; those that are not a part of the Requirements belief

There are two assumptions being used;

Assumption 1; they are doing Requirements

Assumption 2: that they have a belief in the laws of Requirements a1, a2, a3

The assignment of the bracket operationalized by;

a) Recognising the need; either within the [Bracket] or from [B] cause, in which case it is derived from the Workbooks. The first (within the [Bracket is strong), the second (emanating out-side of [Bracket]) is weak.

b) Recognising the belief that they can achieve this and,

c) This is the operationalization of (a1 or a2 or a3) or any combination of the law of Requirements

The [B] Condition, the Provocative Antecedent Conditions [B-1] [B-2] [B-3] will always be given if the cause lies outside the [Bracket] otherwise the cause is inherently within the [Bracket]

7.3.2 Commensurate Requirement-ing

The three examples of commensurate Requirement-ing of the Requirements theory

- a1 -We can solve the problem with a product
- a2 - We can get the Requirements right
- a3 - We can get the stakeholders to agree

[A + B = C] – Belief and the commensurate signs of Requirements

This relationship of the theory is causal, programmable actions are seen and are correct. The application of the belief has been realized without any influence of other beliefs and processes defects. The [A+B = C] combination shows a successful theory application and the action verifies, justifies one or more of the three beliefs. Products presented to solve the problem.

[A a1+B = Ca] - we can solve the problem with a product – examples:

[Key phenomenon] [Key Bracket]		[A] Req. Belief (a1-a2 – a3)	[B] Provocative Antecedent Conditions (B-1) (B-2)(B-3)	[Ca] Commensurate Req.-ing	[Cb] Defective Req.-ing	[D] Incommensurate Req.-ing
TAPE 04	T04-B6-L39-42 [V: // but there are current arrangements whereby they can obtain from the computer centre a licence for some TREND software and from then on once they've got that licence they can download up to date from the internet ….]	a1	need - Security Software	COT's package solution (TREND Software)		
TAPE 16	T16-B3-L8-9 [C: what we do have is the SOFTPOINT (.) I know it is not a testing product but it is actually a developed product (.) yes?]	a1	need – to use the same product that is in use – in complaints dept	option using (REACT) Options available		
TAPE 34	T34-B5-L74-75 [C:.. (.) they wanted to be able to communicate with e-mail from their offices (.) home and any location in the world (.) so hopefully we will have that]	a1 a2	Brief – the mission statement	validating the Requirements		

Table 7.2: a1 - we can solve the problem with a product

Tape 4 – to solve the problem of security we can purchase a COT's package – security is a function here and not a Non-Functional attribute.

Tape 16 – At this stage of the project – the Requirements could be said to have been met and identified as compatible with using the SOFTPOINT Product, as a viable option.

Tape 34 – validating the Requirements specification. The matching up, or validation in the last tape was of checking it off as satisfying the Requirements brief; it would have also satisfied the needs of the Requirements law.

Of note is that in all three examples selected, a COT's product solution was on offer to solve the Requirements problem, although these were only a part of the total Requirements. Also, what made these actions commensurate was the selection of the sphere of influence of the bracket.

Each of the [Bracket] and the commensurate Requirements actions of the COT's approach present different perspectives, yet the Requirements belief can be clearly shown and the actions are seen to be commensurate, however, the question that these three examples raise is; has the Requirements for the organisation been accurately captured? The issue that this highlights is the fitting of the solution to the problem.

This can be clearly seen in tape 16, where the solution proposes the extension of the complaints system. The SOFTPOINT web application was considered the solution as it was the web front end to REACTSOFT, which was the application used in the complaints department. Since the organisation was already using the application, and that the assumption that the project team worked with was that 'most' of the correspondence that the organisation saw was complaints handling, and this was perceived as the problem, then the follow on assumption was that the COT's SOFTPOINT solution would solve the Requirements problem. The suitability was assessed by an external analyst and his report gave it as a favourable option, (of note – this clearly indicates the problem of the briefing of the analyst) the head of the complaints department, stakeholder, saw it as a solution, and the head of the project group 'C' also perceived it as an answer. However, this option and it's strong pursuance was one of the main issues that caused many subsequent difficulties, and eventually this option was overturned, but not without a robust argument, demonstrating a second problem, that of the issue of overturning a done decision.
Nowadays, the COT's products solutions is an essential aspect that presents itself to the initial stage of the scoping and defining of Requirements, and the decision of whether to make or buy. Four different approaches to COT's provide solutions; the buy in of the technical solution, the finding of a product that will solve the solution, the upgrading of the existing product to solve the solution, and that of getting the supplier to tailor the product. In this project all four alternatives presented themselves as possible solutions and options in this project. What the Requirements theory lacks is the process of Requirements assessment to make comparisons of the options and cross check functional aspects.

Seeking the COT's solution presents the 'how' solution and does not necessarily match up with the 'what' problem. The buy-in of the product presents itself as the best solution in terms of satisfying the Requirements theory. But, it is no solution with which to solve what was the Requirements problem. Nor is it capable of informing research what the phenomenon of a Requirement is.

[Aa2 +B = Ca] - we can get the Requirements right – examples:

[Key phenomenon] [Key Bracket]		[A] Req. Belief (a1-a2 – a3)	[B] Provocative Antecedent Conditions (B-1) (B-2)(B-3)	[Ca] Commensurate Req.-ing	[Cb] Defective Req.-ing	[D] Incommensurate Req.-ing
TAPE 04	T04-B1-L 31-33 [J: = I think within that project plan you need to probably pick up all of the issues that we've picked up in the minutes previously and also the stuff that came out of the umm other session last night (.) yes if we take it through the agenda]	a2	Using previous minutes	Collect requirements		
TAPE 16	T16-B6- L20-23 [C: …we will look at Daniel's paper (.) try and sort out a clear list of functions that we can talk to Jackie about (.) saying what is in and what is out and then to look at the four options that we have talked about and make a decision within the next two weeks….]	a2		C is retaining the decision making – the options process Correlation of functions to options to be able to make – help make decision		
TAPE 34	T34-B10-L11-13 [M: ….the initial system and it didn't look like anything that was specified so we went back to J and said can you make it look like what was specified (0.2) which is what he's done]	a2	Web access pages needed to be redone	Web sight development		

Table 7.3: a2 - we can get the Requirements right

Tape 4 – the agenda for the forthcoming meeting is to collect the Requirements; they have the knowledge to write up Requirements, in that they are talking about the issue, recognising the data that informs Requirements.

Tape 16 – Requirements prioritising, what is a must have

Tape 34 – validation we can build the right product to the specification

To get the Requirements right appears, at first glance, to achieve correspondence with the Requirements law. These three examples prominently highlight and demonstrate the use of the method process. This would suggest that the problem lies in selecting the 'right' method or the right collection of methods, or contingently using an appropriate method. However, of note is that the method collects a 'predefined' output, ‘picks up statements made’, reads into ‘the paper produced’, ‘compares with the specification’, all of these being examples of actions of invoking a method. But this is no guarantee of getting the right Requirement, as in the first place the method does not produce the Requirements. The adage reflects with the analogy of ‘garbage in garbage out’, the concept of ‘a method’ is of an instrument, “a procedure for deriving a solution to the problem” (Churchman, Ackoff et al., 1957), unfortunately it fails, as the input is always prone to misinterpretation in the case where Requirements exist in the life-world understanding.

The Requirements methods in the life-world have no defined specific analytic symbolic inputs, because there is no natural material from which to extract characteristics for the measurements to take place. Collecting numbers and data as inputs for the rules of the ‘game’, for use in the method, cannot be explicitly stated. Because the material already has implied, intertwined ‘value’ judgements of what the nature of the material is. These are in the life-world analogisms, made up of other interpreted data and not of direct physical objects. The translation process of properties is evaluatively grasped within the actions and is not set and cannot be set against an objective independent concept. Temperature is an agreed calibrated measurement that can be read-off from an instrument, a thermometer. The process method is the analytic calibration of uniform progressive numeric symbolic markers, starting at a predefined physical point, which is the agreed accepted standard of temperature measurement and from which it is possible to construct a machine to do this task. But when it concerns a Requirement function in the life-world, firstly, there are different ways of defining the need; it is not necessarily a direct assertion about a physical reality. Secondly, the life-world is a pseudo physical reality, it is or has been pre-interpreted, ‘we’ are already reading an interpretation of another indeterminate measuring device. Or, the input contains a motivational relevancy of human action of a subjective in-order-to motive. The symbolic inputs to the Requirements method could be anything and everything. As there is no isolated base proposition point, and every ‘need-function’ appears as a part of other chains, in a form of interconnected systems of relevancies with one another, it will be impossible to assign an analytic value to anything that is not a physical object. Even if one ‘need-function’ could be defined as a standard definition for a function, then the second function interaction exponentially increases the complexity beyond any reasonable comprehension.

[Aa3+B = Ca] - we can get the stakeholders to agree - examples:

[Key phenomenon] [Key Bracket]		[A] Req. Belief (a1-a2 – a3)	[B] Provocative Antecedent Conditions (B-1)(B-2)(B-3)	[Ca] Commensurate Req.-ing	[Cb] Defective Req.-ing	[D] Incommensurate Req.-ing
TAPE 04	T04-B10-L19-25 [C: …we could …..when the members come in …just take them through this little questionnaire ….then to supplement that we can then have a drop-in evening ….and … so what we need to sort out is who is going to make that list of what members need to know and do a little questionnaire]	a3	-	recognising user needs through training		
TAPE 16	T16-B3-L176-178 [C: …and then give us the pros and cons of the two options and then make a decision (.) I hope to be able to do that within the next 10 days or so]	a3	-	There are alternative – options Request to make a decision		
TAPE 34	T34-B2-L4-5 [C-Cont:- …We did have this meeting with the members enquiries officers (.) which went quite well I thought]	a3		Involving stakeholders Acceptance		

Table 7.4: a4 - we can get the stakeholders to agree

Tape 4 – through the questionnaire we can the stakeholder to agree, through using an assessment of training needs we can get the agreed Requirements.

Tape 16 – produces a list of two options so that the stakeholders, in this case the project group committee can make a decision.

Tape 34 – have a meeting to gain stakeholder acceptance of the new work processes.

Tape 4 is an example of employing the rule of coagulating the stakeholders' perspective into a common abstract user. The operation of the Requirements law seeks to acquire a description of the problem by the user's perception of the potential solutions that are available to solve the problem (Leffingwell and Widrig, 2000). In the case study the results of a survey act as a common denominator for establishing constraints for the project, confirming Beath's (1994) observation "users are given a relatively passive role to play during development yet are expected to 'sign off' the Requirements documents, such a position is problematic" (Beath and Orlikowski, 1994). There is a need of a list of stakeholders' needs that would deliver a system that conforms to stakeholders' Requirements, that can be confirmed by the terms of the questionnaire. The issue is that; the model parameters already exist in the design of the 'little questionnaire', so the stakeholders' variable returns produce a mean that facilitates a norm. The needs are assessed from the content of the questions asked.

Tape 16, presents an example problem, that of choice, and the problem of who has the right to choose or select. 'C' is initiating some work, making a comparable list so that a choice can be made. By restricting the list option to two, firstly, 'C' reduces other alternatives, secondly, putting the head-to-head comparison will favour the COT's option, as Requirements has not been fully elucidated, and thirdly, the selection choice endorsement and legitimisation will not necessarily be a group decision, the "I hope to be able to do that within the next 10 days or so", means that the decision will not necessarily be made by the committee.

In Tape 34, 'C' is reporting on the user acceptance, the change in working practice induced by the introduction of the system in the complaints department, which would confirm Hirschheim and Newman's (1988) user's resistance to change model accounting for IS failure. And Damodaran's (1996) findings on the 'resistance to change' and the lack of effective participation, Damodaran suggests that "without effective user involvement in all stages of planning and design the organization is simply storing up problems for the future" (Damodaran, 1996). This provides the justification for the use of a user participatory approach. Indeed, it conforms to the principle of "we can get stakeholders to agree". However, this research suggests that this is a too simplistic viewpoint and confirms that the analytical models and prescriptive guidance found in the literature is limited, due to the complexity of the change process (Mcloughlin, Badham et al., 2000). This empirically confirms with Saravanamuthu's (2002) theoretical article on ETHICS and UTOPIA which highlighted the underlying problem with asymmetrical power relations, the political quietism in the participatory systems literature resulting in an unrealistic depiction of employment relations (Saravanamuthu, 2002). Thus casting doubt over its ability for introducing genuine workplace democracy (Saravanamuthu, 2002).

In conclusion, the three examples above show the existence of the belief of getting the stakeholders agreement in operationalization, as did the other examples, a1 -We can solve the problem with a product, a2 - We can get the Requirements right, and a3 - We can get the stakeholders to agree. All of which similarly demonstrated the concurrence of the operationalization of the Requirements belief. But, the only way to show the causal effect was to deny the existence of [Cb] and [D], the defective Requirement-ing and the incommensurate. The [Cb] and [D] conditions are now discussed and show how the defective and incommensurate exhibit the belief in operation.

7.3.3: [A+B = Cb] – Defective Requirement-ing but applied theory

This combination recognises a Requirements belief and the realized activity commensurably undertaken. However, in terms of the Requirement-ing framework, the presence of [Cb], demonstrates that there are activities that are defective, brought about inefficiently or that are just badly applied. The presence of [Cb] could well show a further implication, that of the incompleteness of the application of the activity, so that the activity is only partly successful.

When [A + Cb] appear together, following the belief and yet working incorrectly towards the belief, it demonstrates the engineering approach applied to an IS system

[Key phenomenon] [Key Bracket]		[A] Req. Belief (a1-a2 – a3)	[B] Provocative Antecedent Conditions (B-1) (B-2)(B-3)	[Ca] Commensurate Req.-ing	[Cb] Defective Req.-ing	[D] Incommensurate Req.-ing
TAPE 04	T04-B1-L11-12 [J:.. that we're going to deliver on what we agreed at the meeting yesterday…]	a2 a3	meeting of the stakeholders	Provision of requirements	not clear what was agreed - a general presentation - reiterating an IT perspective Presentation of proposed system – mainly on access – infrastructure – web based access - no / little detail on councillor system	-
TAPE 16	T16 -B2-L9-11 [Q: ….what I did and the thing I circulated (.) I don't pretend that it is a detailed requirement but we wanted to produce something that we could basically show to people to get them to give estimates (.) costs and times to produce (.) …]	a1 a2 a3	IT – written –drafted IT driven requirements - report – initiative - for purposes of estimation -	-	IT – produced report & report itself not discussed before going outside of committee cost 'driven' approach indeterminate	-
TAPE 34	T34-B5-L3 [C: .but if it all works then I think members main objectives will have been met…]	a1 a2 a3	the web front access access to the programs members case work system		"If" it works - the requirements will have been meet	

Table 7.5: [Cb] – Defective Requirement-ing

Tape 4 – Right at the beginning of the meeting, the IT strategy director 'J' wants to present 'what was agreed with the main stakeholders in yesterdays meeting', in taking it that the stakeholders gave agreement (a3) to what they (the IT) said they were going to deliver, and also to presenting the plan for achieving it (a2). All of which a Requirement-ist would recognise as the opening to Requirements elicitation and the collating of the needs of the system. But, upon closer inspection a different perspective emerges that shows a defective Requirement-ing sequence; Taking the wider perspective, 'J' is making the statement right at the opening of the meeting, even before all of the people have arrived, the inference, interpretation being is that he wants to; firstly, set the agenda of what is going to happen and secondly mark out, and suggest who (Q) will be doing the work. The full utterance begins to set the position in context;

J // I really see two things that need to be done (.) one of which is put something together for the leader in terms of a paper that is going to set out what approach it's going to be and two to put in place a project management around making sure that we're going to deliver on what we agreed at the meeting yesterday (.) which I imagine Qxxx will be picking up and doing (.)

Text Box 7.1: [T04 - B1 - L8-12]

However, 'C' regains the agenda with the opening of [Bracket 2].

C brilliant (.) I think probably we'll pick up everything that needs to be picked up on the minutes in the agenda (.) so I'm going to take the minutes as read unless anybody's got an issue…

Text Box 7.2: [T01-B2-L4-6]

It is not until [Bracket 4] before the topic returns to Requirements elicitation, but 'C' is leading, is in control of the running of the meeting, utilizing the agenda and assigning the minute taker (Jxx) to record the needs.

C= Qxxx and Jxxx (.) yes (.) to kind of work through the issues with members yer (.) they were told about the vision that the leader has and the kind of (.) we spent a bit of time on the model as well (.) to make sure that everybody understood (.) what we were talking about (.) I think that er as we went on members were beginning to articulate their needs (.) I think it would be worthwhile just noting (.) Jxxx (.) just to make sure you don't lose them along the way (.) umm they said that they still wanted …….

Text Box 7.3: [T01- B4-L13-19]

For most of the remainder of the meeting, J was defensive of what he perceived as the adding of Requirements.

J so we're adding a fifth application are we now?

Text Box 7.4: [T01-B5b-L31]

In summary, the previous night's stakeholder meeting was a general presentation, which mainly reiterated an IT perspective, which was that originally a facilitator was going to elicit the Requirements (IT change). In the presentation IT 'gave the outline of a technical model' (IT scoped the project), mainly on infrastructure access, with little detail on details of a councillor system. It was not clear what was agreed, and finally, 'J' came to this meeting with a plan and an outline of the Requirements that he then stuck to (an attempt to freeze the Requirements). Other project team members (stakeholders), attempted to contribute and re-iterated other needs, but were then faced with negotiations.

Tape 16 – Defective, because IT had produced a report, but the remit and Requirements were not discussed, demonstrating the original plan, as the previous (tape 04) revealed. The document was an 'estimate' of the Requirements (as IT determined), put together with the aim of elucidating cost (cost driven approach).

Tape 34 – “If it all works then I think members’ main objectives will have been met”; this is defective Requirement-ing assessment on two counts. Firstly, the objectives (Requirements) referred to were the ones that the project group had chosen and advocated as the solution. The ‘main objectives’ were already decided by the group and they made and gave in a list of the Requirements and functionalities themselves. They had set the goal, the rules of the game and were now umpiring it. Secondly, the assessment is a "pseudo because-statement" or a backward-looking glance, which is a backward reference to the past and an orientation toward the future (Schutz, 1967 pg, 90). It is the interests of people in the project group that “member’s main objectives will have been met”.

> *Briefly, to summarise these defective Requirements; there is a clear conclusion that these events are contingent activities to the local circumstances of their application, but apart from this they are raising doubts about the notion of a context free method (Introna and Whitley, 1997). Further, the polythetic ‘contingency’ type and nature of the activities occurring, heavily influence the shaping of the Requirement-ing activities of the project groups. These types cannot be easily discerned as distinct variables or invariants, because their occurrences are characteristic of daily life in the life-world.*

Grouped together it may be possible to ‘account’ for the presence of [Cb] occurrences as types of examples:

a) Breakdown of communication
b) Non-attendance
c) Misunderstandings
d) Garbage can decision making or bad decision making
e) Inefficient use of time

But, although these are common types of defective Requirement-ing there must be strong doubt, epistemologically; about the concept of labelling it in the IS academic justification context as ‘contingency’, or that which need not be true, or may be false as these types are not contingent analytic a priori, nor are they contingent synthetic a posteriori. These types are of the moment, fashioned and thoroughly furnished by the parties (Schegloff, 2000), just then, just there.

This section focuses upon exposing some of the reasons that were uncovered in the [Bracket] phenomenon. The measure is not the success factor of the implementation nor the number of well defined functional elements that have been successfully identified and applied in software code. The criterion of assessment for the inclusion of a [Cb] type is its benignancy, or its non malignant attitude and actions towards the resolution of the [Bracket].

7.3.4: [B+D not A] - Incommensurate Requirement-ing

This combination happens when the Requirements belief [A] has not been recognised in its operationalization [C]. But, there are actions of the [Bracket] that work against one or more of the Requirements beliefs, or in, its application. There are occurrences of actions, conspired events, in the [Bracket] phenomenon that result in direct conflicts with the belief. Therefore, they are not breakdowns in the belief, but are processes at work against the belief and are not a recognisable part of the belief structure. These adverse, perverse actions are strong enough to have more than a subtle influence upon the process, and have a noticeable affect upon corrupting the Requirements belief.

The incommensurate activities to the Requirements belief needs [D] or [B] to help to explain, where the [C] is shown is to isolate the cause as a negative influence of Requirement-ing, but normally there would not be the [A] or [C] option. This is recognising an IS perspective, but only one where there is no Requirements belief. The IS has a strong perspective viewpoint, however, the Requirements belief does not cater for it, i.e. the Non-Functional Requirements aspects that are normally considered as the 'How' qualities, yet are dictating the 'What'. The prime example of this being the way in which the IT department de-scoped the Requirements by dictating the access method through the fire wall, by rejecting Java applets.

The presence of [D] is incommensurable in relation to the Requirements theory. However, the particulars found occurring with the [D] qualities were all previously established and apprehended in chapter six. [D] Types are all the process types found in the case study; the major ones being; Governing, Decision making, Designing and sense-making. As such they are not incommensurate to IS Research or the domain of IS, but have not been adequately 'ap-predicated' within the Requirements theoretical construction.

[Key phenomenon] [Key Bracket]		[A] Req. Belief (a1-a2 – a3)	[B] Provocative Antecedent Conditions (B-1) (B-2)(B-3)	[Ca] Commensurate Req.-ing	[Cb] Defective Req. -ing	[D] Incommensurate Req.-ing
TAPE 04	T04-B2-L93-97 [J: …so the model would be that we would design all of the systems that we provide to councillors so that they are available directly through the internet (.) instead of giving them the direct connection to Springfield itself and then letting them out from Springfield to connect to other parts of the internet]	-	Access through infrastructure – technical constraint	-	-	constraint on to the system – on how it should be done – access – requirements not known
TAPE 16	T16-B3-L138-142[Q:…if Members are prepared to have some flexibility on what their requirements are in terms of privacy and security (.) and my impressions up to this point they haven't really been saying that (.) that was the one solid requirement (.) if you like (.) requirement (.) but if they are prepared to soften that line then obviously SOFTPOINT becomes more of a viable option]	-	-	IT control	-	Q is putting emphasis on the requirements of security – prioritising the requirements – Using it as an reason to promote why they should not use SOFTPOINT
TAPE 34	T34-B3-L22-24 [C: ..I don't want to get into a situation where we're seen to be over-spending, when actually we're trying to contain it within the [redacted]K that we were given to do this piece of work]	-	financial year planning	-	-	budget – constraint – manipulation

Table 7.6: Incommensurate Requirement-ing

Tape 4 – Constraint of the technical infrastructure upon the Requirements design
In this tape the IT strategy presented a technical infrastructure approach, before the Requirements were known.

Tape 16 – Constructing the constraint; IT making, forming the rules and regulations of security. The emphasis is upon security, making security a Requirement feature; the problem here is that is it used as a constraint, or reason for limiting functionality and Requirements needs. The 'Q' interpretation of the "one solid Requirement" upon the security was an interesting 'mis-interpretation' by IT; the security they required was from the officers of the council being able to see the records of meetings in the councillors' dealings with members of the public and other organisations. This mis-understanding was one of a number of Requirements that were never fully realized. The mis-apprehended perspective that IT worked with was the security of data in respect to the council; the mistake was that they saw that all data was within the remit of responsibility of the council.

Tape 34 – The financial manipulation / constraint. The financial adjustments, an accounting activity equivalent to the manipulations of the balance sheet for purposes of giving the best interpretation upon the facts.

7.4 The key phenomenon of Requirement-ing – Discussion

The Requirements theoretical framework assumes that it is possible to see the work of the belief of Requirements and that it accurately reflects the ideal process or method of Requirement process. This has to be so, if, when we act in the world we are supported and underpinned by a set of beliefs that guide us. The intervening connection, this causal link, between the ideal and the reality action in the real world is that of the theories that inform, and is part of the baggage of experience that a person carries around with them. The scientific conventional approach assumes that people are actors performing within a framework of universals. The conclusion of the investigation into the Requirements phenomena turns the conventional concept inside out. The evidence points to the converse; which is that the people engaged in Requirements process only reflectively invoke the Requirements process; what-we-have-just-done-has-been-the-actions-of-doing-Requirements, in order to say rationally that we hold a belief in the doing of Requirements. Instead of utilizing the means, the operationalization of using the tool of the Requirement-ing process towards the end of obtaining a Requirement, what happens, is the converse; that the end informs the means. It is just that, and no more. The rationale of Requirements is a convenient peg to hang the Requirements cloth on because there is a need to be able to say that the process has made-sense, and be able to announce to others, the justified process of stipulating an IS or IT system. Consequently, the conclusion of the thesis in answer to the question, what is a Requirement, is that; A Requirement is nothing more than a blind belief.

The confirmation that is sought was established by the very actions of commensurate Requirement-ing itself. To successfully achieve the Requirement we have to construct a process that will establish a1 (We can solve the problem with a product), a2 (We can get the Requirements right), and a3 (We can get the stakeholders to agree). The actions found were not analogous to the assumed actions of doing that enable or constrain the actions made from the following of the belief; rather these are the things that are decided upon post-hoc, because it is something that is, itself, a Requirement to-do. This also helps to explain the some of the difficulties that are found with groups or teams of people in the scoping and eliciting of Requirements. From the thesis findings perspective Requirements is akin to report writing, as from the perspective of an author upon a concept, rather that the thought or research process that is involved in creative writing.

The ethos of the theory of Requirements is that; its use is justified because the methods and standards ensure that when correctly formulated, they will yield the meaning and set the goal of finding the correct answer to the problem of defining what is the need, want or Requirements of the system. Software Requirements Specifications process works from “the basic premise that the analysis determines what the customer needs, and that the specifications will document those needs. This view holds, regardless of the tools and methodology used to arrive at the needs and specifications” (Thayer and Dorfman, 1990). A system Requirement is a system capability needed by a user to solve a problem or achieve an objective (Thayer and Royce, 1990). The Requirements analysis phase should begin with an objectives analysis” (Yeh, 1990). In other words, these typical representative authors are calling into play operationalization of the procedural rules when doing Requirement-ing. The presumption is that it is relevant to use this procedure for the solution to ascertain, draw-out, and realize a problem, in this given situation. The presumption has validities that are dependent upon foundational informing scientific constructs. The task for Thayer, Dorfman and Yeh, or any other methodologist who has the ambition to construct a method which will elicit Requirements, is to make the rules explicit and to be able to follow the method. As; ‘correct scientific decision' is defined in terms of the rules, the logic of science (methodology) is the theory of correct scientific decisions (Kaufmann, 1944). The underlying assumption is that accurate, correct predictions are made by using the validated method. From the examples shown above, section, (7.4.2) the three commensurate Requirement-ing process aims could show, at first glance, the Requirement belief in operation. However, when these actions are set and considered within the context of other surrounding actions, then other equally plausible alternative causes, some of which are not considered as attributes within the theoretical Requirements construction, emerge. The problem of finding such a process of Requirements soon escalates into a multitudinous morass, with other imperatives, and it becomes impossible to contrive a method responsible for controlling the process factors of Requirements, without the process showing defective and incommensurate characteristics.

As there is a strong consistency of the problems and such issues, as just outlined, throughout the tapes and analysis, the ‘inescapable’ conclusion to the operationalization of Requirement-ing framework is that: The Requirement-ing achievement is through a series of empirical polymechany, post-hoc endogenetic actions. The actionable root cause, the antecedent conditions that shape the actions are far too multitudinous to be assigned accurately to the predictive framework. The actions that influence the decisions and selections of the direction a project exist in an infinite combination of complexity. The ‘inescapable’ conclusion of the Requirements phenomena is that we do not sufficiently understand the remit of Requirements elicitation with the methodological tool kit that is currently available.

The thesis conclusion suggests that there exists an alternative research understanding, via common-sense reasoning. In short, this phase two framework confirms the findings of the second proposition of chapter six, which is that Requirements exist only as a part of other processes. But even this conclusion has problems and the only satisfactory conclusion to make upon the phenomenon is that the Requirements phenomenon is a post-hoc rationalization process used for justifying a position that was previously taken. The implications for ISD are discussed in the next chapter.

7.5 Dynamics of the phenomenon of Requirement-ing

There are three possible explanations for the phenomenon of Requirements; firstly; the whole case study encompasses the context of the phenomenon of Requirements. There are many good reasons why IS-IT would prefer this, the main reason being that if the boundaries of Requirements extend to all the actions, from conception to closure, upon the specification and even on to implementation, then the contexts of justification, discovery and meaning can be combined into one domain of study, and be strongly equated and unambiguously related to a theoretical domain. Unfortunately, chapter six found this conclusion difficult to accept and this chapter’s framework found that much commensurable Requirement-ing was either corrupted or incommensurate.

The second proposition also emerged from the previous chapter's conclusion, suggesting that Requirements exist only as a functional part that is found in other major processes. The Process findings of the previous chapter were that; Designing processes/methods, Decision making processes (largely defective), Governing processes, Sense making processes and Other process types dominate this elicitation stage, although the mechanisms by which these operate and are made operationalizational are not well known. This helps in explaining the frequency of the defective Requirement-ing and the many incommensurable aspect types. The evidence for this is demonstrated in the interplay with the project management process, where the second half of the project was 'run' with the PRINCE2 method and although that method can also be seen as a sub-process, it nevertheless directly interacted with the Requirements theory. The main process types have their own internal sets of logic that Requirement-ing actions have to fit into, so the practicalities of Requirement-ing have to amend the theoretical Requirements process to fit with the dominant interaction of processes. The phase two operationalizing Requirement-ing framework has confirmed this. Finding difficulty of directly linking up the cause with the effects of the Requirements process, without using additional explanations of 'this action is a part of 'x', something else', that we will call Requirements, as it is a convenient process label name.

The third proposition suggested that the Requirements concept exists as a distinct process. Chapter six was unable to confirm this, as it did not immediately find it, except as a reference to the justification action 'this-is-what-we-have-been-doing'. At the beginning of this chapter this assumption still stood; that Requirements could remain, somewhere hidden in the results, and submerged in the morass of detail. After all, a Requirement, specification document was produced, making it difficult to believe that the process that created it does not exist.

There exists within the third proposition a possible explanation that needs accounting for; which is, what if the project group used and imposed a strict process method? The claim could be that the contracted firm brought in to do the work had a strict methodological approach, of using UML and modelling diagrams that brought about the specification documentation. The question would be; should not the Requirements process and method have been implemented from the start? This reaches into the heart of the problem and leaves open an ambiguity that that can only result in a paradox or a dilemma. This is the finding that is now explored, which continues into the next chapter and on into the conclusion, with implications for IS. But in short, an overview of how the argument runs is as follows; emphatically, the starting point is that the problem still remains, that the theory has to be able to explain the ‘behaviour’ of the people who are doing the task of scoping and defining Requirements, but the theory does not appear to be able to control the process. The argument of saying that we need to (‘strictly’) apply the existing methods is erroneous, because, quite simply, by employing the method, it is no longer a Requirement. It has already been imbued with the sense of what it is, Why? The x-y variable correlation is possible, but it is “only” possible through post hoc reconstruction and NOT as a predictive explanatory framework. A Requirement process itself cannot make or ascertain the Requirement. That is saying that x is not a specific ‘x’, rather it is selected and decided from an alphabet combination of an infinite context situation made in common sense practicalities.

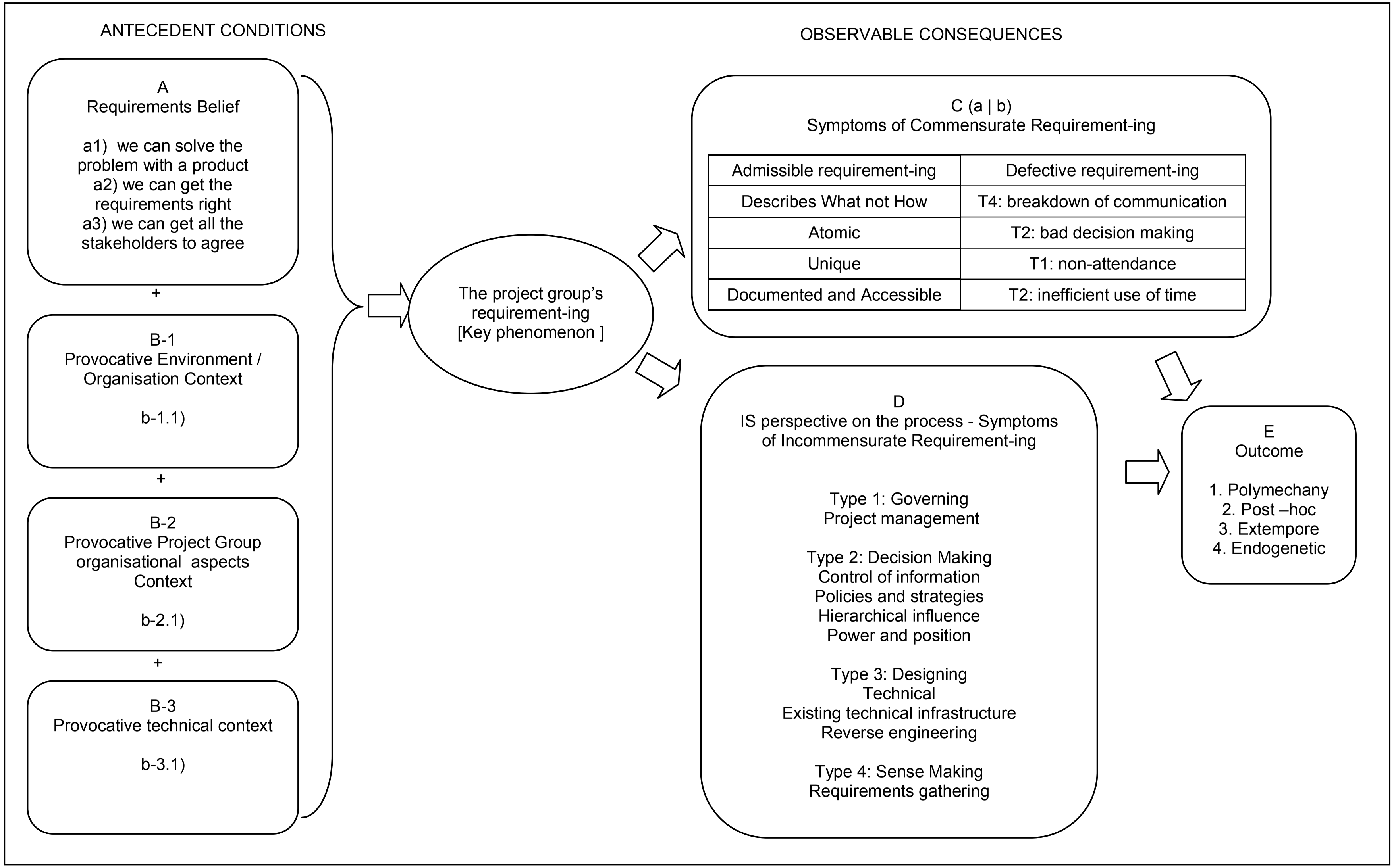

Figure 7.2: The framework operationalizing Requirement-ing

The framework of Requirement-ing above depicts the analysis of the phenomenon of Requirements in operation, which is the research representation of the operationalization of Requirement-ing to explain the process/phenomena. This explains the co-existence of the [Ca] or [Cb] and [D] that inevitably and conclusively leads to the [E] outcome of Common-sense life-world understanding.

The updated results framework (above) (re)describes all of the component parts, indicating firstly that there were no spurious conclusions, such as that 'everything' can be accounted for, given time, and secondly, that the framework was coherent with the previous propositional conceptual research design. As such, the first observation is upon the workings of the framework itself and its validity. The framework results facilitated the drawing of inferences and conclusions in a plausible and cogently logical reasoned method (Walsham and Waema, 1994; Myers, 1997; Yin, 2003).

The results simplified into the three phenomena of Requirement-ing illustrated below facilitating a summarized discussion:

[Ca], is commensurate, but it does not matter how commensurate a Requirement-ist is with the belief and its operationalization, in the total process of doing the phenomenon of Requirement-ing there will be instances of [Cb] and also [D].

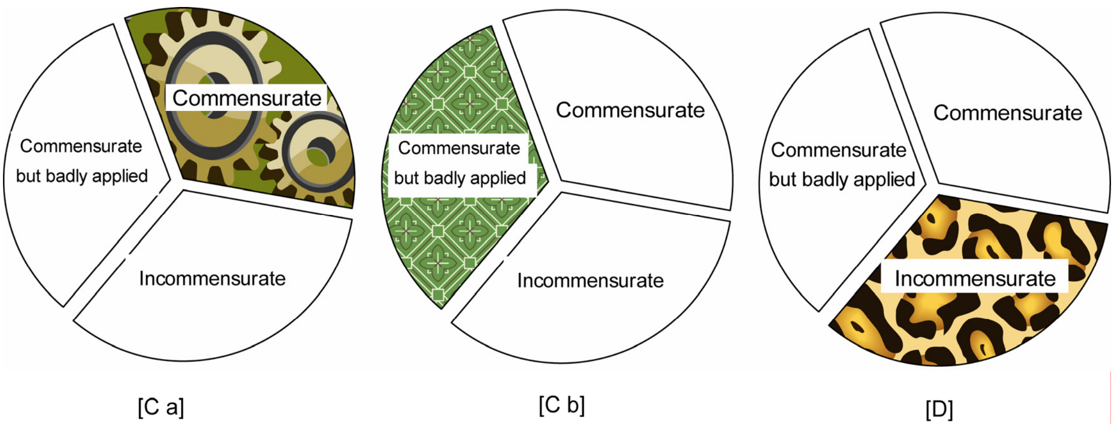

Figure 7.3: The three Requirement-ing types

[Cb]. Shows actions of symptoms that are commensurate, yet produced defective Requirement-ing. This presents the problem revolving around the issue of how a Requirement-ist determines what is 'in fact', 'defective'. How can a Requirement-ist determine defectiveness – at-the-time-of-doing Requirement-ing? If the Requirement itself is unknown, the knowledge, and ability of assessment about making a 'wrong' decision is not available at the time of making the decision, but is only seen through post-hoc review. Further, any reflective post-hoc revision upon a decision taken involves added complications upon directing future courses of actions. So, firstly a Requirement-ist, at the time, does not know how or why a decision that is in the process of being made is in fact the wrong decision. Secondly, a Requirement-ist, at the time, cannot tell whether a decision is the right one, either in respect to itself or in relation to other decisions that will have to be made. And lastly, any, and all attempted corrective actions taken upon a seemingly wrong decision brings about a course of actions that will further compound the issue, leading to consequences that further increase the chances of defective Requirement-ing.

In examining a defective Requirement-ing, such as a breakdown of communication, it involves a research interpretation upon the action, as the people involved in the action do not see themselves as being in the state of 'a breakdown of communication'. If they did self-perceive it, then it would be typically termed as missed-communication, or a misunderstanding which is capable of rectification by inciting an action, thus labelling the state of breakdown of communication by researchers that of a misdiagnosis.

[C: ... can somebody explain to me what encrypting means?...]

Text Box 7.5: [T04-B3-L3]

Typically, two sorts of defective rectification processes take place, working on two different levels of interpretation, firstly, a repair made from a set of self-serving constructs, made in conversation in intersubjective interpretation, such as reference to 'facts', as in "the facts of the matter are…..". Secondly, because, of the legitimacy of the position that the role holder possesses, by virtue of hierarchical position and status within the organisation. The point is clearly demonstrable from the previous example of the actions taken in the 'non-attendance-of-a-meeting, the result of which maintains, supports, and inversely sanctions the existing status quo rather than facilitating remedial 'correct' Requirement-ing.

Both [A, Ca|b] actions are nevertheless abundant in "the ways this is done" and this is treated by all as contingently accountable. This contingency, popularly thought about as the fifth class of methodologies of information systems development (Avison and Taylor, 1997) sanctions the alternative practice, a political anarchy, of just do-it, thus accepting little theoretical positioning except that of incorrectly borrowing the justification. This can be clearly seen here, in the workings to promote the attitude of the present ‘now’, rather than the time-less posture of the scientific attitude. The occasions in which the rectification processes proceed, in respect to the circumstances of the work of Requirement-ing, is by re-specifying, and selecting, either admissible or defective commensurable activities and constructing them to fit into the boundary of what is contingently admissible into the endogenously produced local practice. That is, that which a Requirement is conceived to be.

Conclusion: [A-Cb] instances of defective Requirement-ing demonstrate the reparation work that the members of the group do. The ‘reparation-work’ of bad Requirement-ing is the act of realization of a Requirement, but from within the given context. Some in IS-IT would call this the Non-Functional aspects. These, for Requirements traditionalists, are the difficulties to deal with at the design and implementation stage and not at the analysis stage, as the focus should be upon the ‘What’, and not the ‘How’ separation. However, the inevitable intertwining of specification and implementation (Swartout and Balzer, 1982; Reubenstein, 1991) points to the same position that separates the body-world relation. In summary, the previously recognised process, as discussed in chapter six, now re-emerges in defective Requirement-ing. These processes are not adequately taken into account in the theory of Requirements. And this is exactly where the rationalization of the specification problem falls apart.

[D] – These are the incommensurate activities to the whole of Requirements and are accounted for by the types of processes previously recognised in chapter six.

Commenting upon research approach

The original concepts, the lifecycle and the iterative design model, were proposals for handling the complex problem of software development. Both start with analysis of the problem domain, and both are based upon reflection of the experience of building and developing software. Exploring the underlying model, the convention is to produce a chain of evidence supporting an inference upon an observed outcome (Miles and Huberman, 1994; Yin, 2003). For qualitative data analysis, the "modus operandi" logic of research process is by cycling between enumerative and eliminative induction (Miles and Huberman, 1994). But the problem with induction is in determining which ones are rational (Everitt and Fisher, 1995). Further, inductive arguments are based upon inference. That extends out to say that knowledge of the world is based on inference (Everitt and Fisher, 1995) here that is, surety is only provisional if it is empirical and not tautological, but this position accepts that any fact about the world is always open to revision in the light of sufficient contrary experience (Baggini and Fosl, 2003); the catch here is that this lacks any certainty and secondly that the inference from one belief to another rests on a principle which can itself be viewed as a further belief, thus forming a chain of inferences. The original concept of Requirements monothetically grasped a reflective practice of synthesis that led to an anonymized constituted ideal type, with a selected emphasis and interpretation "objectively given" in the system (Requirements engineering) of correctly interpreting the world of symbols.

However, this can now also be viewed from the other symbiotic perspective, the conclusion of a logical argument must follow from the general premises that the deductive rules are followed (Hughes and Sharrock, 1997). When the general statement is a universal statement, as Requirements is, 'whenever [A], then [B] follows, and these generalities are then conjoined with other statements which give 'initial conditions, which is to state the empirical circumstances to which the law of Requirements is applied, which is what was done in the phase two Requirement-ing framework. Then, returning to the previous proposition and the form of the argument as explained; S knows that p if and only if (i) p is true, (ii) S believes that p, (iii) what p is about is causally connected in the appropriate way with S's belief. Then the postulates that are the constituent necessary parts of Requirements (‘we can get the Requirements right’, ‘get all of the stakeholders to agree’ and 'we can solve the problem') of the Requirements theory can be tested against empirical observation.

The ideal-typical concept formation underlies the principles of causal adequacy (Schutz, 1967); that correct sequences of events will occur according to established generalizations in that there is a probability it will always actually occur, which allows for two observations upon the enquiry of phase two. Firstly; taking that the proposition is true, or assuming that there are good reasons to support it, and from the text book perspective, this is so, and that the internal validity of the research framework is sound, then its operationalizations allow identification of valid reasonings that are in use. Then there is sufficient evidence to assess whether or not it gives good reason to believe the conclusion that the Requirements-rationalist specification-process is correct. A rebuttal will offer up a falsification, by giving just one counter-instance in which x is not followed by y. In a cause and effect relationship the hypothesis can be disproved by only once showing that it is not true (Fitzgerald, 1991). The alternative structure to the argument is found in its reductio form. This is of particular interest as it directly questions the concept of Requirements itself, and contributes towards answering the second proposition: The logic of the premises being true cannot give a false conclusion, so if the conclusion is false, the premises are not all true. So, as an example; if the question is asked; But what if they used a different Requirements method? Or what if the group applied 'A' method of Requirement-ing rigorously? This question misses the point of the enquiry; Requirements defines the answer to the 'what to build' question, i.e. produces a product to a pre-specified agreement, with the right dimensions. The question itself looks to the wrong set of prepositions. Requirement-ing becomes corrupted; and doing Requirements badly does not automatically mean that it could have been correctly applied. It does not matter how good the Requirement-ing was if it was always going to be corrupted. If that was not enough, two alternative principled imperatives types of interrupts occur; incommensurate activities, which indicate that wider process are in control of the Requirements process, and secondly, when at no point were the Requirements frozen, entities emerge, emergence happens. Freezing the Requirements is a political decision and is not based upon the complete solution found.

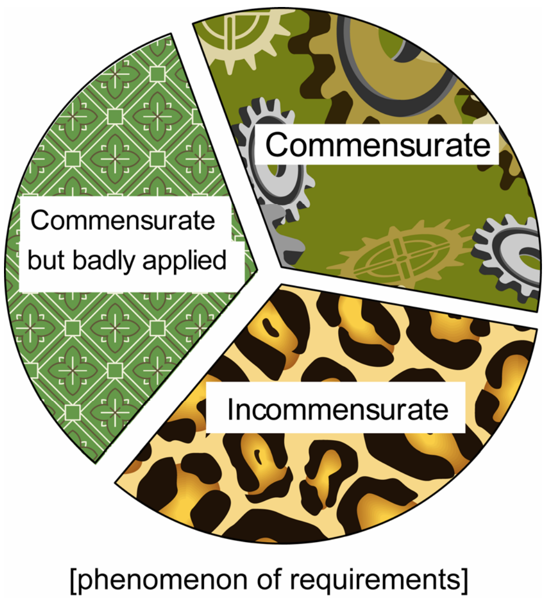

Figure 7.4: The whole

Commenting upon the research approach; the findings upon the methodological approach of re-description is inadequate for describing the activities of the endogenously extemporaneous local order production. What is meant here is that the abstracting of the method activity by the ‘lens’ of the approach, through looking at the activity of the doing of Requirement-ing cannot, and does not re-scribe the reasons for the action, but is a poor substitute, full of inaccuracies and contradictions.

As to the problem of causal imputation and the related problem of warranted predictions; the general finding confirms other research into the application of rational-scientific approaches to a social world; that the multifarious ‘contamination’ presents fundamental difficulties (Hughes and Sharrock, 1997). Again, as indicated in previous chapters the chain of inferences for the Requirements theory soon becomes far too problematic when attempting to ascertain second-order from first-order brute facts as they soon turn into paradoxes (Hassard, 1993). Whereas, if the starting point is made in the temporal extemporaneous life-world, then the intersubjective moments, the endogenous production of local order made and discovered in the ‘context of discovery’ make sense, and only make sense because of our commonsense understanding.

The refrain of why 'We can solve the problem with a product', will fail

'We can solve the problem with a product' is saying that it is possible to realize a need that can be satisfied with a representative ideal object. The claim made is that IS-IT has a process by which we might ‘discover’, capture and conceptualise that need in the form of a model and when built, it will solve the problem identified with a product solution. Using scientism’s methods authenticates the claim. The presumption is that IS-IT can use the same conception as that with which the natural, physical sciences makes discoveries towards greater generalizations. But, the IT model only follows and copies the technical method with an assumption that the life-world corresponds to a physical world. The contention here is that the method gives correct procedures of analysis, accredited with validation and verification, which also includes the taken-for-granted assumptions that the life-world biographical actions are harmonious or of the same type. There is, so to speak, an assumption of a geometric locus of all possible types at all possible temporal points that lead to the Requirements specification solution.

Essentially, it is a process to make a statement about something, an object, with the underlying model of; ‘Requirements-Problem-Solution’, but it is a pattern that IS-IT has transformed into the process that conforms to ‘Requirements + Build = Product’ as a core belief of 'We can solve the problem with a product', and in doing so, the claim of this thesis is that this belief has confused, in an ambiguous manner, the ideal world and the actuality of the life-world in its application and theorizing.

The ‘Product’ or artefact conforms to ‘formal specifications’ which are logical, coherent and match physical attributes, or which are said to possess qualities of a product. Consequently, the focus on getting the right product depends upon the initial first step of setting off on the right course. The emphasis is to find a solution with ingenuity, an elegant solution. The first meter starts with the assumption of 'We can solve the problem with a product' and proceeds with the processes and methods that conform to the building of products. The methods exist to guide, with a sequence of well defined steps, giving direction and means of structuring the approach to building products. The outcome, usually the Requirements-specification document, “is assumed to be a complete description of the product's external behaviour” (Davis, 1990) and secondly, a document containing “a complete description of what the software will do, independent of implementation details” (Kotonya and Sommerville, 2000). The autonomic implementation maintains its independence bounding, en-framing ‘what the software will do’ in its ‘functionality-of-the-product’, whist the ‘description of the product's external behaviour’ will dictate the appropriate ‘fit’.

The essential steps in the generic method for the assumptions found in the product pattern of ‘Requirements + Build = Product’ can be reduced to the principle steps of; firstly, obtain Requirements from ‘Stakeholders’, secondly, formalise Requirements and make them "testable", then prioritise Requirements, estimating the cost and quality, then agree the model and proceed to production and implementation. If this is done perfectly, i.e. correctly, and agreement is reached to develop a product then it will automatically equal success. So, Requirements is currently said to include in its principled steps a number of component processes recognised as; its ‘Functionality-of-the-product’, will ‘Fit into the organisation’, and in order to achieve this it’s secondary implied subsequent supporting process activities of; ‘Project management which would include aspects of cost, time and quality, and finally, its structured logical analytical ‘decision making’. However, as noted in chapter two, the claim made is of an historical adaptation rather than one matching the physical science progression. That is, the augmentation as just noted above is an extension, which is something that did not originally exist in the days of ‘glass-house’ computing, where the work arrived as a preformatted input to be processed. Things are now there that did not exist in the original relationship between two axiomatic propositions on punch cards. The historic intertwining of the world of manufacturing, of telephones and traffic lights and of production of artifacts was bolted onto the IT data processing activity, in a supplementary analysis step. It added a process onto the analysis phase called Requirements. Yet this additional, the supposedly sympathetic viewpoint to business manufacturing resulted in the bolting on of synthetic propositions. The syntheses that included anomalies. This led inevitably on to incommensurate Requirement-ing and a resultant bodge job. The only advantage of the bolting on of the synthetic propositions is that it facilitates empirical testing.

To explain and clearly state the conclusions further, the inconsistencies of Requirements as conceived in 'We can solve the problem with a product' has internal inconsistent component parts contained within the premises of ‘Requirements + Build = Product’. The engrossment contains ‘value’ judgements which are not statements made by virtue of whether a value is assigned in conformity with given axiological rules and conforming to analytic propositions. Therefore, the concept, now taken as a whole, has faulty premises and when used in its extension under the guise of rules which incorporate the empirical sciences of synthetic a posteriori propositions mainly of the Synthetic type it will lead inevitably to exposing incommensurable activities.

7.6 Discussion on phase two framework

This chapter, Phase two, directly addressed the operationalizing of the theory of Requirements in its instantiation relationship between the theory and practice. The Requirements theoretical framework assumes that it is possible to observe the work of the belief of requirements in the actions of the doing of an IS-IT project. The issue that the adapted research framework of phase two addressed concerned the showing of the operationalization.

The IS-IT position is that; the use of a Requirements theory is one that is foundational and based upon self evident basic propositions which have been built upon and accepted because of a transferring ability to manipulate relations to other propositions and concepts abstractly, i.e. the analytical logic of decision making. Thus, the rational use of the methods of Requirement that validated actions of Requirement-ing are rationalized into the economics of operation. The assumption is that variables can be found that are turned into measurable ‘things’ that are objectified so that they can be analysed and organised into a ‘complete list’ of alternatives and finally presented as objectives in quantitative terms. This process can be rationally extended into all human activities, for example Churchman, Ackoff et al (1957) saw “there is no logical or methodological reason… why such concepts as ‘good will’, ‘morale’, and ‘responsibility’ cannot be reduced to quantitative terms”.

The concept assumes that this can be an ‘applied theoretical position’, however, coherency must be found in the proposition, that p is true; in that the assumption of IS-IT in its proposition has to be true. That a theory, to be a useful theory has to be a complete one and has to be able to explain and predict the phenomenon it is supposed to represent.

Using an adapted Janis groupthink analytical framework the task was to perform the requirement-ist role to judge the detailed acts found in the case study against the laws of Requirements. However, the thesis has shown that the engrossed theory of Requirements is incomplete; having become loaded with internal inconsistencies requiring remedial fixing because of other major intangibles being laundered out. The finding is the disagreement of the theory, concerning the rules of the theory which means a disagreement with respect to the meaning of 'scientific knowledge' (Kaufmann, 1944; Polanyi, 1958) which makes the theory of Requirements, only false when used in the life-world.

An argument could suggest that the project group did not do the Requirement-ing reflecting a text-book example, that they were doing Requirement-ing incorrectly. However, the work that the project group undertook would still have to be considered as working within the remit of the belief structure which has been shown to be possibly false. Applying a strict Requirements method, as it currently stands, becomes impossible as it will always be corrupted by the incommensurate activities, which dominate the process, and these processes have been exposed as being various impediments to the Requirements belief. As this is only readily exposed at the detailed level of operationalization, it can be easily glossed over and actions re-ascribed in post-hoc accounting at a general level.

The repair job is in-filled during operationalization with seemingly incommensurate activities. Therefore; the theory of Requirements is separated from its antecedents by a considerable logical gap, which has been filled by invention and discovery. The essential characteristic of our everyday, mundane lives, is that of invention, and as with discovery, it can claim to be what it is only if it is surprising. The outcome then must be a call for an understanding of the fundamental alternative, in Garfinkelian terminology; the incommensurable asymmetric phenomenon of the shop-floor haecceities made in the life-world circumstantialities of ordinary activities.

Chapter 8

Implications and findings for IS-IT

"It is only when we are confronted with the anxious dilemma of a live scientific issue, that the ambiguity of the formal processes and of the various attenuated criteria of scientific truth becomes apparent, and leaves us without effective guidance" Polanyi (1958) Personal knowledge

8.1 Introduction

Throughout the thesis, the aim has been to make explicit certain connotations that are no more than implied by the IS-IT belief in Requirements, and to test the validity and soundness of the arguments used to justify the methods in the concept of Requirements as they are currently understood and accepted in the IS-IT literature (sections 1.7, 2.6.4). Criticism is one of the most important forms of scientific cooperation (Kaufmann, 1944) and the challenge for the thesis was to question whether or not the belief in the concept of Requirements, is in fact, a justified belief (section 3.3). The challenge in the thesis was to examine the assumptions that are held by the Requirements domain, this led to an investigation with the research question of what are [phenomenon of Requirements] for IS-IT and How does [phenomenon of Requirements] become operationalized (section 1.4).

Questioning the belief involves looking at the phenomenon from different perspectives, pointing out any inconsistencies found in a belief, and challenging the assumptions within the belief. The outline reasoning for taking alternative perspectives starts with (section 4.1.1) which questions the justification principles of Requirements, in particular the claim that it extends the process of Requirements rationality out into the 'context of discovery' (section 2.6.4, Model 'B'). The research approach had to find the best explanation of the phenomenon. So, the aim is to seek alternative explanations, to then see if the 'fit' between them explains the phenomenon; hence the employment of two phases (section 5.1.1).

The thesis offered two explanations of the behaviours in the phenomenon of Requirements; these are based upon different philosophic positions; one being that the [phenomenon of Requirements] is freely determined, that it is made from the sense-making accounts of accidents and spontaneous discoveries, and announced intentionality, also from mundane interactions made by people with agendas in-order for them to achieve a particular goal. Alternatively, it could be that the theoretical conception of Requirements provides a process whereby Requirements are determined, with discoverable functions being abstracted out of context by the correct use of methods. The choice between the two overlays the real dilemma, which occurs because of by the two opposing world views. However, currently the domain of Requirements is in a state of 'Bridging-the-gap' (section 2.3.2), this gap to be filled by having various 'fixes', which will result in the compromise of having to make uncomfortable decisions during the stage of the freezing of the Requirements (section 4.1.2).

The purpose of splitting the research design into two phases was so as to be able to present the oppositional viewpoints in a direct clash, and to flush out the current difficulties with Requirements. In doing so, the thesis relied upon making the Requirements process accountable to testing, thus gaining an understanding of the problem of the gap between theory and practice.

A key discussion revolved around the core issue of the remit of the Requirements design process's 'extension' out into the 'context of discovery' (section 2.6.4, Model 'B'). The conclusion reached by the thesis was as follows; that the fault and the root cause of the ambiguity lies in assuming that the justification is correct in its use for the 'extension' of the Requirements design process (section 7.5). In generalising the findings; it is apparent that the process of Requirements is not correct in making the inference of extension with the current set of subsumed laws, as is expounded in the various methodologies, because its justification is unfounded and incorrect. Why does it fail? Because of the tightly controlled boundaries, and this is discussed in the later section 8.3.

So, an ambiguity in the Requirements problem (Section 1.3.1) is found within the remit of Requirements, which is that it isolates 'a problem', by framing or bounding it, in the problem domain. But, the Requirements problem does not end there, there is another further troubling inference adduced from these findings that affects IS-IT approaches and that of research. Namely the diverse set of relationships that exists between the positions of IS and IT. Orlikowski and Iacono (2001) recently suggested that 'the field of IS is premised on the centrality of IT in everyday socio-economic life'.

Requirements is a microcosm of the viewpoint, that model 'A' (figure 2.2) inferentially includes the context of interest, resulting in model 'B' (figure 2.3).

However, for Requirements this results in a false dilemma between IS and IT in the bridging of the Requirements gap. The ethos of the theory of Requirements is that; its operationalizable use is justified because the methods used and the set of standards ensure that when correctly formulated and applied, they will yield the meaning, set the goal, and find the correct solution to the problem of defining the need, want or Requirements of the system (section 2.6). Requirements, reliance is upon the justification principle using the assumption of interpreting the real world. The implications of the IS and IT 'gap' problem for Requirements is explored in the later section 8.3, after a review of the previous seven chapters. Finally, the thesis is rounded off with a discussion in section (8.4) on the contributions and the avenues of future research (8.5).

8.2 Review of the thesis

The thesis can be divided up into three distinct phases (figure 1.1);

- Phase 0, started by examining the existing stocks of knowledge as a given, readily found in the classic textbook definitions (Section 1.2). This developed theme was further explored in chapters two and three, which developed a theory of Requirements and assessed the philosophical underpinnings of it.
- Phase 1, Chapters four, five and six, developed and applied a research approach to examine What-is-done and How-it-is-done in the actions of a case study where the people involved are said-to-be-doing the phenomenon of Requirements.
- Phase 2, Chapter seven unites Phases 0 and 1 in an analytical Requirement-ing framework, testing the detailed operationalization of Requirements theory.

Finally the last chapter, eight, this chapter, examines the consequences of the failing Requirement-ing operationalization, and places the problem in terms of the dilemma.

8.2.1 Chapter 1: What is a Requirement: a journey of discovery 'Requirements dilemma'

This chapter gave an overview of the whole thesis, starting with an overview of the definitions of Requirements and the prescriptive methods and approaches that are advocated for practitioners in the undertaking of a Requirements project. This also marked the starting position of this thesis, which began by exposing the ambiguous problem of there being a gap between the theory and the practice (Section 1.5). The first chapter gave an overview of the classic elements of Requirements project failures and in doing so positioned the issue of the 'problem of Requirements'.

The need to do this work stems from a large body of evidence that has indicated that the Requirements process is deeply problematic when applied to the life-world, which means that fundamental questions have to be asked about the basic premises of it [phenomena of Requirements]. Consequently, three logical research design tasks were identified;

- An enquiry into what is the meaning of Requirements; as it is given in the stocks of knowledge, as taught, as proscribed in the textbooks and as understood by working practitioners. This resulted in the second task.
- Establishing a working theory of Requirements.
- The necessity to examine the core assumptions that are the foundations upon which the Requirements belief has been built.

8.2.2 Chapter 2: The nomenclature of Requirements

The first stage of the research approach compiled a working theory of Requirements. This was no straw man, with an intention of a mock dissembling. The idea was to produce a theory that was robust, and would encompass the understating of the modern Requirements, that would cater for the general business context, that would capture the essence of Requirements and all that which in general is reportedly taking place, rather than selecting a single definitional use, that could only cater for a narrow specific domain context. The justification for constructing a theory at this stage was based on the common understanding that the people who were engaged in the practice of realizing Requirements were utilizing their accepted beliefs in it. The literature research revealed three common constructs that underpinned the belief. These constructs also facilitated a continuum that would also encapsulate most, if not all of the textbook Requirements prescriptions. The three basic tenets required to satisfy a Requirements law: ‘We can solve the problem with a product’, ‘We can get the requirements right’ and ‘We can get the stakeholders to agree’. These formed the basic universal "law" of requirements.

Superincumbent upon this Requirements theory is the essential belief that the development process can be rationally described and formalised into distinct methods, processes and procedures, as used in the real world of practice. The classical claim is that Requirements is at its base is a ‘rationalist-specification-process’, which is one that dispenses with any vague, ambiguous artistic whim of creativity that could lead to errors.

Design rules prevent error and predicate quality; this maxim is supported by inferences made from mathematical logical correctness in engineering science. “By ‘correct’ it is meant only that the program behaves consistently with its specification” (Berry, 1992). By verification, it means that the system does not contain “bad software requirements (incorrect, incomplete, ambiguous or un-testable) and non-compliance with the system functional and non-functional requirements” (Thayer and Royce, 1990). So a Requirement is defined by its proof, and needs only to refer to the specification, which is a machine centred concept and is based upon design rules and Requirements laws that relate to an independent existence.

8.2.3 Chapter 3: Examining the belief held on the Requirement theory

This short chapter provided links connecting the two separate phases. The first link established the theoretical link of the Requirements theory, following on from the discussion in chapter two. The second link established the reasons for a presuppositional research approach into the [phenomenon of Requirements].

The Requirements laws exist because of their independent status that is abstracted from the discourse of the real world. But, just because we hold a belief to be true does not necessarily mean that it is true. For the necessary assurance Requirements depends upon the use of the justification by application of the correct method; by designing systems, and by using the method that can and will make allowances for human frailty. The underlying belief is that the process must be correct because the links of the theoretical concepts of what a theory should do (section 2.5.1), which are the first three components of an ‘ideal theory’ as previously discussed: (1) explicit, (2) universal, and (3) abstract (section 3.3.1). So, a justified belief must make reference to causes of belief. But this presents the problem of the mask of Requirements: The

‘How’ already has an implicit assumption of the ‘What’. The crux of the matter is an inherently ‘dangerous’ assumption, already insightfully recognised by Weber, who maintains that the ‘*ideal type’* and ‘*reality’* will be confused with one another. The argument explored in chapter three sought to expose the area of concern here, noting that this lay on top of irrefutable philosophical positions. Further, it is apparent that the domain of IS research, seeking reassurance in Science, has been caught up in this debate, with the flashing of the methodological issues that have always appeared, for this researcher, to fudge the issues. Thus begging the question, and underpinning the research approach of this thesis, of using reduction ad absurdum.

8.2.4 Chapter 4: Phase One: Mindset free of presupposition

This chapter started the next phase of the thesis, seeking an un-prejudiced and pre-suppositional position from which to proceed with the inquiry, establishing an attitude towards the understanding of the inter-subjective actions involved in the sense-making moments of a project group forum that was responsible for an IT project. The second phase sought to understand:-

‘What-is-it-that-people-are-doing-when-doing-Requirements’

This needed to be a presuppositional approach, following Schuz’s position as; the arrangement that sets out with a pre-suppositionless philosophic position to study common sense, starting from the spatial and temporal dimensions of the life-world (Schutz, 1962). The perspective drew upon the studies of 'ongoing accomplishments' (Garfinkel, 1967), to look at the work undertaken in the actual methods whereby members of a society, lay or professional, make the social structures of everyday activities observable (Garfinkel, 1967 pg, 75).

8.2.5 Chapter 5: Phase One: The case study analysis using workbooks

There were three parts to chapter five; 1) to introduce and give an overview of the case study. 2) to expound further details and develop the research approach and 3) to discuss critically the collection and formation of the data set.

The case study

The case study (section 5.2) took place in a large metropolitan local authority, Springfield (pseudonym), that was responding to central government five year initiatives on e-government in setting up a number of projects to improve local services. The case study that the thesis reports upon is a project that the chief executive created. The research follows the actions of a board specifically organised to oversee the web based project. The remit of the board started with a vision statement brief to produce a ‘Web based system’ for the council members, to use in their management of casework. The ‘stated’, purpose and aim for the project was to ‘computerise’, to assist and propel, the ‘councillor’s work’ into the 21st century. The given “vision statement” was referred to and re-used throughout the project, often acting as a triggering event for the topic of conversation as they worked through the realisation of an IT project brief.

Justification of case study

A highly detailed case study is needed to understand the phenomenon of Requirements; that is, one without having a presuppositional disposition towards the Requirements process as currently understood in the domain of Requirements. Therefore, the aim of the research approach was to capture naturally occurring data, and use was made of the mundane conversations of the group of people who were involved in formal meetings organised and legitimised to carry out an IT project.

The project group, a specially created board, controlled all aspects of an IT project, the finances, project management and the overseeing of Requirements elicitation. The board was composed of key executive management decision makers, brought together in monthly meetings over the course of a year to initiate, manage and oversee the production and implementation of a Web enabled Management Information System.

The case study material data-set spanned the entire length of the project from the first board meeting, the project commissioning day, to the project board handover meeting and the ensuing phase two development.

The wider implications of this research reflect upon the E-government strategy, organisational IT strategies and IT integration. From an IS perspective the case study displays that a deeper understanding of contextual influences are needed.

Key points

1. Ongoing restructuring of the IT department during the project life cycle affected the changing responsibilities that people had towards some aspects of the project.

2. Vacant posts, especially that of the director of IT, left the responsibility of the project direction to the second tier management, giving rise to strategy implications.

3. Changing personnel of the project board; notably the project manager change half way through the project; the two project managers had very different approaches towards the project management, leading to very different effects. The first one, covering the first six months, had a soft systems approach seeking stakeholder agreement. The second project manager, on a six months contract, utilized PRINCE2 ‘to run’ the project. Both scenarios had faults and further implications.

4. The project presented a fundamental technical challenge; The IT department at the time was not ‘technically’ in a position to facilitate a web based approach to home working.

5. The IT department became beset with on-going ‘technical problems’, often presenting what appeared to be fire-fighting type manoeuvres framing some actions, and these continued throughout the duration of the project, as they sought to resolve the emerging issues.

6. The web like entanglement connections that a ‘simple’ IT project has with the multifaceted aspects of organisational activities are far more multitudinous than realized and accounted for in the IS literature; making a ‘simple’ bounding remit very problematic.

7. Control of the infrastructure scopes the capabilities of the project and abilities to define the Requirements. Thus highlighting that Requirements is not an independent concept; Requirements are very much framed by the operationalization of the technical infrastructure, which dictates many of the antecedent conditions whether technical, project group or organisational, all of

which are intricately intertwined into the contextual conditions in which the process of Requirements is said to be taking place.

8. The software programs cannot be thought about as autonomous models, as programs have to access data, and need to cut across many organisational structural silos, to communicate and be interoperable with other software programs. Implications for all software development in Web type development thinking is the interoperability of data.

9. Security is used as an excuse, or as a reasoned factor to scope, or rather de-scope, in control of the Requirements remit. The justification is the use of security which can limit user needs and demands.

10. The question emerges of departmental control; in the software that they choose, or would like to operate with. This formed a clash with the 'strategy planning' of the central IT department in its desire to coordinate an overall organisational IT strategy.

11. The contracted Requirements consultant/analyst specialist does NOT scope or elucidate the Requirements, as the IT literature would have us believe.

12. Non attendance of meetings is a strategy manoeuvre to maintain control, especially if a gatekeeper.

The research approach

The primary data source was in the recordings of naturally occurring conversations. Studying the process of actions that were occurring in natural conversations, where 'how' is ineluctably intertwined in supplication of the process of 'what'. For this research thesis, the research approach was of 'emergent thinking actions', aiming to produce an audit trail that would be used in the next stage of analysis.

The research approach bracketed out the essences of conversations, or about-ness, focusing upon the topicality, imposing a systematic analysis framework to examine the production problem, that is, it sought to scrutinize the realisation of the project. This approach sought understanding of 'their' intersubjective sense-making of the understanding of 'How' the activities assemble themselves in orderly ways.

The critical discussion of the data set

The third section of this chapter critically assessed the research database 'tabular' materials dataset. One of the key research data analysis issues that has been raised in this thesis concerned the problem of collecting data and the possibility of misplacing the temporal positioning of it. The critical perspective taken was in respect of the validity of the data collection in relation to the ability to accurately recall past events. The contention is that the post-hoc data could contain temporal distortions and have an added reflective attitude, or a glossing which would imbue a possibly incorrect label attachment, leading to incorrect attributions of motives. The analysis concluded that the data set of taped interviews cannot be used independently. Interviews have to be used in conjunction with other 'valid' sources, although these can give rise to further problems of triangulation. A comparison was made between 'live-recorded events' and 'reflective post-recorded', reflective interviews and this revealed a strong potential to produce different research findings and connotations. Three key issues emerged;

- The question about the 'capture of the temporal perspective' of the interview; as a different research perspective could have emerged if the interview had been taken at a different time or on a different day.
- Concerns the addressing of the audience that the interviewee is performing for the researcher.
- Nothing extra is revealed in the interview that the actual transcripts do not expose.

Together with the transcripts, over 100 documents of the project group were collected, which fell into two types; firstly as paper presentational items, providing a public face and information and the outcomes of the workings of the group to 'outsiders' of the group, with the reports and paper productions performing the role of "informational" and "publicity" outputs. Secondly, artefacts were utilised as part of the operationalization of the project, such as agendas, project plans, minutes and emails; these documents were aids to the work in hand.

8.2.6 Chapter 6: Workbooks and analysis of phase one

The research design developed the analysis approach of 'Workbooks' (section 6.1). This was a multi-perspective approach to effect a step by step iterative investigation into examining the evidence of the structurational building blocks that were made by people involved in the-doing-of-Requirements.

Key Research approach aspects

Methodical approach to presenting the data

Iterative learning spiral of two stages

Stage 1 – Topic selection

The forming of [Bracket]

A [Bracket] is composed of =

[Bracket opening] + [Subject Topic] + [Bracket closure]

Stage 2 Work book analyses six perspectives

1. Key Triggering Events
2. Key Actions and Events
3. Key Methods
4. Key Structures - Key Resources
5. Key Consequences

These five aspects are then summarised into the phenomena of the [Bracket]:-

6. Key Sequences which equals the meaning to the [Bracket]

The research design aim sought to comprehend and firmly establish “the meaning”, or Verstehen of the ‘about-ness’ of the phenomenon, where the-doing-of-Requirements-is-said-to-be taking place, by principally utilizing a research approach that fractures and frames the naturally occurring data set into the topics that the people themselves discussed in their conversations in the emergent sensemaking process of intersubjective communications. The result produced [Brackets] of reference material, which is a resource capable of further examination, and deconstruction via a structured analysis through five perspectives. The outputs of this stage of analysis produce phenomena of interest, both individual phenomena and temporal forms of production, and also reveals the unfolding of proceedings, plans, actions and shows the working intentions of the people involved.

The key processes found in the case study were; the governing phenomena (6.2.1), decision making process (6.2.2), designing phenomena (6.2.3), the sense making process (6.2.4), and specialised process tools, labelled as the ‘left over bits’. These were uncovered in the [Bracketed] phenomenon by Tagging the uncovered individuated phenomenon, as a collection potentially belonging to process of like minded ‘processes’. However, formulating beyond like minded recognisable assemblages could be potentially misleading; in that such a rich and varied data set is open to manipulation. Consequently, apart from the project management process of PRINCE2, which was used as a test to the analytical framework in chapter seven, the associations of key sequences to theoretical concepts were loosely connected to the academic literature.

Key aspects of process findings

Governing process – example

C	what I would like to do is to look at the list of functions that Members want (.) to look at what you are proposing here in terms of a phase development and look at what SOFTPOINT can offer us immediately
K	this is a cross tabulation…
C	that is right (.) yes (.) and then to make a judgement on the basis of that=

Text Box 8.1: [T16-B3-L159-165]

Decision making process – example

C	OK (.) so we have threshed out some of the key things that we need to make sure that we pick up….keep it simple (.) yes? …..so a basic system is what we are looking at…..we have…four options….one is SOFTPOINT …the other is developing this with SOFTCO-UK ///// …or another developer or in-house (.) or this kind of PIM/SOFTPOINT combination of….

Text Box 8.2: [T16-B4-L108-119]

Designing phenomena– example

Q	one of the requirements of sharing (.) was that by default the cases belong to an individual Member but there are circumstances (.) say (.) when they make those cases available to a group (.) be that party or even a group…..they want to ability to say I want this group to have full access…///// … to this particular case….they want to decide on a case by case basis whether or not it is only themselves that access…

Text Box 8.3: [T16-B4-L42-53]

The sense making process– example

Q	….what I did and the thing I circulated (.) I don’t pretend that it is a detailed requirement but we wanted to produce something that we could basically show to people to get them to give estimates (.) costs and times to produce (.) …..

Text Box 8.4: [T16-B2-L9-11]

The ‘left over bits’– example

C	I think what we said was that there would be some big messages about IT’s (.) the way that we do business but then to follow that with some other outside the main Induction programme (.) some specific training for Members who need it (.) we are looking to a change of some 30 or 40% of the Members in the new administration so (.) you know (.) there may be people who are more IT literate or less so but I can’t imagine people being less than Xxxxx Xxxxxx umm (.) but (.) you know (.) we will just have to wait and see what we get

Text Box 8.5: [T16-B8-L31-38]

The key finding from this chapter leads to a proposition that the theory of Requirements, from an IS perspective, is inadequate. A version of requirement-ing was taking place, and the conclusion from this first phase was that the Requirements phenomenon did NOT appear to exist, as a distinct process. The verdict upon the actions was that Requirements was something that members of the group added as a label, ‘a requirement’ to finalize or end a discussion, and also that it was used to justify an adopted position.

Q	…..so (.) this is where we are at the moment (.) we have got something that we can show people (.) we are already getting quotes on it (.) It is really a question of what we want to do now (.) I would take the view that if we can get SOFTCO-UK (.) get an agreement with them or are happy to go with them then given the time we have got available I think we should get them to start working on a spec for us and then take it from there (0.2)

Text Box 8.6: [T16-B2-L45-50]

Later on in the same meeting Q (the Requirements analyst) lets slip where he drew up the initial outline plan from.

Q	I don’t envisage that will be a final design (.) it was just really mainly taken from the existing system that is in use (.) the data that is provided and I very quickly put it together in a structure but it is just something that we have got to compare with existing systems…..

Text Box 8.7: [T16-B13-L12-15]

The prominent finding that clearly stands out from the evidence and analysis of the case study; is the ability of the ‘key’ people to select and present a fact from a context of facts. ‘A’ person states the requirement, because it emerges from awareness of the moment in which to place an opportunistic spontaneity of their position which would satisfy their own project.

Only when an intended project is going against their position of interest are other tactics are brought into play. In this case study the main tactic being the use of the interrupt.

C	=can I just raise a couple of issues on this (.) I know you said that we don't have an off the shelf product that we can pick up=

Text Box 8.8: [T16-B3-L3-4]

But there was wide spread evidence of other manoeuvring such as; deferment to experts (who had been briefed).

C	well what I would like to do is I would like Dxxxx to see it because he has done a bit more work with Bxxxxx and stuff to see whether the core function things are covered here

Text Box 8.9: [T16-B3-L81-83]

Non attendance (deferment gaining time and sub-meeting).

M	I don't know if Uxx is coming or not – I have not seen him
C	Right … (0.6) shall I give him a ring – C (went out of room)

Text Box 8.10: [T34-B1-L9-11]

V	………whether we are up to schedule or not because I feel that time is getting short
Q	It is and I was hoping Uxxxxx was going to be here but as far as I……..

Text Box 8.11: [T16-B14-L4-7]

Drawing upon company policy procedures were among other tactics commonly invoked to affect the requirements elicitation process.

C	….but I think what we do need to be clear about is the minimum standards that we would expect or the kind of things that the computer needs to be able to do to access what we are offering. OK .. A couple of other issues that ….

Text Box 8.12: [T16-B10-L116-118]

In terms of answering the research question of; How does [phenomenon of Requirements] become operationalized?; firstly the whole case study encompasses the context of the phenomenon of requirements. One proposition suggests that Requirements exist only as a functional part which can be found in other major processes, and another finds that the Requirements concept exists as a distinct process which is still somewhere hidden in the detail; consequently, the task of chapter seven was to identify the relationships that exist between the practical recorded actions and that of the theory of Requirements.

8.2.7 Chapter 7: Phase Two: Operationalized [phenomenon of Requirements]

Phase two analyses focused upon the theory of Requirement operationalization, specifically the relationship between the theory and practice. This stage sought to see whether the theory explains the behaviour of the people doing the task of scoping and defining requirements, the working assumption being that people ‘act’ in the world according to and underpinned by their beliefs; the main assumption here being that they have a belief in the laws of Requirements.

An analytical framework was adapted from the work of Janis Groupthink and was redesigned to ‘empirically test’ the Requirements theory, and show how it could be seen to launder the brute-facts. The actions that were tested were bounded by the immediate context of use which was determined from the semantically empirical data analysis of [Bracket-ing] extracted from the workbooks. The analysis task was assigned to the role of requirement-ist judge or auditor in asking whether or not the key tokens of ‘process’ were admissible and recognisable as correct actions in terms of the Requirements law. The role of the requirement-ist was to follow the causal connection, to distinguish, identify and examine the actions of Requirements, analysing the detailed members ’practical accomplishments’, and to determine whether the actions performed by the actors in the case study would count as commensurate or incommensurate Requirements.

From the analysis of the case study it was discovered that a Requirement was never independent from the implementation details, its context constraints, the localised regulations, existing and anticipated other systems, both IT or other manual processes, and crucially was always subjugated to the sphere of influence of the person who held the delegated position in the organisation to control the resources, financial, technical and the people who were directly connected to the Requirements in the project. This would not be the project lead person in charge of this project, nor the project manager, nor any of the Requirements analysts; their remit of operation was wholly dependant upon the good-will of the organisation’s managerial position, that of the acting head of the IT department.

H	…….surely there are people you can contract IT support from?
U	yes (.) we’ve decided we don’t want to do that (.) it’s too expensive
H	too expensive
C	yes (.) ohhh

Text Box 8.13: [T23-B5-L62-68]

The ‘What and the How’ were thoroughly intertwined, always from a given perspective, and in this case study the IT resources of infrastructure and structure shaped the perspective given, as in the example below of the IT justifying their decision on a particular option.

J	= yes (.) yes (.) certainly from our point of view (.) I think the worries were that we're going to end up wandering down a sort of technical backyard (.) here=

Text Box 8.14: [T23-B10-L22-23]

Because of technical know how, technical resources, and people who had the knowledge, the control was from the technical perspective, so that it's technical proficiency and rationale was, 'we do it this way'. Anybody who wished to challenge this would automatically put themselves outside of the technical organisational norms of 'this-is-the-way-that-we-do-it-around-here'.

In an atmosphere of compliance with professionalism, of rules and norms, and the distrust of individuality, to do otherwise than conform is potentially placing oneself in an uncomfortable position.

> *But what makes Requirements as a design concept inadequate, was not the politicking, nor the lack of communication, nor other things like these, as these hypotheses should be considered as just other symptoms of malaise but was the fact that the Requirements design process itself failed to positively determine that a Requirement is a design process.*

8.3 The implications of the Thesis work – 'the dilemma for IS and IT'

The review of the thesis in this chapter is underpinned by the ethos of the research strategy to formulate a coherent answer to the research questions; what are [phenomena of Requirements] for IS? And How does [phenomenon of Requirements] become operationalized? Answering the latter question clarifies the answer to the first. The thesis tested the Requirements itself, using the Requirements laws, the Requirement process being the program. In the making of the specification it is revealed that the tenuous link between the theory of Requirements and its practice is not assured; that the operationalization of the theory (chapter 7) has the wrong causal connections, resulting in incommensurate activities within the bounds of the operationalization of the theory. The linkage that is inferred can only be made through ex post facto justifications, but this does not necessarily mean that the knowledge was held and was in place in the first instance.

However, the incommensurate activities are congruent and are possibly accountable within ‘other’ theoretical constructions belonging to ‘other’ processes, as recognised in chapter six, but stating what the actual ‘other’ theoretical conceptual connections are, is something as yet not identified, which is requiring further research. The strict interest, for IS, is in the soundness or otherwise of the theory of Requirements and to determine what the [phenomena of Requirements] are.

The remaining part of the thesis is to finally complete the explanation as to why [phenomena of Requirements] for IS results in a dilemma, and how the conclusion of the thesis places Requirements as being in a dilemma. Consequently resulting is a position that rejects the current stance that is adopted in IS towards Requirements and which calls for an alternative conceptual worldview upon the process of IT integration into organisations that are based upon IT; as a service and not as a product.

The attempts to ‘bridge’ the gap between IT and IS is a false dilemma, the issue and explanation is in section 8.3.1 and 8.3.2. The underlying problem was found in the concept that extended IT into the social and organizational context (Angell and Straub, 1993), but which has not been previously explained and this leads to a surmising that this is a false dilemma, because the process of Requirements uses the same justification principles as the core IT foundations (section 3.2). This would explain why the concept of Requirements is prone to failure. Whereas the liquidity of the exigent Requirements means that, the real dilemma is between the actions in life world and the endeavour of the process that substitutes a Requirement with the objective structure of a product.

The thesis showed that the methods, tools and approaches, as proscribed and underpinned by the science of rational action and engineering principles, lead to an excessive belief in the power of scientific knowledge and techniques to ameliorate or sanitise the risk of failure by employing the concept of design (section 2.3.2 & 4.12). In the thesis, the laws of Requirements are challenged in section 7.3.2; with the realisation that the Requirements theory, is showing the belief, and that the law that is being applied to the token example, is blind to it’s deficiencies.

The causal connections can not be clearly shown, and even if or when they could be shown, ‘other’, life-world influences corrupt the requirements process to such an extent that the laws become meaningless (section 7.4), which is not acceptable to Science (section 3.1). This contributes to the explanation of why this is a dilemma. However to explain why this is also a false dilemma for IS there is a need to return to the 'What–How' question (section 3.6).

The question of why it is a dilemma (section 8.1), rests on the fact that Requirements has assumed IS-IT to be an intervention design process. Conventional literature on Requirements propagates the claim that the 'need' is to solve the Requirements 'problem', with due justification and assumption: that "without the Requirements specification's explicit statement of purpose the designer may solve the wrong problem, a state of affairs that often leads to disastrous consequences" (Roman, 1985). Specifically the Requirements "problem", 'can be solved' by the application of a system engineering approach (Thayer and Royce, 1990), these problems 'can be solved' from this frame of reference and in requirements engineering it is the 'conceptual model' which is used to understand large, complex problems (Yeh, 1990).

This framework for the design and building of a concept model consists of three dimensions; the representation dimension, the specification dimension and the agreement dimension (Pohl, 1993), which can be easily mapped onto the theory of the Requirements' three laws of; we can solve the problem with a product, we can get the Requirements right and we can get the stakeholders to agree (section 2.6). It has been argued in chapter four that IS and IT have been inexplicably bonded together in the methods of Requirements which is found in the exposition of the 'What-How' problem.

The fault is that the design process of Requirements leads to the idea that abstract thinking is considered to be the objective or an end, rather than as a means towards an end. The thinking leads to an 'abstraction of', being a planned responsibility allocated to the information artefact being specified, and this inevitably results in regarding people in the life-world as robots or as occupants of a machine. The technological imperative, being causal, is also where information technology is viewed as a cause of organizational change (Markus and Robey, 1988). The Requirements system is claiming to be the tool for designers of information technologies that can enable them to capture the motives and actions that bring about organizational change and match the organizational imperative. This works at the expense of other serendipitous or spontaneity of practical life possible productions of order.

Consequently, therein lays the ambiguity of the real dilemma, which lies in the thinking that presupposes that the life-world is designed, or that its design process only needs to be understood, as this prerequisite is necessary to replicate the life-world if and when it requires improvement. It is not just that this is faulty or mistaken thinking, but it is perhaps mistaken theoretical reflective thinking that is assuming to be of an elevated type as compared to that which is born of practical accomplishment.

The Requirement dilemma is without resolution, because of the inadequacy of proper definitions of the boundaries, because of the acceptance of unproven assumptions, and because of the misuse of language, in that we assume that we know what information actually is. That we assume that software is the building of hard artifacts, etc, with all being underscored because of misalignment of asymmetric formulations in theory making, and in the process of theory using, and all just because of its justification principles. Specifically for Requirements, the false dilemma and the source of confusion is in the intermixing of the technological imperative and the organizational imperative, which is simplified into the IS and IT perspectives.

Fundamentally: these two assumptions are incompatible with each other, hence the making of a false dilemma into a true dilemma. The juxtaposition of two different world viewpoints, of a life-world and the natural world, throwing up the anomalies of mis-understanding in the stocks of knowledge which have been formulated into the theories in which we hold beliefs.

Dilemmas require "reformulation" and "innovation" (Longley and Pruitt, 1980), consequently in presenting the dilemma it fundamentally questions and challenges the status quo. The domain has to be asked to stop and think, and to explore new and different ways of looking at the problem, or rather of seeing that the problems need to be solved in different ways. The thesis has challenged the belief, showing by a vigorous demonstration that the current belief of the dominant approach is epistemologically false. The present discipline of Requirements obscures the actual work of scoping, defining and elicitation of requirement-ing when applied to the life-world and when involved with determining an IT system for an organisational use.

The real problem of the dilemma is; that the proper function of imagination is a vision of realities that cannot be exhibited under existing conditions of sense-perception (Dewey, 1910).

8.3.1 IT imperative process of requirements

The diagram of 8.1 depicts the IT imperative process of Requirements, the basic premise being; the production of a specification for a product, together with the two other Requirements imperatives of correctness and agreement. The objective of the Requirements process is to produce a ‘product type’ for use in an environmental setting.

Accepting the current Requirements definitions (section 1.2) means accepting that the process is dependent upon it’s method and that there are methods by which a trained skilled analyst will be able to ‘discover’, capture and conceptualise a stakeholder need in the agreed form of an analytical model, and that when built, it will solve the identified problem with a product solution.

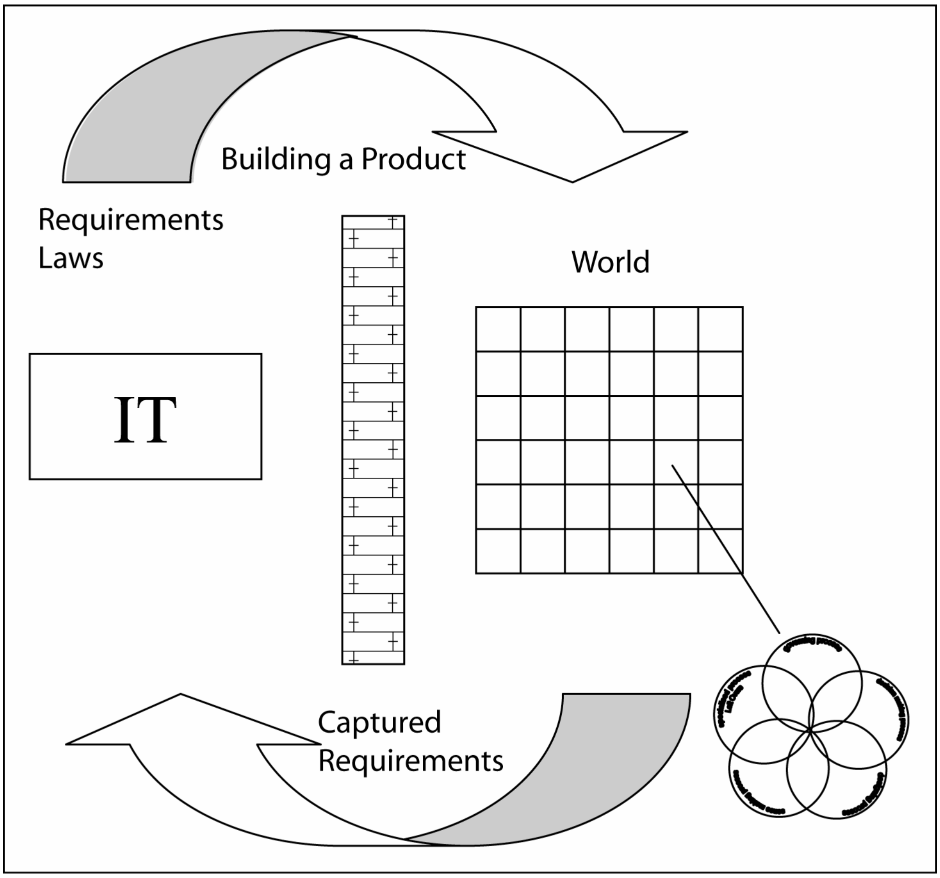

Figure 8.1: IT imperative process of requirements

But the requirement-ist would have to argue that the five other processes fall outside the ‘scope’ of the context domain of Requirements, therefore there is a very strong incentive to draw in the horns, to limit or redraw the boundary and become externalists by reducing what we require for justification, hence the wall. Indeed that is exactly what chapter seven did in its analysis, in order to match the data from the tokens of the case study so as to meet the Requirements laws. However, the acceptance of this requirement-ist traditional position has problems, in that eventually the advocate will have to accept that there are no psychophysical laws, and so will adopt a belief of anomalous monism.

The implications for IT are that IT would keep the current definitions, but stay true, correct and adherent to the underlying philosophical position, and that the caveat proviso would confine its influence specifically to the specification of a product. The postulate would claim that IT success is in producing COT's systems although they have only limited tailorable interfaces or determined acts in human computer interactions.

8.3.2 IS imperative process of requirements

The diagram 8.2 depicts the expansion of IT to encompass typicality found in IS social issues debates. An example of such an epistemic position is found in the notion of the design of a product that will perform the role of an actor in a system that is capable of being an informational exchanger, taking a given that information is data plus meaning, and using definitions of the IS process that defines information itself as a product that can be manipulated by systems. At base is the approach of IT defining information, together with the context of its use, consequently justifying its extension of expanding outwards, together with its claims to be able to define the world through the rational process of scientism. For IT this is not considered to be a task appropriate to meta-ethics but of finding normative substantive conditions that can determine when an action is right according to the requirements laws.

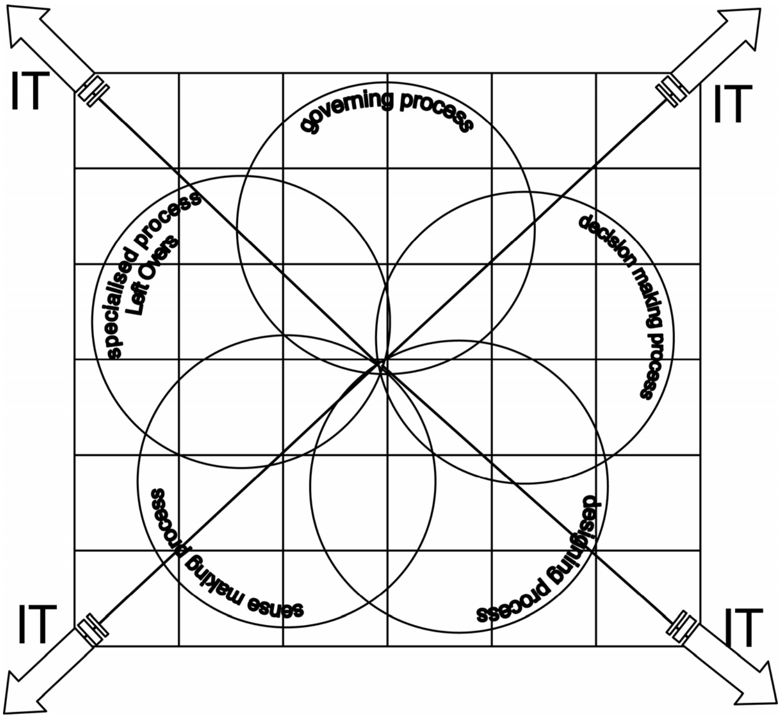

Figure 8.2: IS imperative process of requirements

The attraction of having the aim of achieving an integrated approach is clear, as it would provide a clear concept linkage between stakeholders, the organization and the IT systems. However, the downside of this is the reliance upon supporting social theories in a web like or framework set of interrelations. And although these social theories are numerous, the commonality is homogenous with the IT imperative, in that they have the same defining characteristics; which are those of prediction and control, and cause and effect, that is to be accomplished by the rule of law. This is reflected and captured in IS research using the processes that reproduce the same structures.

The structure of nomo-logical generalizations, critiqued in chapter three, drew to attention the difficulty of constructing and binding discrete parts together, forming a meta-framework, the main problem being maintaining coherency across the whole structure. The often used justification in IS seeks to resolve this issue through contingency, and in that knowledge is just one relationship between facts, among many others. But this attractive feature is its very downfall since the causal relationship is not dependent upon necessary connections, thus this is resulting in the making of false claims.

The problem becomes acutely highlighted when, returning to the role of the system, with an actor distributing information as a product, and the Requirements process purporting to adequately capture it. The end assumptions are made about the nature of information, its uniformity, its neutrality, its lack of prejudice that the information is definable, and that its meaning can be fixed or frozen, however, these direct causal lineages are soon lost in chaos or noise as each single relationship between facts soon becomes one among many. So the laws of Requirements become corrupted, consequently a Requirement is selected from the context, as and when suited. As we are ignorant of the relationship, we therefore lack knowledge.

As chapter seven has remarked, the main problem here is for IS to explain how the sum of the parts are capable of making the whole, as the amalgamation of the different processes involved clashes, are inconsistent, incommensurate, and display different aims. The common riposte in the Requirements literature is that the argument in IS Requirements is encompassed in the call for ‘better communication’. i.e. the ‘solution’ is…; all we have to do is improve the existing process of design, improve the model building, use better communications techniques, facilitation, codify good ‘work practice’, etc. The thesis finds little support for solving the [phenomenon of Requirements] with such endeavours while using the same underpinnings, unless the aim is to product the Weberian model of rationalized ‘iron-cage’, where each part has a defined function. Delaying the fixed point of the Requirements specification, through iteration or by deferring the design implementation will have the same consequence, which is that of accepting delayed gratification fulfilment of a Requirement, yet whilst still stuck in a psychological cage.

However, the post-modern turn justification calls on understanding epistemology such as Structuration, which addresses the division between naturalistic social theories (Hemingway, 1999). But as this thesis has shown, this leads into deeper problems of understanding the constructive nature of humans in the life-world. Something that the thesis has demonstrated is that we posses only limited tools for such understanding, yet paradoxically we do make sense of what we do.

8.4 The contributions of the thesis

Apart from the four main contributions highlighted below, there have been a number of additional observations and explanations have been made throughout the thesis upon the [phenomenon of Requirements] and upon Research approach. For example:-

- The influence of project management styles using PRINCE2 led to exhibiting symptoms of Groupthink (section 6.2.1). The accounting practices of the PRINCE2 methodology make it an excellent blame allocation tool.
- Requirements ‘emerged’ from interruptions, opportunistic topic agenda grabbing or through authoritative pronouncement (section 6.3). When Requirements are pronounced, they are subject to the vagaries of a benevolent dictator who supplies software applications.
- The decision not to use COT’s software but rather develop a system, demonstrated that the scoping of Requirements is underpinned by political action (section 7.3.1).
- Research discussions (section 5.3) concerning the difficulties of interview data.

Main contributions

- **Formulate a working theory of Requirements**

  The approach collates the body of knowledge, from textbooks, academic literature, best working-practices and professional standards; The Requirements theory laws are:

  - We can solve the problem with a product
  - We can get the requirements right
  - We can get the stakeholders to agree

- **Develop a research approach – ‘Workbook’ ([Bracket], about-ness)**
  - The thesis develops a systematic approach to investigate the 'what-is-done’ and ‘how-it-is-done' from a pre-suppositional position.
  - The situated work examined the scoping and defining of Requirements undertaken by a project management board.

- **Modified a research analysis framework for testing the Requirements theory**

  An analytical framework was utilized to examine the causal connection of the actions in context.

- **Uncovering the five key processes involved in scoping and defining an IT project**
  - Governing phenomena
  - Decision making process phenomena
  - Designing phenomena
  - Sense making process phenomena
  - Specialised process tools, labelled as the 'left over bits'

  These demonstrated that the dynamics of Requirementing are context embedded and constrained by the technical infrastructure.

8.4.1 Formulate a working theory of Requirement

A major feature of the thesis was the need of a rudimentary, introductory 'working theory' of Requirements. This was constructed using the acceptance criteria that it was sufficiently complete and comprehensive in its coverage to have commonsensical appeal to both academics and practitioners. The Requirements theory objective was characterised as the process involved with control over the 'doing' of Requirements, meaning, the using of rigorous principles, and the commitment to those principles in applied practice in the form of a belief, united under the banner of software engineering, and further underpinned and supported by a science of software engineering, reflecting the image of the established sciences and supported by the establishments of academia and professional practice institutions.

Three principled IEEE requirements standards assisted in underscoring the Requirements process of design, supported by definitions and the generally accepted concepts found in the domain of software engineering and the domain of IS-IT literature studies. It was argued that a theory of Requirements was composed and governed by three laws that encompassed a continuum, the provisional Requirements theory;

• We can solve the problem with a product
• We can get the requirements right

• We can get the stakeholders to agree

The elliptical reformulation of the Requirements theory, exposed in the operationalization phase two research framework, displayed the corruption of the laws. The framework exposited that either the laws were being misapplied or that other dominating processes made the laws incommensurable.

With the first law, 'We can solve the problem with a product', defective Requirements were shown when the objectives (requirements) referred to were ones that the project group had chosen and advocated as the solution. Defective, in the way in which IT had produced a report, while the remit and the Requirements themselves had not been discussed or even elucidated. The document produced was an 'estimate' of the Requirements (as IT determined), put together with the aim of estimating cost (cost driven approach). The 'main objectives' were already decided upon by the group; they had made a list of the requirements and necessary functionalities themselves. They had set the goal, agreed the rules of the game and also decided how it should be umpired.

In the second law, 'We can get the Requirements right', common types of defective requirement-ing occurred, some of the types of examples are: a) Breakdown of communication, b) Non-attendance, c) Misunderstandings, d) Garbage can decision making or bad decision making, and e) Inefficient use of time. But this masked the incommensurable activities, the intertwining of the 'What and the How', especially prominent in the use of the 'security' justification for not selecting a course of action.

The third law, 'we can get the stakeholders to agree' firstly confirmed Beath's and Orlikowski's (1994) observation that "users are given a relatively passive role to play during development yet are expected to 'sign off' the Requirements documents, such a position is problematic" (Beath and Orlikowski, 1994). This also confirms by Hirschheim and Newman's (1988) contention that user resistance to change model for IS failure is still a valid model, as systems development misses the richness and complexity of organisational life. And at the same time it severely questions the 'modern' concept approach of agile or lightweight approaches with a strong emphasis on customer interaction. The main issues being that the validation cycles may well satisfy the first two laws but still leaves open, with little resolve, the conflicts between stakeholder requirements in organisational settings.

The only way to show the causal effect of the Requirements laws was to deny the existence of, or attempt to explain away, the defective requirement-ing and the incommensurate activities. But, on the other hand, the appeal to ‘contingency’ type and the nature of the activities being fortuitous offers little respite as it cannot confirm scientific principles of standards of truth, eventually leading to the impersonal Nietzschean stratagem of the exercise of power over others.

A contribution of the thesis is found in the riposte to the argument that the traditionalist would advance, claiming that the thesis activities are defective, brought about inefficiently or are just badly applied requirement-ing. The thesis has found that we can discount this counterclaim, and with it, the justifying clarion call for the application of more rigorous prescriptive approaches. For the same reason that a bad work-person blames their tools, the incompetence is falsely ascribed to the tools, in which case, Requirements method is not necessarily wrong. The problem is the unfitness in the process of the requirements belief which will lead to the impotence of the process. Echoing Zaner ‘s (1970) position; ‘if reason is restricted in its legitimate employment only to the sphere of empirical science, that very restriction is self-contradictory and makes that science impossible’ (Zaner, 1970).

8.4.2 Develop a research approach – ‘Workbook’ ([Bracket], about-ness)

The thesis noted that there is the problem of how to study the human centred activities that are made in the real life-world, especially concerning the intersubjective sense-making actions. The need was for a research approach to examine these interactions, marking out and preserving the original temporaneous sensemaking moment that is made in the project of the Requirements phenomenon.

The issue faced in the research approach was to take a step back from the current approaches and thinking used in ISR methods, because firstly of the need to understand intersubjective sense-making and secondly, because a strong link, containing the same assumptions and intertwining ISR methods can be found in the Requirements approaches. Consequently, the discussion in the thesis incorporated a methodological level of research methods together with the appropriate philosophical foundations.

The primary problem was; how to study the phenomenon of Requirements and capture the conditions that are present during the Requirements process. This was achieved through the concept of [Bracketing], an intrinsic aspect of the research design developed though the concept of Workbooks. This specifically structured method was developed to interrogate (format and make sense of) the observations on naturally occurring recordings of the 'what and how' from a pre-suppositional position, empirically unpicking and dissecting what is in effect a supposedly causal relationship, however, upon closer inspection these moments became spirals of horizons that soon become too multitudinous to remain meaningful if viewed as a separation of theoretical concerns.

The developed approach was driven by a fundamental alternative concept; that there is a difference found between the ‘after-account-of’ and the ‘account-made-in-the-action’. This was demonstrated by comparing interview data with the actual occurrences in the locally produced extemporaneous life-world intersubjective moments during in the ‘context of discovery’.

By concentrating upon the structurations processes, linguistic typification of its constituent phenomena emerged from the actions, which revealed the actual gearing people make into the life-world of relationships. The like-minded processes are recognised as familiar typified tokens used in normal discourse sense-making because we are all part of the same world. Except that the researcher has become ‘tuned-in’, or sensitized because of the ethnographic ‘how strange’ and through iterative analysis process of rewinding and re-playing the [Bracketed-out] human act performed within the real world setting, repeated until sense is made and Verstehen understanding reveals itself in a clearing, or stands out from it’s camouflaged concealment, thus unmasking the phenomenon.

The results of the approach produced and exposed the working processes exactly as they were, as stand alone brute facts, with exposed in-order-to-motives infinitely rendered, accomplished by the manifold interplay of the dynamic processes. These were overlapped, layered and intersecting processes, intricately interconnected, with multifarious threads of topicalities, which could be untangled, not with tools, but by common-sense understanding, and reasoning.

8.4.3 Modified a research analysis framework for testing the Requirements theory

Chapter seven squared-up to and faced the phenomenal findings that emerged from the detailed empirical structurational analysis of chapter six. This previous chapter had raised the ambiguous issues that could be found within the actions of the Requirements process. The task was to explain the behaviour of the people doing the task of scoping and defining Requirements from the perspective of the Requirements theory, whilst still assuming that the Requirements theory was correct.

The analytical framework adapted the Janis 'groupthink' framework, echoing an explanatory correlation between the antecedent conditions and the observable consequences of decision making. The perspective taken was that of a requirement-ist judge, to adjudicate whether or not the 'process' that was invoked was admissible as being 'correct' in terms of the spirit and events of the Requirements law.

The data evidence was supplied and bounded by [Bracket] topicality conversations that had been analysed in chapter six, recognising that the conversation was 'about' the subject, and involving 'what-is-done' and 'how-it-is-done'. However, after pilot testing, the topicality of the [Bracket-ing] granularity was considered too coarse, the exact causal connections could be open to misalignment, so out of each [Bracket] selected key tokens of actions that accurately reflected the [Bracket] actions were used. At this detailed level the causal connections of the actions were judged, and it was deemed from this that the case for the claims for a predictive, explanatory Requirements theory are un-proven.

8.4.4 Uncovering the five key processes involved in scoping and defining an IT project

The live recordings of meetings produced a data set of depth and richness that challenges traditional research approaches and methods if accepted as indubitable empirical evidence, that stands-for-itself and not as abstract typifications or representations, or interlocking networks of norms. It turns out that this is not a limitation; rather the quiddity is found in the understanding of the practicable activity undertaken in the constituting of the phenomena. The conversations, pauses, grunts and moments of laughter are brute facts of intersubjective meanings. These are in short; real time journals, and snippets of social practices that offer an alternative outlook and concept thinking.

If cause and effect is to be shown then this can only be localized, the cause within the reach of the immediate preceding inter-exchange and the effect continues until the topicality of conversation is terminated, or when a new topic of conversation is initiated. The question is whether people are influenced behaviourally, acting and responding to a given set of overlapping set of abstract meta-frameworks or, are people, in a specific sense, endowed with consciousness, and as captured in the tapes, simultaneously intercepting in face-to-face interactions, accepting that we all "coexist," in our respective streams of consciousness, working at a temporal cutting edge to reveal meaning.

The thesis has argued that a meta-framework construction is a confusing viewpoint to take, even perhaps a misleading perspective. Indeed, the thesis argued in chapter seven that the cause and effect relationship driven by a 'higher' structural level of control was in fact a misapprehension. Even if some sort of framework control could be shown to mechanize or control the process it would soon reveal signs of artistic corruption or of Groupthink compliance, as demonstrated in the thesis, as alternative 'intentions' emerge and jostle to change the perspectives of the IS-IT project.

This division between theory and data only concurs with approaches that emphasize a priori conceptual analysis or insist on a theory of knowledge that is independent of the particular details of a life-world. The thesis perspective of phase one offers an alternative fundamental starting position, attending to the pre-phenomenal and undifferentiated initiation of the investigation or of 'what-is-done' and 'how-it-is-done'. The analysis was grasped reflectively, in Schutzian terms as experiences in respective streams of consciousness, that intersect only after they are over and done with and their moment has passed, which differentiates it from the actual temporal sequence (and simultaneity). Understanding the difference of simultaneity and quasi-temporal simultaneity is a key concept to the analysis approach. The investigation focused upon the orderliness found in the activities of the people 'doing' a requirements project. This disengagement with theory driven inquiries that only perpetuate the dichotomy, lies at the heart of understanding the Requirements dilemma.

8.4.5 Finding the conjunction between the theoretical and the empirical

The thesis focused upon the elliptical interrelationship between the theory of Requirements and its practice. This started with the proposition that the theory of Requirements is a process for obtaining an abstract definition, this process is held as a belief, indeed, somewhat taken for granted in it's use as a justification for the particular purpose of obtaining a Requirements specification to build IT systems. The Requirements process makes definite statements that the process will lead to correct, complete verifiable statements; bound by rule-governed behaviour, something that Weber would call rational-legal. With these classical roots the assumption is that IS-IT researchers and system analysts working in practice, as a cohort, can move into the context of discovery and find not only factual social structure but also normative order.

Essentially, the 'What' cannot be exactly defined as the rationality of an engineering science of Requirements demands, because of the fluidity of Requirement activities of the life-world; the 'what' requirements process of elicitation is intersubjective, but that does not mean that there is no order or that there is nothing but chaos. No, there was indeed order at all points, to use disorder as a term, is misunderstanding it. Rather the life-world appears to be incommensurable to an ordered metaphysical reality, and this requires the Requirements elicitation process to be explained in rule or behaviour. The limit placed on the second framework was the extent of what could actually be seen or otherwise empirically tested from the remit of the Requirements warrant, as a logically prearranged theory. The captured operationalization processes found that re -specification further accentuated the ambiguities between the ordered elements and the substantive elements that had been produced endogenously.

The conclusion, through analysis, postulated that:

> *Requirements facts are selected, and this means that it is deeply problematic for a theory that supports processes that purport to uncover or elucidate the concrete facts.*

But further, the Requirements fact, or rather the process of requirement-ing, is a post-hoc rationalisation of itself. This 'fitting-up' of the facts, the dressing of the specification and the 'control-of' the Requirements process is subject to and subsumed under many influences. But especially prevalent was the provocative 'role' of control in the Requirements process by virtue of a person's position in the organisation. This was seen by tactics such as ‘non-attendance authority’, that by non-attendance of a meeting, ‘I’ can still control it’s outcome, as their viewpoint has to be accounted and accommodated within the group’s discourse. Another prominent feature of the ‘control-of’ the Requirements process was the assigning of tasks and the briefing of the analysts, which is usually considered to be the start of an IT project in IS terms, whereas, the evidence would suggest that the scoping of the project had already taken place and what was left was the designing of the specification.

8.5 Future research

- Conduct research into the processes found in Requirements elicitation, each of the five processes suggests further research topics.

- Use the requirement-ist framework to test other theories, the next candidate being the theory construction of project management. In Kloppenborg and Opfer (2000) analysis of project management research, spanning forty years, they concluded that they had nothing to report on regarding a theory of project management.

- Conduct research on why and how do people select products, and product adoption, specifically why and how do people choose a particular one.

- In chapter five it was noted that an unresolved research issue revolved around the presentation of data examples and analysis. Traditionally this has primarily cantered upon the written paper document, which favours traditional research approaches. However, with the advent of Wickies, Web 2.0 and other simultaneity and quasi-temporal simultaneity recording and presentational mediums of information exchange mediums research presentation of multi-media might facilitate a format applicable to multi material data sets.

- Conduct further research into the research approach of [bracketing].

End Note: Requirements are dead, long live Requirements

But, what happened to the case study?

The election night of May 1st was a disaster for the previous long term ruling party. Three months after the defeat, when the corrective maintenance was completed and the system was bedded down in use, there was talk of phase two. However, the new political party of power took the decision to scrap all of it. Therein lays another Requirement.

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