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Phenomenological Inquiry into
the Experience of Web Project Managers

by

Pradipta K. Sarkar
MS-CIS (Assumption University), BBA (Assumption University)

Submitted in fulfilment of the requirements for the degree of

Doctor of Philosophy

Deakin University
December 2003
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Abstract

The advent of the Internet and the World Wide Web has been instrumental in bringing about the growth in the implementation of web-based information systems (WBIS). Such systems are designed with the aim of improving productivity, data accuracy, and the reduction of paperwork and administrative overheads. Moreover, unlike their conventional non-web-based predecessors, the WBIS are commonly aimed at users who are casual and untrained, geographically distributed and non-homogenous. The dissemination of WBIS necessitates additional infrastructure support in the form of a security system, workflow and transaction management, and web administration.

WBIS are commonly developed using an evolutionary approach, whereby the version of the application, acquired from the vendor, is first deployed as a pilot, in order to gather feedback from the target users before the evolutionary cycles commence. While a number of web development methodologies have been proposed by existing research, there is a dearth of empirical evidence that elucidates the experiences of project initiators in pursuing the evolution of web services, a process that undoubtedly involves dealing with stakeholder issues.

This research project presents a phenomenological investigation of the experiences of project managers with the implementation of web-based employee service systems (ESS), a domain that has witnessed a sharp growth in Australia in recent times. However, the project managers' rich, multidimensional account of their experiences with the implementation of ESS revealed the social obstacles and fragility of intra-organizational relationships that demanded a cautious and tactful approach. Thus, the study provides a socio-organizational perspective to web projects in contrast to the functionalist paradigm of current web development methodologies. The research also confirms that consideration of the concerns of stakeholders by project managers is crucial to the successive cycles of ESS evolution. Project managers address stakeholder concerns by pursuing actions that are aimed at encouraging ESS usage, but at the same time, such actions can have consequences necessitating subsequent iterations of system enhancement and improvement. Finally, the research also discovered that despite the different socio-political climate prevalent in various organizations, in which ESS are being implemented, the experiences of project managers in dealing with stakeholder concerns can be captured and independently confirmed in terms of their perceived relevance and usefulness in problem-solving within the application domain.
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Chapter 1: Introduction

1.1 Background

The advent of the World Wide Web (WWW) and the emergence of Internet Commerce have given rise to the web as a medium of information exchange. In recent years, the phenomenon has affected the realm of transaction processing systems, as organizations are moving from designing web pages for marketing purposes, to web-based applications that support business-to-business (B2B), business-to-consumer (B2C), and Intranet-based business to employee (B2E) interactions, integrated with databases and other back-end systems (Isakowitz et al. 1998). Furthermore, web-enabled applications are increasingly being used to facilitate transactions even between various business units within a single enterprise. Examples of some of the more popular web-enabled applications in use today include airline reservation systems, internet banking, student enrolment systems in universities, and Human Resource (HR) and payroll systems, to name a few.

The prime motive behind the adoption of web-enabled applications are productivity gains due to reduced processing time, decrease in the usage of paper-based documentation and conventional modes of communication (such as letters, fax, or telephone), and improved quality of services to clients (Bodendorf and Saueressig 2000, Nambisan and Wang 1999). Indeed, web-based solutions are commonly referred to as customer-centric (Li 2000), thereby not necessitating a high level of computer proficiency. Organizations implement such systems to streamline routine transactions and gain strategic benefits in the process (Nambisan and Wang 1999, Rockwell 1998).

1.2 Purpose and Justification for the Study

Compared with the majority of traditional software applications, web-based information systems (WBIS) undergo a significantly different developmental process (Carter 2002, Stevens and Timbrell 2002, Russo 2000, Gordijn et al. 2000, Standing 2002). Fraternali (1999) states that the development of web applications is a multifaceted activity, involving not only technical issues, but also organizational, managerial, and even social and artistic issues. Requirements identification is one of the developmental stages where
this difference is especially pronounced (Overmeyer 2000). This is indeed true in light of the fact that WBIS services are often built for a specific business purpose by developers and then distributed to a broad and non-homogeneous client community over the web. This is why the requirements analysts associated with web development often fail to identify and characterize the potential users of their future web systems (Russo 2000). Literature on the development of WBIS reveal that to minimise the gap between assumed and real requirements, the WBIS systems are commonly “configured” using an evolutionary approach, whereby the version of the application, acquired from the vendor, is first deployed as a pilot system (Martin 1991), in order to gather user feedback before the evolutionary cycles commence (Fraternali 1999).

On the basis of the user feedback, the web system typically undergoes continuous evolution until it eventually becomes a system capable of providing fully-fledged web services (Ginige 1998, Siau 1998, Standing 2001). Gordijn and associates (2000) criticize the currently practiced process of requirements gathering as largely inadequate for web development. In particular, they claim that requirements for web-based information systems are commonly “created from scratch” by developers themselves rather than being discovered through the normal process of identifying system stakeholders and gathering their requirements. A stakeholder could be defined as any individual, groups, or organizations whose actions can influence or be influenced by the development and use of the system whether directly or indirectly (Pouloski 1999). Hence, the anticipation of potential stakeholders for the web system is hence extremely critical for developers who routinely need to cope with the sheer diversity of web system users, in terms of their geographical locations, cultural and linguistic background, computer proficiency, and varying knowledge of business rules (Standing 2002, Stevens and Timbrell 2002, Nazareth 1998, Carter 2002). These issues present major implications for the analysis of web systems requirements.

A number of methodologies have been proposed for the development of WBIS. These methodologies describe the process of web development, and acknowledge the importance of identifying the different types of relevant stakeholders and their diverse needs. Examples of these methodologies include the seminal concept of web engineering (Ginige 1998), Internet Commerce Development Methodology (Standing 2000), and Web Information Systems Development Methodology (Vidgen 2002a). Detailed discussions of
the approaches and the comparisons between them will be presented in chapter 2. While making major contributions to the knowledge of web development, the methodologies run the risks of being too prescriptive (Wastell and Newman 1993) and, like many prominent information systems development (ISD) approaches adopting a largely functionalist view, do not devote adequate attention to the contextual, political, and social factors associated with web development (Galliers and Swan 2000). Moreover, few methodologies shed any significant light upon how the needs and expectations of the diverse range of stakeholders, associated with the usage of a WBIS, are incorporated into the development process. There is also considerable lack of recorded prior knowledge of how project managers actually deal with the common development and management problems in WBIS implementation as perceived and voiced by various system stakeholders (Detlor 2003). Given the fact that the range of stakeholders (which primarily includes the users of the services rendered by WBIS) are diverse, expanding, and cannot be mandated to use the web system as organizational members, it is beyond the shadow of doubt that there exists a great potential for the rise of critical stakeholder issues and concerns. Thus, empirical investigations into the actual experiences of project managers and web developers and implementers could significantly contribute to the pool of knowledge regarding WBIS development, especially in light of the social context of inter-stakeholder interactions.

Furthermore, Giddens (1987) maintains that phenomena occurring within human society are socially constructed. According to this notion, the development of information systems should also be considered an integral part of social processes (Boland 1985, Stamper 1994, Buckingham et al. 1987). Interestingly, many researchers in requirements engineering (RE) share this view of the social context in which system requirements are elicited and consolidated (Zave 1995, Goguen and Linde 1993, Jirotka and Goguen 1994). According to Hirschheim and Klein (1989), the experiences of project managers are formed from their social interactions with stakeholders during the implementation of the information systems. Thanasankit (1999) also emphasizes the social nature of requirements engineering in his ethnographic study of system analysts in Thailand, while Peszynski et al (2002) analyzed the influence of Maori culture on the implementation of a Business-to-Consumer (B2C) electronic commerce venture in New Zealand. In accordance with the social relativist paradigm of Hirschheim and Klein (1989), the web project managers are the organizational agents and the social process is the
implementation of the WBIS. As can be seen from the previous discussion, the experiences of the project managers play an important role in understanding the social phenomena of stakeholder concerns in the implementation of web systems. Thus, the social relativist paradigm is relevant and applicable. Further discussions justifying the adoption of the paradigm have been presented in chapter 3.

1.3 Research Question and Constituent Objectives

Having discussed the purpose and justification for undertaking the research study, the research question can now be stated.

What are the experiences of project managers in dealing with stakeholder concerns in the implementation of web-based information systems?

The term “concerns” assumes the meaning offered in the New Oxford dictionary, as an issue of “importance, interest, anxiety, or worry”. The posed research question raises issues, which are instrumental in the formulation of the following objectives.

1. To identify the experiences of project managers with regards to the impact of stakeholder concerns on the implementation and evolution of WBIS. The research question warrants a study of how the concerns of stakeholders are actually perceived by project managers engaged in the implementation of web-based information systems for organizational work.

2. To determine the experiences of project managers in dealing with stakeholder concerns during the implementation of WBIS. This objective necessitates the investigation into the nature of the concerns, the actions undertaken by project managers to alleviate the concerns, and the consequences of those actions.

3. To establish whether the commonalities in the experiences of project managers can be captured across the domain of web-enabled information systems. Commonalities in the experiences of project managers who have experienced common phenomena can be established (Moreno Jr. 2002). Thus, the accomplishment of this objective is expected to yield a set of common experiences
across all projects in the domain. A "domain" can be defined as a set of existing and future information systems associated with a common area of endeavor (Bolton et al. 1994, Kang et al. 1990), for example, the domain of Employee Service Systems (ESS), which includes all (a range of) applications providing services to employees in various organisations.

4. To ascertain the extent to which the collected domain experiences could be "generalized" in terms of its relevance and usefulness to managers involved in new projects in the same domain. In view of this objective, the common experiences, generated in the process of achieving the third objective, are presented to managers involved with new web projects (that is, in different organizations) in the same domain. The objective is to examine the perceptions of the new projects managers with regards to the relevance of the common experiences to their own individual experiences. This will not only further evaluate the findings of the first three objectives, but will serve as a method of triangulating the findings (Gillham 2000, Denzin 1978, Drisko 1997, Douglas 1976). Once, the issue of relevance is established, the perceived usefulness of the common experiences can be further pursued. Thus, it will be possible to ascertain whether common experiences can facilitate a "learning by experience" situation in web projects, as previously also discussed by Ginige (1998) and Standing (2000).

1.4 Organization of the Thesis

This thesis consists of eight chapters, including this (chapter 1) chapter. Chapter 2 presents a review of relevant literature, and begins with an in-depth discussion of web development methodologies with a particular focus on the system stakeholder. This review provides a comparison of these methodologies, and then highlights their inherent shortcomings and opportunities for their further enhancements. These inadequacies in web literature lead to the broadening of the review into non-web IS and even non-IS territory, where the concepts of stakeholder theory, multiple viewpoints, and conflict, are examined from the disciplines of IS, management and organization behaviour, sociology, and requirements engineering (RE). From these concepts, a preliminary conceptual framework for the study is then developed.
In chapter 3, the research methodology is discussed. In view of the research objectives and purpose and justification of the study, the qualitative paradigm accompanied by an interpretivist epistemology was deemed as the most appropriate. Furthermore, the case for the application of the phenomenological method to this study is strongly argued.

Having established an appropriate research approach as well as a method, the actual research design is mapped out and elaborated in chapter 4. This includes the selection of a suitable domain of WBIS projects and constituent participants (managers involved in the projects) for the purpose of carrying out the investigations. Significant stages of the research roadmap, such as phenomenological data collection and analysis, data representation in the form of voice tables and patterns, and the evaluation of data are emphasized. In addition, ethical considerations are highlighted.

The accounts of the various web project managers are examined in chapter 5. Even though ten managers in six projects took part in the study, the narratives in the two most representative projects are actually analyzed in chapter 5 for the sake of brevity (the rest are presented in the appendices). The preliminary conceptual framework, developed in chapter 2, will be compared with the results of the analysis of the project managers’ accounts of their experiences in dealing with stakeholder concerns in the implementation of WBIS. The phenomenological analysis is accompanied by verbatim examples from the narratives of the project managers. Voice tables are employed for the purpose of analyzing the narratives. Chapter 5 addresses the first two research objectives.

Chapter 6 is a synthesis of the individual experiences of the project managers. The outcome is a set of common experiences that is meant to be representative of the particular web domain. The common experiences are derived from the commonalities in the accounts of the project managers regarding the phenomenon of interest to the study, i.e. experiences in dealing with stakeholder concerns in the implementation of web-based information systems. Thus, the third research objective is reached in this chapter. Furthermore, patterns are used to represent the common experiences.

In chapter 7, the patterns, the results of chapter 6, are subsequently presented to groups of managers involved in projects in the same domain, but have not been empirically
investigated. The aim of this chapter is to evaluate the patterns in terms of their perceived relevance and usefulness to the new project managers, thereby addressing the fourth and final research objective. The evaluation of the patterns was carried out by conducting direct observations with the new participants. The patterns were provided as a tool to assist the research participants in the task of identifying and considering stakeholder concerns prevailing in a mini case study.

Finally chapter 8 presents the conclusions of the study, in terms of the four research objectives, and directions for future research. It is in this final chapter that the preliminary conceptual framework of chapter 2 is revisited, compared and contrasted with the findings of the study. The contributions to theory and methodology of WBIS, as well as to the practice of the development and implementation of web-enabled workflow systems are provided.

Several appendices have been attached to provide strength to the argument in the thesis.

1.5 Conventions

This section describes the writing convention adopted for the study. In line with conventions adopted for writing theses and dissertations in which the phenomenological method has been applied (Moreno Jr. 2001, Harmer 2003), I will be discussing the substance of the study in the first person. Such a writing style is used because the author of a phenomenological study is actively involved in setting up an environment for the participants to share their experiences of the phenomenon of interest, and in the interpretation of the experiences. Thus, writing in the third person will not be appropriate, as articulated by Harmer (2003):

"To speak in the third person would be to create a false impression of neutrality and separation between myself as researcher, and the phenomena which are the subject of my investigations."

Furthermore, the structure of the thesis reflects the principle of the hermeneutic cycle (Gadamer 1976, Heidegger 1962), discussed in chapter 3. Accordingly, each chapter will subject the contents of the study to cycles of refinement in order to sharpen and highlight the essences of the phenomenon being investigated (as outlined by the research question
and constituent research objectives). Thus, certain facts and issues will be intentionally repeated for the purpose of demonstrating the refinement of the inductions.
Chapter 2: Literature Review

2.1 Introduction

Information systems (IS) projects constitute a social process consisting of the development and implementation of information systems (Walsham 1993b, Metcalfe 2000). The review of relevant literature in this chapter will be guided by the social non-functionalist perspective adopted for the study. In chapter 1, the area of web-based information systems (WBIS) development was discussed to justify the impetus for the study. However, in the following sections of this chapter, web development methodologies are reviewed in-depth to investigate how the notion of stakeholder concerns is incorporated into the processes. Each methodology will be evaluated on the basis of how it elaborates on the nature of the development process and stakeholder issues, and the inadequacies will be uncovered. To pursue the inadequacies prevalent in existing web research, I will delve into IS research, requirements engineering (RE), sociology, and management studies, with the aim of deriving enough substance to build a preliminary conceptual framework. All these areas consist of specialized literature that are directly relevant to the theme of this thesis. The focus of the literature review will be guided by the research objectives, rather than cover the entire gamut of concepts prevalent in the aforementioned areas.

The fundamentals of stakeholder theory, from management and IS research, are examined in order to gain insights into the importance of stakeholder identification and analysis in organizational projects. Since, the relationship between the identification of stakeholder needs and expectations, and the establishment of system requirements needs to be exposed, the notion of stakeholder “viewpoints” in requirements engineering is also explored. Closely related to stakeholder viewpoints are issues of conflict, thereby motivating a review of conflict theory in sociology and strategic management. Once this connection between stakeholder viewpoints and conflict is ascertained, literature in information system development and implementation are consulted to support understanding of its occurrences in IS development. Out of this study, the importance of the notion of stakeholder concerns is established and discussed with a working definition of the term “concern”, expounded on the basis of the survey of relevant literature. Finally, a preliminary conceptual framework of the study is constructed.
2.2 Review of Web Development Methodologies

Review of relevant literature on the development of web-based information systems reveal that such systems are commonly developed using an incremental prototyping approach (Howcroft and Carroll 2000), whereby the simplified version of the application is first deployed as a pilot, in order to gather user feedback before the major development effort commences (Fraternali 1999). Subsequently, the web system prototype typically undergoes continuous evolution until it eventually becomes a fully-fledged web system (Standing 2001, Ginige 1998, Siau 1998). Prototype-based development leads web-enabled information systems to have much shorter time to the market, but which, as compared with the traditional applications, frequently suffer from poor quality and unsatisfied users, which are mainly due to the ad-hoc development process and the use of less structured development methods (Hammar-Cloyd 2001, Earl and Khan 2001, Stevens and Timbrell 2002, Carstensen and Vogelsang 2001). The relative newness of WBIS, the incremental nature of the development approach, the rapid evolution of the underlying technology and the competitive pressure from other business units all seem to create a situation in which the requirements are in an almost constant flux (Earl and Khan 2001).

As the objectives of this thesis stress the importance of project managers’ experiences in dealing with stakeholder issues and concerns, it is imperative to set the focus of this literature review not only on the web systems development but also to take into account the various strategic initiatives undertaken in organizations, a process model in which stakeholder issues are explicitly addressed, and to promote a mechanism of recording and learning from past experience.

2.2.1 Web Engineering

Ginige (1998) argues that web development should be recognised as a process with all its structure and complexity, and not just as an atomic event considered by many web practitioners. In fact, the founders of the web-engineering concept (Ginige 1998, Murugesan et al. 1999) go further to stress the importance of following a process where new functionality and information resources are iteratively added to the system over time. Furthermore, they assert that most of the current difficulties, with respect to the
development of large web sites, can be attributed to a lack of suitable process models for the project teams to follow, suitable architecture, or a product model for the development of web-enabled applications. Another key aspect is that users could also be treated as an integral part of a WBIS. Thus, when developing such systems, it is essential to have appropriate measures built into the development process that allow developers to cater for user related issues. One of the most significant points, at least from the point of view of this thesis, presented by Ginja (1998) as a new and emerging trend associated with the development and evolution of web-enabled services, is the acknowledgement of the importance for project teams to improve by learning through experience.

2.2.2 Relationship Management Methodology (RMM)

RMM was introduced by Isakowitz (1985) as a methodology for the development of hypermedia systems. RMM involves seven steps, of which the first three focus on design issues using entity-relationship diagrams. While acknowledging the importance of requirements analysis, RMM sheds little light on its mechanisms. Moreover, the steps prescribed by the methodology require a high level of specialized technical skills, which may not be a motivating factor for its adoption by web developers (Russo 2000).

Another approach, proposed by Balasubramanian (1998), an extension of RMM, is also a seven-stage iterative methodology. Though the methodology recognizes the complexity of stakeholder issues and consequent requirements setting, again as in RMM, it hardly sheds any light on the establishment of requirements, and focuses on document management over the web, instead.

2.2.3 Howcroft’s Methodology

In Howcroft’s methodology (2000), the first phase begins with a thorough analysis of the organizational web and competitive strategy. The project members need to be deeply involved with the formulation of the organization’s strategies regarding the use of the web infrastructure. In the subsequent step the objectives or the business needs that are to be met through the adoption of the web infrastructure are defined. In the third step of the analysis phase, stakeholder analysis is conducted. Through Information Analysis, static and dynamic information required by the target users are identified. This is followed by an analysis of the skills of the project members, which are commonly multidisciplinary.
The most critical process element, however, is the *User Analysis*, which for the most part, is a complex process itself, as the intended users of the system have to be identified and analyses of their needs and characteristics carried out in advance. This step also includes an analysis of project risks analysis.

Despite its thorough coverage of organizational objectives, business needs and user needs, the methodology does not propose any concrete means of how web developers could incorporate stakeholder issues into their work. Furthermore, there exists a dearth of empirical evidence about the experience of web developers with regards to their consideration of stakeholder issues.

### 2.2.4 Internet Commerce Development Methodology (ICDM)

Internet Commerce Development Methodology (ICDM) was proposed by Standing (2001, 2000). ICDM combines the elements of business analysis as well as system development. Standing (2001) contends that traditional information systems methodologies cover only the more technical aspects of information system development and do not look into the business aspects. Internet commerce is one of those fields, which necessitate intense business activity as part of their systems development, and thus it requires a thorough analysis of its place in the overall business strategy. Customers and suppliers (users of the systems) are encouraged to be involved at various stages of the e-Business operations, and participate in periodic reviews. Customer input is essential at the strategy development and business analysis stages and may involve the use of market research teams to obtain information on what customers require and on the potential barriers to using the web. More detailed requirements can be obtained in Group Requirements Sessions (GRS), telephone interviews or questionnaires. Customers can be involved in evaluating design issues through the use of prototype web systems and they should be included in testing and evaluation of the web site. Feedback is obtained from users once the web site is 'live'.

The two requirements gathering techniques commonly used in ICDM are brainstorming and the Group Requirements Sessions (GRS). Standing (2002) claims that brainstorming techniques are used to define alternative ways of undertaking Internet commerce, while GRS comprises of obtaining the detailed requirements within a relatively fast time frame.
with the involvement of customers, suppliers and internal staff (Standing 2001, Standing 2000, Standing 2002).

Standing (2000) also suggests that organizations implementing e-Business ventures should foster learning environments that enable the project executives to "learn" from the successes and failures of other organizations that have already adopted such ventures. This necessitates organizations investing in training programs for their staff. In fact, a web venture will not succeed if the users are not provided training in the usage of the system. Although clearly acknowledging the importance of stakeholder issues and "learning from experience" in requirements establishment for WBIS, ICDM is not prescriptive as to the use of any specific model or a process where these issues could be addressed. Thus, it does not provide any specific answers in support of this thesis objectives, i.e. "how" stakeholder issues could be considered and their impact on the project, as well as "what" tools could be used in support of experiential learning. In addition, no light is shed on the experiences of project managers in implementing e-Business ventures in general or employing ICDM in particular.

2.2.5 Web Information Systems Development Methodology (WISDM)

The methodology, proposed by Vidgen (2002b), is an application of MultiView (Avison et al. 1998) to the development of web applications. WISDM was employed with the aim of evaluating the effectiveness of a pre-web methodology, such as MultiView, to a web-based application. The WISDM / MultiView approach begins with a thorough analysis of the system-hosting (owning or initiating) organizations to understand and articulate the strategic programs of the initiator. In the words of the author, "the overall aim of organizational analysis is the consideration of how value will be created." In the Information Analysis stage, the capture of system requirements is meant to take place, however, the recommended approach describes this development stage from a perspective of technical rationality.

The empirical testing of the WISDM methodology, actually on an electronic commerce project, indicates RAD (rapid application development) and prototyping as an effective approach to the WISDM project development. With this in mind, WISDM-developed websites are updated in an incremental manner to enhance them with new features. Disappointingly for the study reported in this thesis, WISDM, in its current form of
definition, does not lay any explicit recommendations on the identification and analysis of stakeholders and their viewpoints and the project team’s experience in dealing with user issues, though there is a clear indication of the future employment of an instrument (WebQual) to assess user satisfaction (Vidgen 2002a).

It is worth noting that other approaches to web design have also gained prominence in recent years, e.g. the object-oriented hypermedia development methodology (OOHDM) by Rossi (1997). Such methodologies are beyond the scope of this study as their primary focus is on the technical aspects of web systems rather than on stakeholder issues. Since, we are dealing with the issue of stakeholder needs, examination of literature on stakeholder analysis in the disciplines of management, IS, and Requirements Engineering (RE) was warranted.

2.2.6 Comparison of Approaches

The summary of the approaches discussed in the preceding sections is presented in Table 1. The criteria, on the basis of which the six methodologies have been compared, are indicated in columns.

<table>
<thead>
<tr>
<th>Web Engineering</th>
<th>Organizational Context</th>
<th>Development Process</th>
<th>Importance of Stakeholder Issues</th>
<th>Actual Incorporation of Stakeholder Issues</th>
<th>Learning from Experience</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Considered</td>
<td>Iterative and evolutionary</td>
<td>Mentioned</td>
<td>Covered lightly</td>
<td>Mentioned</td>
</tr>
<tr>
<td>Balasubramanian</td>
<td>Considered</td>
<td>Iterative</td>
<td>Not mentioned</td>
<td>Not Covered</td>
<td>Not mentioned</td>
</tr>
<tr>
<td>RMM</td>
<td>Not considered</td>
<td>Structured</td>
<td>Not mentioned</td>
<td>Not Covered</td>
<td>Not mentioned</td>
</tr>
<tr>
<td>Howcroft</td>
<td>Considered</td>
<td>Incremental</td>
<td>Mentioned</td>
<td>Not Covered</td>
<td>Not mentioned</td>
</tr>
<tr>
<td>ICDM</td>
<td>Considered</td>
<td>Incremental and evolutionary</td>
<td>Mentioned</td>
<td>Covered lightly</td>
<td>Mentioned</td>
</tr>
<tr>
<td>WISDM</td>
<td>Considered</td>
<td>Incremental and evolutionary</td>
<td>Mentioned</td>
<td>Covered lightly</td>
<td>Not mentioned</td>
</tr>
</tbody>
</table>

Table 1. Comparison of Web Development Approaches
It can be seen that all the methodologies, with the exception of RMM, consider the organizational context to be a prime aspect associated with the adoption and implementation of WBIS. Furthermore, it can also be easily noted that by large the development of WBIS is iterative and incremental in nature. RMM is once again an approach that is structurally inclined.

The importance of stakeholder issues is acknowledged in most of the discussed methodologies. However, none of the approaches explicitly incorporates stakeholder issues in the WBIS implementation process. Some of these proposed approaches have been offered in the form of mere suggestions (Balasubramanian and Bashian 1998, Ginige 1998, Isakowitz et al. 1985), others have been evaluated by experts (Howcroft and Carroll 2000) or by focus groups (Standing 2001). WISDM has been empirically tested through an action research study (Vidgen 2002a), however, in the currently reported form of WISDM, the consideration of stakeholder issues has not been fully dealt with.

With regards to the existence of a mechanism for learning from experience, Ginige (1998) (web engineering) and Standing (2000) (ICDM) have mentioned that owing to the newness of web services dissemination within enterprises, project teams can reuse relevant aspects of their past experience or consult the experiences of their counterparts involved with similar projects in other institutions.

It should also be noted that the approaches discussed above, being methodologies, are naturally prescriptive, even to the extent that they could erect obstacles for project teams working in highly stressful and complex conditions (Wastell and Newman 1993). Avoidance of such obstacles could possibly be the reason for the reviewed methodologies not to deal with the issue of stakeholders in a very structured, and thus, restrictive manner. Web development methodologies, nevertheless, do act as frameworks guiding the construction of WBIS and are commonly found to be useful especially in organizations undertaking web projects across different organizational contexts, and which have different goals and thus distinct problems (Howcroft and Carroll 2000). This trend is also reflected in a number of field studies where methodologies were adapted in order to cater to a particular organizational context (Fitzgerald 1997, Russo et al. 1995). This is where the practical importance of project teams’ consideration of the WBIS stakeholder needs is especially highlighted, though not adequately discussed in the
existing methodologies. This very situation thereby triggered the motivation for this study to undertake further empirical investigation of real-life web projects.

Having discussed the relevant literature in the areas of WBIS, I will engage in introspection of what I have learnt and understood so far in light of the research objectives. Review of research into the development of web-enabled applications, and the implementation of web services have uncovered a number of relevant facts and inadequacies, which are listed in Table 2.

<table>
<thead>
<tr>
<th><strong>Key Points</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>• WBIS are acquired by organizations, from vendors, in order to web-enable (both intra-and inter-organizational) workflows,</td>
</tr>
<tr>
<td>• WBIS are developed or configured in an incremental manner using the evolutionary prototyping approach,</td>
</tr>
<tr>
<td>• New features are added to the WBIS with each iteration of the development cycle,</td>
</tr>
<tr>
<td>• However, the time frame for the development of WBIS is considerably shorter, i.e. about 3 months,</td>
</tr>
<tr>
<td>• A diverse and broad base of stakeholders are the potential users of web services, but it is not always possible to anticipate the constituent groups,</td>
</tr>
<tr>
<td>• The stakeholders are external to the project initiator, and thus, are beyond the control of the latter, and can't be made obliged to attend training sessions,</td>
</tr>
<tr>
<td>• Due to this unanticipated large and relatively heterogeneous groups of stakeholders, system requirements for web applications may have to be created, rather than elicited,</td>
</tr>
<tr>
<td>• The existence of a mechanism that enables web teams to learn from past experience or the experience of other teams, can aid the establishment of system requirements,</td>
</tr>
<tr>
<td>• Yet, current methodologies in the area of WBIS development do not adequately explain how the needs of the various potential users are inculcated in the further evolution and roll over of web services (i.e. is there any connection between stakeholder needs and the requirements created from scratch?), nor do they shed sufficient light on the learning mechanism in the process.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>Issues for further investigation</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>• Identification and description of stakeholders and their needs in the process of development and implementation of WBIS,</td>
</tr>
<tr>
<td>• Impact of the stakeholder needs and concerns on the requirement-driven features associated with the WBIS,</td>
</tr>
<tr>
<td>• Empirical studies on the experience of project managers with the development of WBIS and the implementation of web-enabled services, particularly in dealing with the needs and concerns expressed by a diverse and relatively large stakeholder base.</td>
</tr>
</tbody>
</table>

Table 2. Key points from WBIS literature
The three issues pointing at the methodological inadequacies, as stated in Table 2, are associated with the existing research in the field of web-enabled workflow applications. Such issues fuel the need to probe further into the phenomenon of interest, as clearly outlined in the research objectives of this thesis. Thus, additional review needs to be conducted into the area of stakeholder analysis, owing to the prominence of stakeholder issues in the study.

2.3 Analysis of Stakeholder Needs

The impetus for the research at this juncture came from the field of stakeholder analysis. In view of the first research objective regarding the impact of the concerns of stakeholders in the further evolution of web-enabled services throughout an enterprise, as experienced by project managers, the review of relevant works of research was driven by the analysis of stakeholders and their needs and wants with regard to their future involvement with the system. The examination of stakeholder requirements and concerns led to the study of viewpoints or multiple perspectives in Requirements Engineering. The investigation of the concepts associated with the development and maintenance of multiple perspectives in the various disciplines, most notably in organization behaviour and management, information systems, and requirements engineering, led to the revelation of an underlying body of knowledge about stakeholder resistance and conflict. The literature review moves to a discussion of conflict and stakeholder resistance in the context of information system development (ISD) and implementation.

2.3.1 The Concept of Stakeholder Analysis

A review of literature in information systems development (ISD) and project management reveals that one of the major causes of project failures is attributed to the dissatisfaction of stakeholders with the either the way the project is undertaken or the final product of the project (Robey et al. 1989, Robey and Farrow 1982, Bennet et al. 1999). Indeed, stakeholder resistance to new technology adoption and their concerns over their association with it, and the prevailing power structures have a great impact on actual implementation of technological artifacts within the organization (Markus 1983). This is a fact that is echoed by practitioners (May 1998), that system development projects fail because developers don't know who the "real" stakeholders are. These works lead to the elevation of stakeholder issues in system development projects and highlight how
imperative it is to undertake a thorough study of stakeholder analysis. Stakeholder analysis originates from strategic management. Perhaps, one of the most prominent works in the area is by Freeman (1984), who argues that a perquisite to effective strategic planning is the identification and analysis of those parties who can affect the implementation of the organization’s strategic programs or be affected by them. This claim is strongly supported by Richardson (1992), who affirms that stakeholder analysis should be carried out in business planning. Business stakeholders, or organizational members participating in common business processes, hold different perspectives on matters such as the setting of a group, organizational goals and values, allocation of resources, distribution of rewards, policies, procedures, and task assignments (Schermerhorn Jr. et al. 1997, Putnam and Poole 1987, Freeman 1984). This reveals the idea of multiple perspectives held by the different stakeholders involved in organizational ventures. Freeman’s (1984) use of the concept enables an investigator to examine the external environment of an enterprise and to study how the enterprise manages multiple stakeholder relationships. Thus, the approach is aimed at assisting managers in establishing business policy and overseeing the implementation of programs directed by business policy. Miroff and Linstone (1993) happen to be a couple of “unbounded system” thinkers who recognize the complexity and interconnectedness of business problems. Thus, business problems need to be managed. In view of this, they suggest that the issue of multiple perspectives should be incorporated into the management of these business problems. In this way, a more comprehensive view is gained of the complexity of the business problems.

While traditional strategic management literature has emphasized stakeholder analysis from descriptive and instrumental perspectives¹, there has been a shift toward a normative or more fundamental approach in recent times (Pouloudi 1999). Advocates of such an approach include Carroll and Nasi (1997) who stress the importance of considering multiple perspectives of stakeholders on ethical and moral grounds. In other words, the stakeholder analysis should be done not only to ensure the organization’s survival and its profitability, but also because it is ethical to look into the viewpoints of the stakeholders

¹ Concept of Stakeholder Analysis is descriptive as it views the enterprise as “a constellation of cooperative and competitive interests possessing intrinsic value”. Stakeholder Analysis is instrumental as it seeks to explain the relationship between the practice of stakeholder management within an enterprise as how that leads to the attainment of strategic objectives (Donaldson and Preston 1995).
who are affected or will be affected by the strategic decisions of the organization, a stance also supported by Clarkson (1995). The active participation and empowerment of stakeholders is also supported by the post-modernists (Calton and Kurland 1996).

Information system researchers have discovered that the success of system development projects does not depend solely on technical issues, and thus, encourage the participation of more and diverse set of stakeholders in such projects (Markus 1983). Ruohonen (1991) states that owing to the scant level of "hybrid" knowledge in an enterprise (i.e., people who are knowledgeable about information systems as well as the various work processes and decision-making mechanism within the enterprise), the existence of multiple perspectives with regard to system development and implementation projects is apparent. Therefore, as different stakeholders have different expectations with regards to an information system, the success or failure of the development project depends on how effectively managers address these expectations (Bennet et al. 1999, Lacity and Hirschheim 1995).

Perhaps, the greatest proponents of the active involvement of end users in the development of information systems are Mumford and Weir (1979). In their approach to socio-technical system design, entitled the ETHICS (Effective Technical and Human Implementation of Computer-based Systems) approach, the authors contend that the effectiveness of system development projects can be brought about by the participation of stakeholders. A strong argument is put forward in favor of stakeholder participation in system development projects by warning that "systems designed without the active involvement of users may initially appear to be cost-effective on technical criteria, but in fact often incur high social costs, such as resistance to change, poor equipment utilization, high turnover, and absenteeism." Hence, the underlying premise behind ETHICS is the fact that for a system development project to be successful, there should be a close fit of the technology with social and organizational factors. Hwang and Thorn (1999) speak in a similar strain with their assertion that stakeholder participation in the development of information systems can lead to higher levels of user satisfaction, system quality, and system usage.

Checkland and Scholes (1990) in their prominent work, Soft Systems Methodology in Action, stress the importance of the identification of stakeholders and consideration of
multiple perspectives, using CATWOE (customer, actor, transformation process, Weltanschauung, system owner, environmental constraints). Under this approach, each stakeholder holds a perspective or a CATWOE. The customer (C) is the recipient of the service of the information system in some environment (E), the actor (A) is the person who works with the system to provide the service, transformation (T) is the actual service, Weltanschauung (W) refers to the assumptions made by the particular holder of the viewpoint, and owner (O) is the one who is answerable. The approach takes a holistic look at information system. In essence, this is another approach that deals with socio-technical systems, referred to as human activity systems (Checkland 1981).

The concept of stakeholders with multiple perspectives is also relevant in the literature on interorganizational systems (IOS). According to Cavaye (1995), there are two key stakeholder perspectives in an IOS, namely those of the sponsor and of the adopter. Sponsors are firms leading the development and implementation of the IOS, while adopters are the intended users of IOS. Sponsors and adopters are referred to as hubs and spokes, respectively, by Murchland (1995), and as initiators and followers, respectively, by Riggins and Mukhopadhay (1999). Even though, a detailed look into IOS literature is beyond the scope of the study, I have adopted the term “initiator” to denote organizational units spearheading the implementation of WBIS.

One of the most significant contributions to the application of stakeholder theory in information system is by Pouloudi (1999), who reiterates that the consideration of multiple stakeholder viewpoints will expose conflicting perspectives, and thus generate a greater understanding of stakeholder issues. This, in turn, will pave the way for the effective development and implementation of information systems. Pouloudi (1997) proposes, within a specific organizational or interorganizational context, a process of stakeholder identification and analysis that is iterative and evolutionary, thereby enabling a longitudinal and continuing approach of examining stakeholders and their viewpoints.

While placing considerable emphasis on the identification and analysis of stakeholders in information system development, how the multiple perspectives of stakeholders are examined in the process of building applications for organizational (or interorganizational) workflows, and their reflection in the various software artifacts generated in the project is insufficiently explained. This indicates the value of a further
investigation into the application of stakeholder theory and the resultant “multiple perspectives” to the requirements elicitation.

The key points gathered and learnt from the literature in stakeholder theory and the issue(s) calling for further investigation are summarized in Table 3.

| Key Points | • Dissatisfaction of stakeholders is a major cause of project failure  
|            | • Thus, the identification of stakeholders and their needs should be incorporated into the strategic programs of an organization  
|            | • However, stakeholders (even those participating in common business processes) are diverse and hold different perspectives with regards to organizational projects  
|            | • Project planners should take into account the multiple perspectives held by the diverse stakeholders, as the success of the project hinges on this issue  
|            | • The active participation of stakeholders in the design, development and implementation of information systems is encouraged  
|            | • Identification of stakeholders and their needs, like the evolution of WBIS, is an iterative process, where each cycle generates a better understanding of stakeholder needs and perspectives regarding the project  
|            | • Multiple perspectives are also held by organizations participating in an IOS, are referred to as sponsors and adopters, hubs and spokes, or initiators and followers. |

| Issues for further investigation | • Practical incorporation of the multiple perspectives into the specification of information system requirements. |

Table 3. Key issues emerging from Stakeholder Theory

2.3.2 Stakeholder Analysis in Requirements Engineering: Looking at Viewpoints

The development of information systems commonly begins with some form of requirements engineering, and has a profound impact on the more downstream activities in the development life cycle, such as software specification, design, and implementation (Cybulski 2001). Since requirements should ideally reflect the needs and expectations of stakeholders of the proposed system, the importance of undertaking the identification of stakeholders and their needs at this early stage of development is therefore recommended (Smith 2000). The issue of stakeholder analysis gained ground in requirements engineering following the realization and significance devoted to heterogeneity of stakeholders and their requirements (Easterbrook 1991, Sommerville and Sawyer 1992a,
Finkelstein et al. 1993, Darke and Shanks 1995, Sharp et al. 1999). In fact, Hunton and Beeler (1997), as well as Newman and Sabherwal (1996), speak about improvements to the process of requirements establishment by enlisting the participation of stakeholders in early stages of IS development. One of the prime works in the area that devotes considerable attention to stakeholder analysis is the Theory Y, the software project management principle based on the spiral model by Boehm (1989), where it is argued that the success of a software development project depends on how well the project manager makes "winners" of the "critical" stakeholders. The theory explains that if all the stakeholders are satisfied with the outcome and deliverables of the project, it can be concluded that the development efforts were a success. In fact, the spiral model of software development of which stakeholder analysis is an integral part, bears a great deal of resemblance to that proposed by Pouloudi (1997) who stipulates a method of identifying stakeholders in projects that is "dynamic, context-dependant, and iterative".

Requirements engineers also adopted the concept of stakeholder analysis for the purpose of identifying information sources and their characteristics, and the subsequent elicitation of requirements. This paved the way for the emergence of the concept of stakeholder viewpoints in RE. The concept of viewpoints was first introduced by Mullery (1979) in his Controlled Requirement Specification (CORE) method. CORE recognizes the need for taking into account multiple perspectives of a system in the expression of requirements. The viewpoint approaches recognize that the development of a system involves the participation (in the form of expressing requirements) of multiple stakeholders with different perspectives, and conflict may erupt between these different perspectives According to Leite (1991):

"A viewpoint is a standing or mental position used by an individual when examining or observing a universe of discourse, and identified by an individual, e.g. his name, and his role in the universe of discourse, e.g. a systems analyst, programmer or manager."

Finkelstein et al (1992), and Nuseibeh et al (1994) support the concept of multiple stakeholder perspectives with the statement that any requirements engineering activity in a project is likely to involve a "multiple development participants" with "multiple perspectives" on the system. They build on the concept of viewpoints as "a framework to
structure, organize, and manage these perspectives” (Finkelstein et al. 1992). In their work, viewpoints are concerned with the role and responsibility of a particular participant or stakeholder in a software development process (Finkelstein et al. 1990). It is to be noted that the terms perspective and viewpoint will be used interchangeably in the thesis.

The viewpoints approach that is relevant to this study, in view of its disposition towards the organizational and human aspects of information systems development, is the PREview (Process and Requirements Engineering Viewpoints), the latest undertaking by the CSEG², and which was employed in the REAIMS project (Esprit 8649) by Sommerville and Sawyer (1997). PREview provides an iterative process, based on the spiral model by Boehm (1986), of identifying essential viewpoints, emergence of new requirements, and fine-tuning of existing ones with each cycle of the process. PREview places a significant emphasis on taking the strategic goals of an organization into account at the outset of the development process. These strategic issues affect every aspect of the system to be developed and are referred to as concerns. A concern was defined here as a non-negotiable requirement, the compliance with which is critical to the success of the development process. Concerns reflect the goals of the organization, business objectives, beliefs, and policies, and can be represented with natural language statements. Thus, concerns need to be considered while designing a system. Concerns may impose constraints on requirements or translate into obligatory requirements.

Another prominent approach, which deals with multi-perspectives of stakeholders in Information Systems Development (ISD) is MultiView (Avison and Wood-Harper 1990). It comprises of a hybrid process involving both IT experts and users, thereby looking at both the technical and human aspects of ISD. The authors reiterate that the ISD process can be considered as a social process, and be examined from a number of different perspectives, namely technical (system analysts), organizational (societal), and personal (individual). The perspectives were adopted from Linstone (1989) who claimed that organizational and individual viewpoints "bridge the gap" between analysis of relevant issues by project managers and the actions undertaken by them. In Linstone's approach, there are three perspectives, namely the technical/analytic perspective (T), the organizational/institutional perspective (O), and the personal/individual perspective (P).

² Cooperative System Engineering Group, Computing Dept, Lancaster University
The adoption of all three perspectives can facilitate more effective decision-making by project managers than the T perspective on its own. In an earlier work, Linstone (1985) held the notion of multiple perspectives supporting different ways of viewing phenomenon, an integral aspect of unbounded systems thinking. In the words of Avison (1998), ISD should "generate robust technical artifacts that support purposeful organizational activity and take into account the needs and freedom of the individual". The perspectives of stakeholders are crucial to IS projects, and project managers are strongly encouraged to assist the stakeholders in articulating their viewpoints with regards to the proposed information system (Hirschheim and Klein 1989b, Robertson and Robertson 2000). Metcalfe (2002) is also an advocate of the notion of multiple viewpoints in IS development by advocating Aristotle's concept of the dialectic, by which the importance of taking into account the multiple perspectives of different individuals is highlighted. Organizational and personal perspectives reflect the human and social factors inherent in complex situations surrounding ISD projects (Wood-Harper et al. 1996). Hence, an organization, in which the IS project is being undertaken, can also hold a perspective, which essentially reflects its strategic goals and objectives. In this regard, it can be induced that the organizational viewpoint is similar to the notion of the concern offered by Sommerville (1997). Darke and Shanks (1995, 1997 #8) are also proponents of the concept of multiple viewpoints in IS research.

In Table 4, the key issues that emerged from a review of the notion of multiple viewpoints in requirements engineering and ISD literature are summarized. The issue listed in the table as worthy further investigation is addressed in the following section.

<table>
<thead>
<tr>
<th>Key Points</th>
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<tbody>
<tr>
<td>• Since requirements ought to reflect the needs and expectations of stakeholders, the requirements engineering process should begin with stakeholder identification and analysis</td>
</tr>
<tr>
<td>• Owing to the multiplicity of stakeholders associated with a proposed information system, there exist multiple perspectives, also referred to as multiple viewpoints</td>
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<tr>
<td>• Viewpoints, upon the identification and analysis, translate into information system requirements</td>
</tr>
<tr>
<td>• The requirements engineering process, essentially a social process, can also be iterative, whereby each cycle involves the identification of new viewpoints and the fine-tuning of existing viewpoints</td>
</tr>
<tr>
<td>• Concerns, reflecting the strategic goals of an organization, are non-negotiable requirements covering all aspects of the proposed information system and need to be complied with</td>
</tr>
<tr>
<td>• Concerns may impose constraints on requirements or translate into</td>
</tr>
</tbody>
</table>
2.3.3 Multiple Viewpoints, Resistance and Consequent Emergence of Conflict

At this juncture, it is appropriate to reflect on the fact that over time, while distinct stakeholders develop multiple viewpoints, the resulting divergence of views and objectives creates the potential for conflict (Easterbrook 1991, Nuseibeh et al. 1994). Researchers in information systems (IS) also acknowledge the existence of conflict in Information Systems development (ISD) between multiple interdependent stakeholders (Barki and Hartwick 1994, Robey and Farrow 1982, Robey et al. 1989). The empirical evidence by these researchers brought to light the fact that participation of stakeholders (users from different groups, IS developers, IT support), with multiple viewpoints can lead to conflict in ISD. The failure of some interorganizational networks, of which IOSs form an important aspect, has been attributed to the implicit (or in some cases, direct) domination of the initiators/hubs/sponsors over the internal business processes of their partner firms (Miles and Snow 1992). Murchland (1995) warns that hubs tend to dominate the implementation of the IOS and may not share the benefits with spokes. Examples include Webster’s case studies (1995) of Ford Motors using its EDI to tightly monitor and control its trading relationships with suppliers, who on the other hand, were deprived of any strategic benefits. Moreover, Copeland and McKenny’s (1988) study of the airline reservation system and Vitale’s (1983) earlier case study of Frontier Airlines also revealed how sponsor (the organizational initiating the venture) dominance over interorganizational information systems led to conflict. Citing this case study as an example, Kumar and van Dissel (1996) contend that conflict could arise due to a dominant firm, which is a sponsor of the IOS network and has control over it, using the pooled information resource pertaining to a network member and competitor, to destroy the latter’s competitiveness. This aspect of opportunistic behaviour and renegotiation by some stakeholders and the Sponsor-Adopter gap (Cavaye 1995) could cause discord.
among "less-privileged" firms, thereby leading to conflict. Other significant studies of conflict in ISD include that of Cap Gemini, undertaken and investigated by Allen, Colligan and Finnie (1999). In their study, Cap Gemini had developed an interorganizational system called Translease, for streamlining selected business processes involving two primary stakeholders. However, the system failed to yield the expected benefits for the adopters, and hence, dissatisfaction arose and conflict was imminent. At the core of the conflict in the viewpoints between the stakeholders was the misalignment inherent in their strategic goals. In fact, if an IOS was designed without devoting sufficient thought to differences in culture and business processes, the potential risk of socio-political conflict can arise (Kumar and van Dissel 1996).

Robey and Farrow (1982) describe conflict in ISD as "a special case of departmental or lateral conflict in organizations, where departments with different sub-goals may intentionally or unintentionally interfere with one another attempts to achieve sub-goals". Thus, as elucidated by these studies, conflict antecedents are inherent in ISD. Conflict is essentially a consequence of the scant attention paid by IS project managers to the resistance expressed by stakeholders (Marchewka 2003). This is also maintained by Pouloudi (1996), who puts forward that conflict ensues when the needs and expectations of stakeholders are not being addressed. According to Davidson (2002), resistance and conflict are an integral part of the changes brought about by a project, such as the introduction of an information system. Stakeholders, especially users, express resistance owing to several factors, the prime among these being (Davidson 2002, Marchewka 2003):

- the dedication of extra time and effort to the proposed information system,
- letting go of the current state of affairs and the disruption in normal work processes, owing to project implementation,
- perception of imposition caused by the agents of the change (e.g. IS project team),

etc.

Of course, without some form of stakeholder identification and analysis, it will be difficult to detect resistance or sense the possibility or existence of resultant conflict. As the issue of conflict arises because the presence of multiple stakeholders implies multiple
viewpoints, it is important to ascertain whether this can be regarded as an established phenomenon, i.e. multiple viewpoints always indicate the possibility of conflict.

The subject of conflict has been the subject of extensive study in the disciplines of Management Science and Sociology, which have long held the notion of conflict as a pervasive aspect of human interactions in organizational settings (Schneiderman Jr. et al. 1997). Recent work considers conflict as an "intrinsic" part of organizational life and, (if properly managed) an instrument for growth and change (Deutsch 1973, Renwick 1975, Robbins 1974). Conflict can be defined as "the interaction of interdependent people who perceive opposition of goals, aims, and values, and who see the other party as potentially interfering with the realization of these goals" (Putnam and Poole 1987). According to this definition, three general characteristics of conflicts are highlighted, namely interaction, interdependence, and incompatible goals, which all describe the nature of relationships and opposition between stakeholders in a conflict situation. This is echoed by Verma (1998) who states that the types of conflict can be categorized according to the differences in stakeholder viewpoints over the objectives and specifications of the project, project administration and management structures, interpersonal relationships and prevailing power structures, and importantly, the underlying philosophy behind the project. Conflict is also defined as "an expressed struggle between at least two interdependent stakeholders who perceive incompatible goals, scarce rewards, and interference from the other party in achieving their goals" (Hocker and Wilmot 1985).

Research in Organization Behavior has revealed that that the development of conflict takes place in stages, which include the presence of antecedent conditions, the development of perceived and felt conflict, manifest conflict, conflict resolution or suppression, and conflict aftermath (Pondy 1967). This multi-stage model of conflict was further extended (Schneiderman Jr. et al. 1997, Wood et al. 1998, Jordan and Collins 1995), to include model stages also referred to as conflict episodes.

The stages of conflict

1. Conflict antecedents

Schneiderman et al (1997) refer to conflict antecedents as "latent" conflict, or "clues" indicating that conflict may take place. Antecedents are described as causes of
conflict by Wood et al. (1998). Conflict antecedents set the conditions from which conflicts are likely to develop. Therefore, in order to study conflict, it is imperative to identify and understand its antecedents. Some representations of conflict antecedents include (Deutsch 1973):

- Task interdependency among stakeholders;
- Resource scarcities, both tangible and intangible, for example, funds, equipment, facilities, knowledge, expertise, influence, etc.
- Role ambiguities (lack of clarity about the boundary of one's role);
- Organizational differentiation, which occurs when the stakeholders follow different time horizons for their projects, have different goals and perspectives, and use special language or jargon in their respective cliques.
- Structural differentiation, which exists because the stakeholders may have different rules, procedures, and policies.
- Unresolved prior conflicts, or residue of past conflicts among the stakeholders.

From the discussion, it is indeed apparent that conflict antecedents are closely associated with the resistance of stakeholders, their concerns and their fears, a fact also maintained by Davidson (2002). Since these antecedents are the sources of conflict, the focus of project managers should be directed towards gaining an understanding of these antecedent conditions. This stage in conflict development is therefore of greatest interest to this thesis.

2. Felt conflict

Conflict antecedents may lead to a stage of felt conflict, where stakeholders "feel" the presence of conflict. Felt conflict is experienced as tension in a person. Thus, conflict in this stage is implicit.

3. Perceived conflict
Alternately, conflict antecedents may lead to differences between stakeholders, thereby indicating the existence of the stage of perceived conflict. In this stage, stakeholders become aware of the presence of conflict among each other.

4. Manifest conflict

Conflict actually breaks out between stakeholders in the manifest conflict stage, where it is either suppressed or resolved. Conflict is openly expressed in the stakeholders' behavior.

5. Conflict aftermath

This is the final stage of conflict, and is greatly influenced by the strategy used to deal with conflict in the preceding stage. If a strategy of resolution was effectively employed in the manifest conflict stage, the aftermath stage could be one of improved understanding of the issues that led to the conflict and establish conditions for dealing with future conflict. On the other hand, suppression may leave certain issues unresolved, which become the antecedents for future conflict.
| **Key Points** | • Multiple stakeholders may hold conflicting viewpoints regarding a project  
• Stakeholders will express resistance to a project if their viewpoints are not considered by the project initiators  
• If scant attention is devoted to the viewpoints or no effort is made to ease stakeholder resistance, conflict can manifest between the stakeholders and the project initiators  
• Thus, in the viewpoints of the stakeholder lie the seeds or antecedents of conflict  
• Moreover, resistance and conflict are integral elements associated with the changes brought about by a project  
• Therefore, project managers need to identify and analyze the antecedents of conflict, expressed through the viewpoints of stakeholders, in the early stages of project implementation. |

| **Issues for further investigation** | • Antecedents of conflict in the development and implementation of information systems  
• Propositions for actions by project managers to minimize the effects of these antecedents |

Table 5. Key issues from stakeholder resistance & conflict literature

### 2.3.4 Conflict Antecedents in Information Systems (IS) Projects

Research in IS and requirements engineering acknowledge the fact that stakeholder resistance and conflict are evitable in IS projects, due to which project managers have no option but to devote attention to examining the antecedents of conflict that is embedded in stakeholder viewpoints (Jordan and Collins 1995, Walsham 1993a, Easterbrook 1994). In fact, Walsham (1993a) and Marchewka (2003) argue that resistance put up by stakeholders can be perceived by project managers as an opportunity for developing new ideas about IS projects and associated organizational factors. On the other hand, unresolved stakeholder issues can manifest into full-blown conflict and jeopardize the progress of a project (Davidson 2002). Such predicaments are undoubtedly prevalent in the realm of WBIS implementation (Sarkar and Cybulski 2002a). In the first instance, it is the conflict intractability, which can be due to the ineffectiveness of project managers in identifying conflict antecedents. Secondly, the inability to determine and reconcile the incompatible views and concerns of stakeholders can contribute to the rise in conflict. Hence, it is of great importance for project managers to deal with stakeholder issues and identify the potential sources of conflict in the early stages of a project (Verma 1998, Marchewka 2003).
Curtis, Krasner and Iscoe (1988) identified three causes of potential conflict inherent in the process of designing large software systems, i.e. the thin spread of application knowledge, fluctuating and conflicting requirements, and communication and coordination breakdowns. Grindley (1992) states that the "culture gap" between stakeholders (system developers and users) can result in communication problems and instigate conflict. This issue of culture gap has, moreover, been prevalent in the Cap Gemini case studied by Allen (1999). This is indeed a phenomenon that can be found in many business ventures between enterprises or even within the individual divisions within an organization (Putnam and Poole 1987). In a survey of IT projects conducted by Wateridge (1995), it was discovered that users perceived the 'lack of adequate user involvement' and 'problems in communication' as the reasons for the failure of projects. Also, the differing viewpoints (objectives and agendas) have been cited as potential causes of problems in IT projects (Poullymenakou and Holmes 1996). Multiple viewpoints have also been cited as a cause of conflict in a case where a participant, such as a developer or a sponsor, was keen on investing in new technology, but this conflicted with the needs of other stakeholders (adopters) (Hørlück 1995, Cavaye 1995).

With regards to the ETHICS approach, Mumford (1979) states that the ISD is commonly viewed as an instrument of change in work processes, owing to which there could be a rise in conflict of interest between the different stakeholders involved in those processes. To resolve these conflicts, open discussion of conflicting interests is strongly recommended, so that a solution that is more or less acceptable to the relevant stakeholders is arrived at through negotiation. Moreover, Checkland (1990) also recognizes the fact that the different stakeholders can hold conflicting goals. This could be due to differences in “Weltanschauung”, or the perception of the environment, or considerable differences about the identity of the owner, the customer, or the actor.

IBIS provides a formal structure for exploring "wicked" problems (Conklin 2000). A problem is considered wicked because of a disagreement as to what the problem really is. This disagreement becomes an issue, which is discussed with the aim of coming up with new ways of looking at the problem. Wicked problems arise as a result of the involvement of multiple stakeholders. Wicked problems are made complex by the fact that none of the stakeholder groups can be left out, thereby challenging problem-solving activities. Owing to the social nature of the process of dealing with wicked problems,
communication among stakeholders is imperative. Jackson (1999, 2000) proposes the use of *problem frames* in the analysis of problems in software development projects. Easterbrook (1991) suggest two possible sources of conflict in a real-world system development process - conflict between the participants' perceptions of the problem domain, and conflict between the many goals of a design. Other sources of conflict include conflicts between suggested solution components; conflicts between stated constraints; conflicts between perceived needs; conflicts in resource usage; and discrepancies between evaluations of priority.

The process of IS implementation is closely linked to ISD, which are both social aspects of an IS project (Walsham 1993a). Walsham (1993a) also maintains that the consideration of stakeholder viewpoints should invariably take place during the implementation of information systems, especially when the project is accompanied by changes in business processes. Indeed, social issues are considered the most challenging in the process of IS implementation (Hopelain 1981). The causes of conflict in IS implementation are primarily social in nature, and contribute to the difficulty of project managers in understanding all the pertinent issues and the interconnections between the issues (de Abreu and Conrath 1993). This adds to the complexity of the context in which the project managers have to select appropriate solutions to the issues. By stressing the fact that an IS project entails a social process, Walsham (1993a) and Keen (1981) advocate coalition-building between the project managers and the other primary stakeholders as this will tend to minimize stakeholder resistance to the changes brought about by the information system. This, in turn, requires project managers to be endowed with the authority and the resources to effect this change. The building of coalitions or alliances is also considered to be highly significant in the development of interorganizational systems (IOS) as this can generate new ideas and build support for the IOS among the participant firms (Johnston and Vitale 1988). Furthermore, tactical approaches had been suggested for project managers to minimize resistance in the organization. Such approaches included a contract for change in the relevant business processes, identifying resistance as an indicator of issues to be dealt with, interacting closely with the potential users and establishing rapport, and co-opting the early involvement of the users. The *Expectancy* studies, a stream of IS implementation research present the direct correlations between the expectations of stakeholders prior to information system implementation and the attitudes and actual use of the stakeholders in the post-implementation stage (Lyytinen
and Hirschheim 1987, Ginzberg 1981). Thus, by developing an understanding of the beliefs and desires of stakeholders with regards to how the proposed information system will or will not serve their interests, project managers will be able to initiate actions geared towards the fulfillment of the expectations.

Landry (1995) claims that problems in IS projects are socially constructed by stakeholders, which includes project managers and top management. To work toward resolution of the problems, project managers need to change the stakeholder perceptions regarding the problem either by modifying the features and requirements of the information system or by diverting the perceptions to something else. Metcalfe (2002) argues that the argumentative process can be beneficial to IS projects by providing project managers the chance to understand the viewpoints of stakeholders and discuss and debate pertinent issues with them. In fact, Metcalfe (2000) also argues that by asking stakeholders their concerns with regards to some aspect of the information system (or in its entirety), project managers will be able to understand their perceptions. The "optimum problem-solving" approach should consist of the elicitation of stakeholder concerns, analyzing the concerns, and communicating the project manager's understanding of the concerns to other stakeholders.

Willcocks and Mark (1989) strongly maintain that project teams involved with IS implementation need to consider political and cultural issues in the management of associated changes. The authors proposed the administration of training programs to familiarize users with the IS, and to create a congenial environment for the implementation and use of the IS. Walsham (1993a) also speaks in the same strain by indicating how training program can be used to convince stakeholders of the merits of the proposed information system. Thus, political and cultural support for the IS project need to be established through interactions with other prominent stakeholder groups in the organization. Hansen (2002) points out that with the rise in the number of users of web-enabled services, the role of the web project team becomes even more crucial, as it needs to be more aware of user needs and training. Thus, the team should be able to identify groups of users that need to be trained and familiarized with the web application.

Even from projects that were perceived as falling short of being successful, a certain level of learning should have taken place for project managers, which can assist them in better
understanding stakeholder issues in future IS projects. Project managers should aim to understand and capture their experiences gained from a particular IS implementation (Walsham 1993a, Marchewka 2003). The experiences are then employed as an assistance tool in future projects. Thus, learning from experience and sharing these experiences among project members is considered to be of paramount importance in identifying and understanding stakeholder viewpoints and conflict antecedents in new projects. This is also claimed by (Hirschheim and Klein 1989b) who suggest that project managers can use prior experience with similar projects in the past to alleviate resistance. Moreover, Baker (1995) speaks in a similar strain by putting forward that both the intended and unintended consequences of the process of strategic information systems planning can be a potential vehicle for organizational learning for future project. Detlor (2003) advises web designers to be “more proactive in learning about the situated use of internet-based IS”, by analyzing the typical problem situations faced by particular user groups, and incorporating the analyses into future web design. The notion of capturing project experience and the subsequent utilization of the experiences as an instrument for organizational learning is comparable to the concept of the experience base advocated by Basili et al. (1994).

The issues requiring further investigation from existing research in Table 5 have been further discussed in this section. Subsequently, they have been summarized as key points in Table 6.

<table>
<thead>
<tr>
<th>Key Points</th>
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<tbody>
<tr>
<td>• Conflict antecedents do exist and conflicts do break out in IS projects</td>
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<tr>
<td>• The multiple viewpoints held by stakeholders over an IS project can be in conflict with each other (also stated in Table 5)</td>
</tr>
<tr>
<td>• IS projects bring about changes in the way stakeholders do their work, which gives rise to resistance to stakeholder involvement with the proposed information system (also stated in Table 5)</td>
</tr>
<tr>
<td>• Since resistance and conflict are an integral part of IS projects, project managers need to deal with stakeholder issues</td>
</tr>
<tr>
<td>• The expectations of stakeholders can also explicitly hint at the kind of actions that can be initiated to motivate their involvement with the proposed information system.</td>
</tr>
<tr>
<td>• Project managers need to keep communication lines open with stakeholders</td>
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<tr>
<td>• Stakeholder involvement in IS projects is encouraged</td>
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<tr>
<td>• By understanding stakeholder concerns, project managers will be able to develop ideas about the perceptions of the stakeholders with regards to some or all the aspects of the proposed information</td>
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system.
- Training programs and the establishment of a congenial environment for the use of the proposed information system can minimize resistance and the chances of the antecedents manifesting into conflict
- Projects managers should share, and utilize in new situations what they have learnt from their experiences in past projects

<table>
<thead>
<tr>
<th>Issues for further investigation</th>
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<tbody>
<tr>
<td>What do we mean by the term “concerns”?</td>
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</table>

Table 6. Key issues emerging from IS research on conflict management

2.4 The Notion of Concerns

As indicated in Table 4, concerns are non-negotiable requirements stemming from the strategic goals of the organization and may impose constraints on requirements or translate into obligatory requirements (Sommerville and Sawyer 1992b, Sommerville and Sawyer 1997, Sommerville et al. 1997).

Before proceeding any further into the discussion of the notion of concerns, it is essential to articulate a clear distinction between the terms “concerns” and “problems”. Metcalfe signals a warning to the advocates of scientific management against the use of the word "problem" to objectify facts (Metcalfe 2000). The objectification of facts to state problems implies an independence from human problem-owners, thereby legitimizing the universality of the issues, and thus preventing the subsequent claim by elite figures to be the sole producers of viable problem solutions, an argument strongly presented by Saul (1997). In reality, a problem does not exist independently of the problem-owner. Metcalfe (2000) goes further to cite an example of the "problem" of organizational efficiency claimed by the higher echelons of management in enterprises, as if this was an issue affecting the general workforce. On the contrary, the issue was a problem only because higher management perceived it as such. In other words, if top management were non-existent, the problem of organizational efficiency would not arise. According to Landry (1995), problems are perceptions in the minds of humans. Thus, it is more appropriate to refer to such issues as "concerns" rather than problems, as the former closely associates the issues with an owner. Furthermore, referring to issues as concerns also aligns the notion with the multiple perspectives or viewpoints approaches (Wood-Harper et al. 1996).
At the same time, from Table 5 and Table 6, it can be seen that the potential users of information systems also have needs and expectations that are to be complied with, should the project be successful in terms of stakeholder satisfaction. From this it can be induced that all stakeholders have concerns, which are expressed through their respective viewpoints. Similarly, the project team also has its own concerns, which are basically aligned with the related strategic concerns of the organization (Irani 2002, Jacobson et al. 1992, Davenport 1993). At this stage, one may wonder – if concerns are expressed through the different viewpoints of multiple stakeholders, how do we know that they are focused on the same issue? Churchman (1971) enlightens us in this regard by advocating the splitting of the problem issue from the person who perceived it as such (i.e. separating the concern from the person who expressed it), and then asking other people to express their concerns over the problem issue. A stakeholder may express a range of concerns pertaining to a particular problem issue. Ultimately, the concerns will be analysed and reconciled with the aim of generating a collective viewpoint on the problem, a perquisite to producing a collective solution (Metcalf 2000). Such an undertaking is in line with the Theory of Communicative Action by Habermas (1984), who reiterated that members of society will jointly pursue actions to reach a rational consensus and mutual understanding, thereby bringing about the evolution of society. It should also be noted that if this consensus and mutual understanding cannot be reached, the concerns can potentially intensify (Wilson 1983), and result in full-blown conflict. Therefore, in concerns can be detected the seeds or antecedents of conflict (Sarkar and Cybulski 2002a).

Landry (1995) and Metcalfe (2000) supports the importance of stakeholder concerns in IS projects by maintaining that the perceptions of stakeholders with regards to the proposed information system are formed on the basis of their concerns. Therefore, project managers' understandings of the concerns of stakeholders are central to the "good design" of information system (Metcalf and Powell 1995). Metcalfe and Powell (1995) further add that concerns provide the primary "lens" by which people process multitudes of information. In other words, they assign priorities to the messages on the basis of their concerns. Baskerville and Wood-Harper (1998) employ the term "areas of concern", which warrants attention at the outset of an IS development process. Hence, my definition of a stakeholder concern is an expansion of the working definition given in chapter 1 and an amalgamation of the previously discussed concepts, accordingly:
A concern is an issue voiced by a particular stakeholder with regards to some aspect of the proposed information system, which impacts the stakeholder's involvement in this system and which when addressed will determine the need for further evolution of the system.

In a sense, concerns are related, albeit not directly, to the expectations of stakeholders (Lyytinen and Hirschheim 1987), i.e. both concerns and expectations are undoubtedly linked to their beliefs regarding what aspects of the proposed information systems will (or will not) motivate their involvement. Mazur (2003), an avid proponent of the QFD (Quality Function Deployment) technique advises project managers to prompt customers and users to convey their main concerns regarding issues that prevent them from achieving their work-related and personal goals. They are also asked to state opportunities they are currently unable to avail, or reveal issues that consolidate their social position in the organization.

The notion of concerns has been prevalent in other research disciplines as well. The Concerns Based Adoption Model, also known as CBAM, was an innovative approach that originated from educational research in the 1970’s and 1980’s (Anderson 1997). The model was aimed at conducting an in-depth study into the process of change experienced by school teachers involved in the implementation of new curriculum and modes of teaching. One of the prime components of the model is the concept of the Stages of Concern (SoC), which is a framework for elaborating the "feelings and motivations" of teachers with regards to the change in curriculum and instructional practices at different junctures in the implementation of new educational programs. The stages are:

Stage 0 Awareness: a stage where the teacher has scant knowledge or interest in the change

Stage 1 Informational: a stage where the teacher has become interested in knowing more about the change and its implication

Stage 2 Personal: a stage where the teacher is anxious about her/his ability to implement the change. There could also be concerns about the appropriateness of the change, and effects of the change on her/him personally.
Stage 3 Management: a stage where the change program has been implemented, and the teacher is concerned with the new behaviors and practices related to the change.

Stage 4 Consequence: the teacher is concerned with the impact of the change on students and with the possibilities for improving the effects of the change.

Stage 5 Collaboration: the teacher is looking at jointly working with colleagues to improve the effects of the change program on students.

Stage 6 Refocusing: At this stage, the teacher is thinking about bringing about significant modifications to the change program, or even considering the possibility of replacing it with another initiative.

Anderson (1997) indicates that a teacher, whose concerns are at an earlier stage, will not express concerns related to the more advanced stages, i.e. stakeholder with awareness or informational concerns (stages 0 and 1) will hardly express concerns associated with the management (stage 3) or consequences (stage 4) stages. Even though SoC depicts concerns in line with the progression of the change program, a teacher at an informational stage may not eventually advance to the collaboration and refocusing stages, owing to the fact that the project may have been abandoned. The SoC framework of CBAM provides a classification mechanism for concerns, which can be applied to web implementation projects as well. The associated properties of concerns have been summarized in Table 7.

<table>
<thead>
<tr>
<th>Key Points</th>
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<tbody>
<tr>
<td>• Referring to issues of contention as “problems” objectify these issues, thereby ignoring the perspectives of people who expressed them and subsequently, restricting resolution in the hands of an elite.</td>
</tr>
<tr>
<td>• These issues are considered problems because some people perceived them as such.</td>
</tr>
<tr>
<td>• Thus, the term “concern” is more appropriate as it relates the issue to the original perspective/viewpoint of the person.</td>
</tr>
<tr>
<td>• Concerns are expressed through the perspectives/viewpoints of stakeholders.</td>
</tr>
<tr>
<td>• However, splitting the actual issue of concern from the perspective/viewpoint can enable other stakeholders to voice their concerns over the issue.</td>
</tr>
<tr>
<td>• Ultimately, concerns need to be analysed and reconciled with the aim of generating a collective viewpoint on the problem, a perquisite to producing a collective solution.</td>
</tr>
</tbody>
</table>
• If the consensus and mutual agreement is not reached, the collective solution becomes impossible, thereby intensifying the concerns, and leading to conflict.
• Thus, highly intense concerns signal the antecedents of conflict.
• Project managers’ understandings of the concerns of stakeholders are central to the "good design" of information system
• A concern is an issue voiced by a particular stakeholder with regards to some aspect of the proposed information system, which impacts the stakeholder’s involvement in this system and which when addressed will determine the need for further evolution of the system.
• In line with the progression of a project, stakeholder concerns move from one stage to the other.

| Issues for further investigation | • How do the issues, discussed in previous sections, and the concept of concerns all fit into the realm of WBIS development and implementation? |

Table 7. Key points regarding the notion of "concerns"

### 2.5 Emergence of the Conceptual Framework

The issue for further investigation in Table 6 leads to the formation of a conceptual framework for this study. In fact, the inputs for this model are gathered from the key points listed in tables 1-6, as illustrates in Figure 1.

From the key points in Table 2, a web system is developed and implemented iteratively. This is shown by the evolutionary cycles of 1, 2 to n, where an enhanced version of the WBIS takes place at the end of each cycle. Furthermore, WBIS development is characterized by the involvement of a broad and diverse range of stakeholders, represented in the diagram by the stick figures A, B, and C, holding their respective viewpoints (vp. A, vp. B, and vp. C) with regards to their involvement with the web system. From these respective viewpoints, stakeholder concerns and requirements are gathered.
In Figure 1, concerns can be gathered by the project manager from the viewpoints vp. A, vp. B, and vp. C. The clouds of conflict antecedents can be seen to be looming near the concerns expressed through the viewpoints. By analysing the concerns, the project manager should be able to understand why the stakeholders are putting up resistance against the project (shown by the “resistance” arrow) or why the potential for such resistance could even exist. Being aware of the importance of these concerns, the project manager initiates actions to address the concerns (shown as an “action” arrow counteracting the “resistance”). In this regard, she/he could use either personal or organizational experience from previous projects, which is indicated by the experience base in Figure 1.

Of course, this conceptual framework has been derived from the review of relevant research literature. However, to examine the conceptual framework in light of actual experiences of project managers in dealing with stakeholder concerns in web projects, it is beyond the least shadow of doubt that a thorough empirical investigation is imperative. In other words, existing literature does not satisfactorily describe the impact of stakeholder concerns in the evolution of the WBIS, as perceived by project managers. In addition, we are yet to gain an understanding of the nature of the concerns in the
implementation of web-enabled workflow systems, as well as the experiences of project managers in dealing with the concerns. It is, therefore, necessary to embark on an empirical investigation of these issues, which are reported in the following chapters.

2.5. Summary

Research into the area of web-based information systems (WBIS) conveys the iterative and evolutionary nature of web development. Furthermore, the complexity of such projects, due to the usual presence of a diverse and heterogeneous set of stakeholders and the consequential difficulty in specifying system requirements is highlighted. However, there are a number of aspects regarding WBIS projects, as outlined in Table 2, that still remained unclear and required further investigation.

To address these aspects, it was imperative to consult research in stakeholder theory and ISD. This inquiry revealed that the inclusion of stakeholders in managerial decision-making process is an important determinant of success in business venture in general and in the development of information systems in particular. The review led to the discovery of the notion that an organizational entity is invariably composed of stakeholders coming from diverse backgrounds and having distinct aspirations. Thus, they commonly hold different perspectives or viewpoints leading to individual needs and objectives. The concept of stakeholder viewpoints has been elaborated at length in RE literature, according to which stakeholder identification and articulation of their viewpoints should be undertaken at the outset of a software development project (in fact, requirements analysis and determination is the first stage in the project). However, the information systems discussed in these studies were primarily large and traditional non-web applications, which involved a pre-determined set of users and were not subjected to pressures of rapid development time frames associated with WBIS. In other words, the development of WBIS does not have the time for a clear-cut viewpoints analysis and requirements establishment stage.

The inevitable question that arises at this juncture is what happens if the viewpoints of stakeholders are not addressed by project teams? According to the literature, resistance to the information system and subsequent conflict between stakeholder groups are likely to
occur as a result of ignoring stakeholder viewpoints. Hence, the bottom line is that the seeds of "dissent" and conflict are sown in a situation where the perspectives of the various stakeholder groups are deliberately or unintentionally suppressed, a highly significant factor that led me to look into conflict theory. The evidence derived from these studies revealed that conflict was a phenomenon that occurred in stages beginning with the existence of latent factors or the antecedents of conflict, and finally resulted in the manifestation of conflict. Thus, it was evident that one of the prime aspects that project teams should be highly aware of relates to the formation and existence of these antecedents in the viewpoints of stakeholders. Case studies in ISD present situations where conflict was triggered between stakeholder groups when one party felt that its viewpoints were not given fair consideration. IS researchers propose a number of general actions that project managers can undertake to ease stakeholder resistance and minimize the chances of full-blown conflict. The importance of learning from experience in administering projects, even when the outcomes of the projects were not satisfactory, was emphasized. Furthermore, the construction of some form of an experience base to effect organizational learning was encouraged in IS project management literature.

Further investigation of ISD and RE literature revealed the importance of understanding stakeholder concerns by project managers. This is because concerns provide a lens through which stakeholders perceive the implementation of an information system. This prompted a thorough examination of the concept of concerns and the emergence of my working definition of a stakeholder "concern".

The key issues emerging from the literature review finally led to the formation of a preliminary conceptual framework. The model is preliminary because it is expected to evolve and re-emerge on the basis of the empirical investigation into the actual experiences from WBIS projects. In other words, the model at this stage of the thesis presentation is unable to provide the substance required by the research objectives, owing to which the empirical investigation was therefore recommended. The subsequent chapters deal with the various facets of the proposed empirical investigation. Prior to this, a discussion of the research methodology is presented in the next chapter.
Chapter 3: Research Methodology

3.1 Introduction

This chapter presents methodological issues related to the study I have undertaken. Before embarking on the discussion, the original research objectives are presented once again (cf. Chapter 1) with the aim of justifying the choice of an appropriate research paradigm, and the underlying epistemology, i.e.

- To identify the experiences of project managers with regards to the impact of stakeholder concerns on the implementation and evolution of WBIS

- To determine the experiences of project managers in dealing with stakeholder concerns during the implementation of WBIS

- To establish whether the commonalities in the experience of project managers can be captured across the domain of WBIS.

- To ascertain the extent to which the collected domain experiences could be “generalized” in terms of its relevance and usefulness to managers involved in new projects in the same domain

Therefore, this study aims to generate a sound understanding of the experience of project managers in dealing with stakeholder concerns during the implementation and further evolution of web services throughout the enterprise. The intent is definitely focussed on how project managers perceive and understand the concerns of the stakeholders during system implementation, rather on the implementation processes themselves. Undoubtedly, this implies an exploration of social phenomena surrounding WBIS projects – a world where the meanings attributed by the project managers to their experiences in dealing with stakeholder concerns are socially constructed (Ngwenyama and Lee 1997). Such a stance is commonly associated with constructivism and subjectivism (Crotty 1998), which both epistemological perspectives call for the utilisation of qualitative research methods (Moreno Jr. 2001). Moreover, the terrain of the stakeholder research in WBIS is still largely unexplored owing to its relative novelty and non-static momentum, which may lead to an interpretive approach to be embraced in order to induce an in-depth understanding of the phenomena from empirical data.
3.2 Opting for the Qualitative Paradigm

Qualitative research originates from the disciplines of social science and education, where the complexities of human behaviour, such as motivation, communication, and understanding, are studied (Taylor and Bogdan 1984). Stakeholder concerns associated with web projects undoubtedly present a situation with a considerable degree of complexity and dynamism, owing to which the qualitative paradigm is eminently suitable for studying them (Cronbach 1975). In contrast, quantitative methods are largely incapable of effectively capturing the understanding of phenomena as experienced by the stakeholders (Kaplan and Maxwell 1994, Cronbach 1975). The behaviour, feelings, and thoughts of humans can only be comprehended if the investigator conducts an in-depth study into their world and their roles in that world (Gillham 2000). The research objectives, discussed in chapter 1 and outlined earlier in this chapter, invariably necessitate a study that probes deep into the complex interactions and institutional setting prevailing in Information System Development (ISD). Qualitative studies focus on the perceptions and experiences of participants, which enable the researcher to understand the phenomenon being studied as well as why it has occurred and its significance (Gillham 2000). In studies of organizations and their projects, qualitative research enables the investigator to "get under the skin" of the organization such that he/she is able to discover the meaning of things as perceived by the participants. Moreover, a qualitative approach enables the researcher to gain an intimate understanding of the nature of phenomenon from the participant’s (e.g. project initiation, user) viewpoint (Leedy 1997). Through qualitative methods, the researcher is able to "distil" meaning and generate her/his understanding of phenomena. This meaning can only be assigned to a phenomenon through an examination of its context and a thorough understanding the position of stakeholders whose actions can impact or be impacted by the phenomenon (Cavaye 1996). Thus, in accordance with the objectives of the research project, a qualitative approach becomes imperative (Kaplan and Maxwell 1994).

3.3 An Interpretive Approach

The interpretivist approach provides a prominent epistemological and theoretical perspective that naturally embraces both constructivism and subjectivism, which social researchers define as the aim for development of a thorough understanding of the manner in which study participants create, modify, and interpret some phenomenon, as they perceive it in a social context (Burrell and Morgan 1979, Crotty 1998). In an interpretive investigation, the researcher aims to understand the structure of phenomena by studying the meanings assigned to them by the participants (Orlikowski and Baroudi 1991). Thus, the interpretive researcher intends to carry out an investigation of the phenomenon of interest in its natural setting and from the viewpoints of the
participants who've experienced the phenomenon, while abandoning or suspending any presupposition of a priori constructs or theory that she/he might posses (Orlikowski and Baroudi 1991, Glaser and Strauss 1967).

The prime aspects of this research, illustrated by the objectives, are inadequately substantiated by existing information systems theories. A positivist approach is unsuitable owing to the lack of the existence of "a priori fixed relationships within phenomena which are typically investigated with structured approaches" (Orlikowski and Baroudi 1991) Moreover, there are no formal propositions, quantifiable measures of variables, or testing of hypotheses. However, I seek to understand and explain the experiences of project managers, derived from their consideration with stakeholder concerns during the implementation and roll over of WBIS, without a set of a priori constructs. Therefore, an interpretive approach is opted for as it will enable me to extract the constructs from the field by meticulously subjecting myself to the phenomenon of interest and investigating it (Orlikowski and Baroudi 1991). Gillham (2000) speaks in the same strain by indicating that an investigator embarks on an interpretive study, when the existing theories have "little bearing" on the research problem. The investigator does an interpretive study when he/she is unsure of the relevance of previous work in the area. In this kind of study, the researcher first looks at the context of the research questions, the means of working in these questions, and likely explanations emerge. Interpretive research firmly rests on the premise that social reality can only be interpreted, rather than captured in hypothetical deductions (Rosen 1991).

Inductive data analysis is often used in qualitative studies. It has an interpretive character, and is directed at the discovery of situated meaning as experienced by the participants, as well as, that interpreted by the investigator (Hoepf 1997). In fact, Lee (1994), states, in his groundbreaking article that empirically investigates electronic mail as a medium for rich communication, that an interpretive approach enables the researcher to figure out how the participants associated with an electronic medium (such as e-mail) understand themselves and their involvement with the medium, as well as their organizational context. In other words, interpretive understanding involves the investigator's understanding of the participants' subjective understanding (Lee 1991). According to Walsham (1993b):

"...the position that our knowledge of reality, including the domain of human action, is a social construction by human actors...Thus there is no objective reality that can be discovered by researchers and replicated by others, in contrast to the assumptions of positivist science. Our theories concerning reality are ways of making sense of the world and shared meanings are a form of intersubjectivity rather than objectivity. Interpretivism is thus an epistemological position, concerned with approaches to the understanding of reality and assuring that all such knowledge is necessarily a social construction and thus subjective."
This research aims to understand the various concerns of project initiators and other baseline stakeholders with regards to their involvement with a proposed WBIS, and gain insights into how these concerns are addressed and what are the consequences, which essentially probes into a world where knowledge is socially constructed and hence, subjective. Thus, an interpretivist approach was adopted as it provided the most appropriate philosophy for undertaking the study (Strauss and Corbin 1990, Walsham 1993b, Klein and Myers 1999). This decision was further strengthened by the claim of Boland (1979) with regards to the fundamental principle held by the interpretive researcher:

"... individuals act towards things on the basis of the meanings that things have for them, that meanings arise out of social interaction, and that meanings are developed and modified through an interpretive process"

One of the most noteworthy arguments has been made by Klein and Myers (1999) who contend that more in-depth insights into the area of information systems development (ISD) can be obtained through the adoption of an interpretive epistemology in IS research. According to Carroll and Swatman (2000), interpretive research may adopt a number of different data collection strategies, to include study of documents, interviews, and observation, and data analysis strategies, which may use hermeneutics, phenomenology, or grounded theory. Other IS researchers, such as Butler and Fitzgerald (Butler and Fitzgerald 1997), Crotty (Crotty 1998), and Kanungo (Kanungo 1993), also consider the interpretive approach as the most appropriate to the study of the phenomenon of ISD in organizations.

3.4 Adopting Phenomenology

Having ascertained the appropriateness of taking the interpretive path, it is now time to discuss the philosophical basis for this research. The phenomenological approach has been selected as the most suitable for the purpose of the study reported in this thesis. The reasons why phenomenology was preferred over other alternative, namely case studies, however, need to be justified. These reasons are discussed later in section 3.4.3.

In view that phenomenology supports the fundamental principles of interpretive investigation, Boland (1979) strongly recommends its application to information system research. This proposition is also supported by Walsham (1993b), who stresses the high suitability of the phenomenological method to the interpretive researcher in information systems. Boland and Day (1989) further maintain that the phenomenological method plays a significant role in the subjectivist, interpretive slant towards the investigation of social phenomena in information systems. Furthermore, according to Sorrell (1995), phenomenological research is interpretive in
nature as it is aimed at uncovering the meanings concealed in the phenomenon, which is
experienced and narrated by the participants of the study. Another prominent supporter of the
phenomenological method as part of the interpretive epistemology is Zuboff (1988), who states:

"Researchers must have a theory of reality and of how reality might surrender itself to their
knowledge-seeking efforts. These epistemological fundamentals are subject to debate but
not to ultimate proof... My own commitment to understanding social phenomena has been
fundamentally shaped by the study of phenomenology and, in particular, its application to
sociology and psychology."

Thus, the significance of phenomenology as the underlying philosophy behind interpretive
research can be established. However, to justify my adoption of the phenomenological approach,
discussion of its appropriateness and suitability to the research objectives is imperative in a later
section. Prior to that, it is important to provide a brief description of the advent of
phenomenology, followed by its application in the field of information systems research.

3.4.1 Advent of Phenomenology as a Philosophy

Even though the origins of the philosophy lay with the works of Hegel, Kant, and Descartes,
Edmund Husserl founded the concept of the transcendental phenomenology, and focused on the
structure and meaning of phenomena, the essence of human experience (Husserl 1965).
According to the proposed concept, the structure and meaning of the phenomenon of interest can
only be derived by suspending or removing all presuppositions and preconceptions. Being a
philosopher as well as a mathematician, Husserl’s aim was to develop phenomenology as a
rigorous science. Kockelmans (1967) explains that by adopting a "presuppositionless philosophy",
Husserl made the statement "back to the things themselves" to herald the return to the immediate
and original experience of consciousness. In other words, he argued that philosophy was designed
to describe the data of consciousness without a priori conceptions or theories. In this way, the
essence and meaning of the phenomenon, as experienced by the subjects of study, can be
analysed. Primordial phenomena form the foundation of all philosophy. By means of
phenomenological reduction, a method that essentially proposes the “peeling off” the layers of
presuppositions, the essence, structure and meaning of the phenomenon can be obtained and
understood.

Heidegger (1962), another renowned phenomenologist, proposed a method that was similar to that
of Husserl. However, he argued that it is impossible to simply take away all the preconceptions
and presuppositions of the researcher. Instead, he proposed the incorporation of such researcher's
biases in the record of observed phenomena. In dealing with these captured biases, he proposed
the method of their explicit "Bracketing" or highlighting during analysis to clearly identify researcher's preconceptions and prejudices regarding the phenomenon. Gadamer (1976) extended the existential phenomenology of Heidegger by emphasizing the importance of the role of prior experience of the researcher in the actual interpretation of meaning and essence of the phenomenon that is being studied. His contribution is known as the Hermeneutical Phenomenology in which he put forth the notion that the thorough understanding of phenomena is a dialectic process. This involves cycles (collectively referred to as the hermeneutic cycle) of reciprocal dialogue between the researchers and the subjects of the study. This intersubjective process is not only confined to dialogue with subjects who have experienced the phenomenon but extends to the representation of the experience in the form of text, the main medium of hermeneutic enquiry. With each cycle of the process, the researcher should have acknowledged her/his presuppositions and prejudices, thereby leading to further and enhanced interpretation and reinterpretation of the experiences of the phenomena.


### 3.4.2 Phenomenology applied in Information Systems Research

Boland (1985) adopted the hermeneutic phenomenology of Gadamer and applied it to research in information systems, by claiming that social scientists investigate the interactions between system developers and users and attempt to interpret the significance and potential meaning they hold. Thus, research on information systems is a hermeneutic task. Before delving deeper into the subject, I will explain what is meant by the concept of phenomenological hermeneutics or hermeneutic phenomenology. Basic themes, such as "interpretation" or "textual meaning", are associated with the concept of phenomenological hermeneutics (van Manen 2002d). Accordingly, a phenomenological study becomes hermeneutic when it is used under the umbrella of an interpretive epistemology. In fact, hermeneutics is defined as the theory of the interpretation of meaning (Bleichner 1980). The movement of phenomenological hermeneutics has been
spearheaded by the renowned phenomenologists, Heidegger (1962), Gadamer (1975), and Ricoeur (1981). Heidegger (1962) states that the object being investigated by the phenomenologist is not visible or explicitly stated. On the contrary, it remains hidden beneath the surface or in a disguised form. Thus, by applying hermeneutics to the phenomenon of interest (the object), the researcher is able to interpret and understand the meanings that are not apparent on the surface. Heidegger's claim is supported by Ricoeur (1981) in his recommendation for embarking on a hermeneutic path of interpretation to uncover the underlying and implicit meanings inherent in the phenomenon of interest. Ricoeur also maintains that phenomenology and hermeneutics presuppose each other. Gadamer (1975) warns that the interpretation of these hidden and implicit meanings may raise questions of ambiguity, and proposes a discursive-dialectic process to reduce the degree of ambiguity. This is referred to as the hermeneutic circle of understanding, an iterative process of interpretive analysis of meanings from the narratives of subjects with regards to the phenomenon of interest.

Boland (1985) further argues why phenomenology can be considered a “preferred approach to research on information systems” by reiterating the fact that the “life world” experiences of information systems are comprised of communicative interactions, which amount to an interpretive situation. Through a hermeneutic engagement with the bearers of the experience (i.e. humans who have been involved with the design and use, and the multiple texts of an information system), phenomenology enables the researcher to gain insights and elaborate the “interpretive structures” associated with design and use of information systems”. This is echoed by Myers (1995) who states that in the context of the hermeneutic study of IS projects, underlying social and political issues can be interpreted from the text originating from the interviews and case studies. The views of the project participants and their experiences with relevant phenomena are typically captured in such texts. Boland (1985) further strengthens his argument in favour of the application of phenomenology in information systems by contending:

“Data becoming information is what information systems are. Data becomes information in the consciousness of a human subject, and that is where we must look if we are to understand information systems. Phenomenology as a social science method holds the best promise for doing so because it is the only method designed with that purpose in mind.”

Hence, the social world, of which organizations and information systems are part of, can be best understood through the subjective and intersubjective accounts of the social actors. Thus, the understanding arises from the analysis of the viewpoints of those involved in the particular social process (Boland and Day 1989). This seminal application of the phenomenological method in information systems research enabled the analysis and discussion of the phenomena of system design that was experienced by an individual system designer. The usefulness of the application
of phenomenology to IS research has also been suggested by Klein and Myers (1999), who highlight the formulation of their principles of interpretive research in IS from phenomenology and hermeneutics. Finally, Butler (1998) believes that the development and implementation of information systems consist of "socially constricted phenomena", which can be examined at length by researchers holding a constructivist perspective through the application of phenomenological hermeneutics.

Moreno Jr. (1999) applied the phenomenological method in his investigation of the experiences of organizational members who had undergone a business process-reengineering (BPR) program. He described phenomena as "the embedded web of meanings related to human experiences, that is, things we have learnt and deduced about our social world via intuition and imagination". The transformation of the individual organizational member's norms, roles, values, and work procedures resulting from BPR projects was considered a "social phenomena". From his phenomenological investigations, Moreno discovered that IT-driven BPR programs, instead of bringing about the predicted outcomes, were complex socially constructed processes, which uncovered the conflict antecedents inherent in the organizational contexts.

Harmer (2003) also used phenomenology to study experiences of members of workgroups in order to gain insights into their perceptions regarding the role of information technologies as a mediator for the interactions between the collaborating workgroups. His investigations revealed the scepticism of workgroup members towards the effectiveness of computer-mediated technologies, such as email, in facilitating communications between the various groups, owing to the fact that it was impossible to transmit non-verbal gestures through such media. Thus, the necessity of establishing a rapport first via face-to-face encounters was apparent. Once relationships had been established in this manner, electronic media were deemed to be useful in their ability to keep the correspondences going between the workgroups.

Using the philosophy behind the existential phenomenology of Heidegger (1962), Merleau-Ponty (1962), and Henry (1974), Introna (2002) proposed an approach to the evaluation of information systems that inculcated both the rational, and the more subjective notions, which used to be referred to in the IS evaluation literature as bipolar opposites. Existential phenomenology is also used by Introna (2000) to induce that a "screen", which serves as the interface between the human user and a computer system, is essentially the "skin of information technology".

At this point in time, I need to explain why phenomenology was suitable for the purpose of my research. According to Sanders (1982), phenomenology is the study of conscious phenomena, or the "analysis of the way in which things or experiences show themselves". It explicates the
usually implicit structure and meaning of human experiences. The aim is to meet the pure essence of the experience. Moreover, the main aim of phenomenological research is to gather examples of experiences of the phenomenon of interest in order to reflect and contemplate on the inherent structures and meanings (van Manen 2002a). Phenomenology has been adopted as the underlying philosophy behind the analysis of the empirical findings of this study, as it examines the “lived experience” of project leaders in dealing with stakeholder concerns (Hancock 2002). Furthermore, Boland and Day (1989) confirm the appropriateness of phenomenology to the study of the experiences of individuals, in their examination of the process of information systems design from the perspective of the individual system designers. They state:

"What is real about system design is not the stages of the development life cycle, but the experience of being a system designer, as seen through the eyes of the designer".

In view of the objectives of my research project, especially the first, second, and the fourth objectives (see Chapter 1), it is beyond the least shadow of doubt that this thesis focuses on gaining insights into the “lived experience” of project managers in dealing with stakeholder concerns expressed during the implementation and further evolution of web-based information systems (WBIS). Not only does the thesis look into the impact of the stakeholder concerns as experienced by the web project managers, but it also aims to generate an understanding of what their experiences were with regards to the actions pursued by them to minimize the effects or altogether alleviate these concerns. Lastly, I am also seeking to analyse their perceptions towards “generalized” or domain experiences, provided to the extent of their facility, as learning or problem-solving tools in addressing stakeholder concerns in new web initiatives. These clearly demonstrate a need to probe into the structures and meaning of the experiences of project managers. Phenomenology comprises of data gained from experience, the meaning that experience holds for the project managers, and importantly, the essence of the phenomena (Giorgi 1971). Thus, phenomenological studies and combined with hermeneutics can be employed together (Galliers 1985) to effectively gain an understanding of the phenomena examined in this study.

Before proceeding onto the discussion of the phenomenological method in the following section, I will briefly explain my choice of the phenomenological variant adopted for the purpose of this study. There are several schools and traditions within the phenomenological movement (van Manen 2002d), which include transcendental phenomenology, existential phenomenology, hermeneutical phenomenology, linguistical phenomenology, ethical phenomenology, and the phenomenology of practice. Of these schools, I have chosen the phenomenology of practice or experiential phenomenology, as it is appropriate to the researcher who is more interested in
applying the phenomenological method to her/his empirical inquiry than in the study of the philosophy of phenomenology per se (van Manen 2002e, Schon 1987, Harmer 2003).

3.4.3 Preference of Phenomenology over the Case Study Method

The preceding sections have provided an in-depth look at phenomenology and the appropriateness of the phenomenological method to the study. However, a researcher needs to compare and contrast the various options before choosing a particular method with which to embark on her/his study. The closest alternative in the context of the study include case study method, but reasons why the method was not found to be as suitable as phenomenology are discussed in the subsequent paragraphs.

Yin (1994) defines case studies as:

"...an empirical enquiry that investigates a contemporary phenomenon within its real-life context, especially when the boundaries between the phenomenon and context are not clearly evident".

Case studies are appropriate for IS research as the study of information systems is increasingly being approached from an organizational perspective, rather than a technical one (Benbasat et al. 1987). Furthermore, case studies are appropriate when a phenomenon is inadequately substantiated in theory, or when contextual factors need to be captured (Cavaye 1996). In this regard, one may consider case studies a suitable method of undertaking the study. However, there are subtle differences between the two aforementioned methods. Even though both methods are used to analyze and describe phenomena (especially where existing knowledge is scant), case studies are frequently associated with the development of theory, and the generation of hypotheses (Darke et al. 1998, Cavaye 1996). Thus, case study research can either in positivist (Yin 1994, Benbasat et al. 1987), or in the interpretive tradition (Walsham and Waema 1994, Walsham 1993b, Myers 1994). Yet, such facts do not provide substance to justify the choice of one research method over the other. Creswell (1998, pp. 65) compares both phenomenology and case study research along a number of dimensions; the most relevant one for the particular purpose (for the justification of one method over the other) at this stage includes the focus.

The focus of case study research is on developing a detailed account analysis of one or more cases (Stake 2000). A case is a "bounded system" (bounded by time and place) (Creswell 1998). A case study explores such a case (or multiple cases) over a period of time by means of elaborate and in-depth data collection from "multiple sources of information rich in context". On the other hand, phenomenology is focused on the investigation of the individuals' lived experience of events and
understanding the essence of the experiences (Polkinghorne 1989, Hancock 2002). However, Creswell (1998) remarks that while it was possible to conduct case study research on the lived experiences of individuals, the method needs to be adequately substantiated with contextual material about each individual (i.e. their experiences with both work in the past and work at present, social standing within the organization and in the community at large, etc.). If the case study was being planned for an investigation into organizational experiences with projects, then the experiences of several project managers and other influential stakeholders, past and present, will need to be understood along with an analysis of crucial documents regarding the background of the project, and the history of progression (or regression).

From this comparison of the two methods on the basis of their foci, it is indeed apparent that the research objectives of the study, especially the first two, are calling for an in-depth investigation of the lived experiences of project managers involved with the implementation of WBIS. What I am interested in understanding are the essences of how the project managers perceived the phenomenon of interest, which may not necessarily reflect what they actually did at the time the phenomenon occurred. On the contrary, case study researchers will also seek to uncover what the project managers actually did when the phenomenon took place by interviewing colleagues and investigating archival material and project memos. Yet, as the research objectives, especially the first two, indicate, the study aims to understand the perceptions of the project managers rather than what they actually did and what the other contextual factors were when the experiences were formed. Thus, the phenomenological method emerges as the preferred approach for the study. At the same time, it should be noted that certain validity issues, namely triangulation, associated with the case study method will be adopted to evaluate the findings of the study. This is discussed in the later in the section on empirical evaluation.

3.5 The Phenomenological Method

As already mentioned before, phenomenological research is the investigation of individuals' lived experience of events (Hancock 2002). Harmer (2003) states that phenomenological research, at its highest level of abstraction, is considered as a holistic examination of the phenomenon of interest, followed by splitting the phenomenon into its constituent parts or essences, and finally concluded with a elaboration of the researcher's understanding of the phenomenon as a whole. Even though eminent phenomenologists generally agree not to prescribe any rigid rules for conducting phenomenological research (van Manen 1990), others (Colaizzi 1978, van Manen 1990, Moustakas 1994a, Spiegelberg 1994) nevertheless offer some suggestions with regards to the activities that are considered imperative to the purpose. According to Moustakas (1994a), these activities fall into four prime stages in phenomenological research, which are epoche,
phenomenological reduction, imaginative variation, and synthesis. He argues that the grasping the “nature, meanings and essences” of these four stages is a prerequisite to the undertaking of a phenomenological inquiry. Each of these stages are discussed the following sections.

3.5.1 Epoke

Epoke, the ancient Greek word meaning the "suspension of judgment", is the process by which one can achieve Husserl's "back to the things themselves" (Husserl 1931). Epoke involves the suspension of the researcher's preconceptions and biases with regards to the phenomenon of interest (Schmitt 1967, Sanders 1982). However, Moustakas (1994a) warns about the difficulty of approaching phenomena without the presuppositions by stating:

"This (suspensions of preconceptions and biases) is a difficult task and requires that we allow a phenomenon or experience to be just what it is and to come to know it as it presents itself. One's whole life of thinking, valuing, and experiencing flows on, but what captures us in any moment and has validity for us is simply what is there before us as a compelling thing, viewed in an entirely new way. Thus, the Epoke gives us an original vantage point, a clearing of mind, space and time, a holding in abeyance of whatever colors that experience or directs us, anything whatever that has been put into our minds by science or society, or government, or other people, especially one's parents, teachers, and authorities, but also ones friends and enemies."

However, Husserl (1931) also pointed out that the epoke involved the suspension of the “natural attitude” only. By the term “natural attitude”, he meant the scientific or rationalized constructs that are obtained from an external base. On the other hand, internal reflection and contemplation by the phenomenological researcher was not only allowed but also encouraged. So, how does one embark on this process of the phenomenological epoke? Moustakas (1994a) suggested that epoke can be achieved through cycles of reflective-meditation. In each cycle, the researcher, in a meditative space, concentrates on the phenomenon of interest, engages with her/his internal thoughts and feelings about it, and then gradually separates her/his biases and preconceptions (derived from an external base). Thus, the practitioner of epoke leaves each cycle feeling that she/he had been able to develop a new awareness regarding the phenomenon of interest.

3.5.2 Phenomenological Reduction

Phenomenological reduction is the second step in the phenomenological research method. It is defined as the task of describing in textual language the experience of the subject, not only in relation to the external object but also the "internal act of consciousness" between the phenomenon and herself/himself (Moustakas 1994a). This is also an iterative process, whereby the transcribed narratives of co-researchers are analysed and elaborated again and again. The prime objective of phenomenological reduction is to gather a "rich, accurate, and complete
textual" account of the phenomenon as experienced by the co-researchers (Moreno Jr. 2001). In phenomenological research, individuals or groups who have experienced the phenomenon are referred to as co-researchers owing to their significant role in the investigation. “Bracketing” away of presuppositions is a key element of this phase of phenomenological research (Husserl 1931, Husserl 1965). Indeed, phenomenological reduction involves the setting aside of theoretical notions and thematizations surrounding the phenomenon, with the aim of enabling the researcher to develop an abstract view the phenomenon (van Manen 2002c). Elements of the phenomena are subjected to a prereflective examination to understand them just as they appear and to "reduce" them to horizontal and thematic entities. In addition, within phenomenological reduction is inherent the process of Horizontalization, with regards to which Moustakas (1994a) stated:

"Each horizon as it comes into our conscious experience is the grounding or condition of the phenomenon that gives it a distinctive character".

During horizontalization, each and every statement made by the co-researcher is granted equal importance in order to unveil its true nature and essence. Once the iterative process of horizontalization is deemed complete, a comprehensive textural account of the experience is established. What is also of great importance in phenomenological reduction is the elimination of all irrelevant, redundant, and overlapping statements, leaving only the textural meanings and invariant constituents associated with the phenomenon, which are then clustered into themes. This final output of this stage is a textural description of the co-researcher's accounts of her/his experience of the phenomenon.

3.5.3 Imaginative Variation

Moustakas (1994a) explains that the uncovering the structure of the essences of the experience of the phenomenon is central to imaginative variation, which is essentially aimed at generating the structural meanings behind the textural descriptions, obtained from phenomenological reduction, through imagination, and looking at the phenomenon from different perspectives. In the words of this prominent phenomenologist:

"The task of Imaginative Variation is to seek possible meanings through the utilization of imagination, varying the frames of reference, employing polarities and reversals, and approaching the phenomenon from divergent perspectives, positions, roles or functions. The aim is to arrive at a structural description of an experience, the underlying and precipitating factors that account for what is being experienced; in other words, the 'how' that speaks to the 'what' of experience. How did the phenomenon come to be what it is?"

A set of steps has been prescribed for carrying out imaginative variation. It begins with the systematically varying the possible structural meanings behind the textural descriptions. This is
followed by the detection of the underlying themes or contexts behind the phenomenon. Thirdly, the universal structures that precipitate feelings and thoughts about the phenomenon are taken into account. These include the structures of time, space, bodily concerns, materiality, causality, one’s relation to oneself, or one’s relation to others. The final step is the search and discovery of exemplars of the invariant structural themes. The output of the process of imaginative variation is a structural description of the phenomenon.

### 3.5.4 Synthesis of Meanings and Essences

This is the final step in the phenomenological research process, and it involves the “intuitive integration” of the textural and structural descriptions in order to provide a unified discussion of the meanings and essences of the experience of the “phenomenon as a whole” (Moustakas 1994a). According to Husserl (1931), the synthesis of the textural-structural description of each co-researcher leads to the establishment of the “knowledge of essences”. By the term “essence”, Husserl meant the commonality or universality of the elements of the experience as obtained from the textural and structural descriptions of the individual co-researchers. The renowned existentialist, Sartre (1965) speaks in the same strain by referring to the term as the “concatenation of experiences”. The essence is the principle of a series of manifestations of the experience. Moustakas (1994a) warns against reaching a terminal conclusion to the essences of the experience. Instead, he argues in favour of leaving room open for new perspectives to emerge and supplement the existing synthesis, developed at a particular point in time and place, of the set of individual textural-structural descriptions.

### 3.6 Data Collection

According to Stone (1978), there are three main modes of data collection in phenomenological research. The most common type includes in-depth interviewing of the subjects, which are tape recorded and then transcribed. The second type of data collection is the documentary study involving the examination of writings of the co-researchers in order to generate "meanings" of the essence of their experience, which is mainly used to complement in-depth interviews. Finally, there are observation techniques, which look at the behaviour of the participants engaged in a situation induced by the phenomena under study. Observation studies are usually followed up by interviews that can generate understanding of particular behaviours observed in relation to the phenomena.

The long open-ended interview is the primary technique of data collection in phenomenological research (Moreno Jr. 2001, Moustakas 1994b). Such interviews are typically informal and
interactive. Creswell (1998) recommends the undertaking of interviews with multiple individuals who have experienced the phenomenon. The goal of a phenomenological interview is to provide a comprehensive and multidimensional account of co-researcher’s experiences (Moreno Jr. 2001). Furthermore, the practice of epoche is important here, as the interviewer should ensure that she/he has suspended her/his preconceptions and biases while eliciting the narratives of the interviewees (Moustakas 1994b). The primacy of phenomenological interviews is summarized by van Manen (2002b) with the statement:

"In phenomenological human science the interview first of all serves the very specific purpose of exploring and gathering experiential narrative material, stories or anecdotes that may serve as a resource for developing a richer and deeper understanding of a human phenomenon."

3.7 Data Analysis

The data analysis technique employed by Moreno Jr. (2001, 1999) in his research on the experiences of individual employees of IT-driven BPR programs was based on a combination of methods proposed by Colaizzi (1978), Stevick (1971), and van Kaam (1959). All three seminal methods bear similarities to each other. According to the method put forward by Colaizzi (1978), statements and phrases, pertaining directly to the phenomenon, are extracted from the narrative of each participant’s story and subsequently focused upon in order to derive its inherent meaning. Statements with similar meanings are then clustered into themes. Stevick (1971), in her study of the phenomenon of anger, adopted Colaizzi’s method, but expanded to an extent on the issue of clarity. Van Kaam’s technique (1959), while basically similar to that of Colaizzi, prescribed some enhancements with regard to data validation. The phenomenological research steps of epoche, phenomenological reduction, imaginative variation, and synthesis, are incorporated in all three methods. Thus, this thesis project follows the method recommended by Moreno Jr. (1999), which in turns adopts modified van Kaam’s Method of Analysis of Phenomenological Data, also presented by Moustakas (1994b), which involves the following steps:

- Listing and preliminary grouping;
- Reduction and elimination;
- Clustering and thematising;
- Identification of invariants and themes - validation;
- Synthesis.

Each of these steps is further elaborated in the following sub-sections.
3.7.1 Listing and Preliminary Grouping

From each narrative of the individual co-researcher, every expression, relevant to the experience, is listed and given equal value, which is also known as horizontalization. Indeed, according to van Kaam (1959):

"Every expression must be listed, whether or not believed worthwhile by the researcher. This faithfulness to 'things as they appear'... avoids the selective influence of any implicit philosophy of the researcher at this stage."

This step is aimed at familiarizing the researchers with the data.

3.7.2 Reduction and Elimination

According to van Kaam (1959) and Moreno Jr. (1999), the filtering of data takes place for the purpose of determining the invariant constituents. This involves the subjecting of each expression or statement to essential requirements, which are:

- Does it contain a moment of the experience that is a necessary and sufficient constituent for understanding it?
- If so, is it possible to abstract and label it, without violating the formulation presented by the participant?

Statements that fail to address the two requirements are discarded. The process of phenomenological reduction actually occurs in this step. Thus, irrelevant, redundant, and overlapping statements are also removed. The residue of this step consists of the horizons of meaning, or rather, the invariant constituents.

3.7.3 Clustering and Thematising the Invariant Constituents

The invariant constituents and the textural meanings of the experience, which are related, are clustered into themes. Van Kaam (1959) maintains the fact that each horizon can be part of various clusters if it illustrates more than one facet of the experience.
3.7.4 Final Identification of the Invariant Constituents and Themes by Application – Validation

This step involves the checking and verification of the invariant constituents and the themes they belong to against the complete account of the experience provide by the co-researcher. The validation of the investigator's interpretation of the phenomenological data is done by applying the two following questions to each invariant constituent (van Kaam, 1959; Moreno Jr., 1999):

- Is it expressed explicitly in the complete transcription?
- Is it compatible if not explicitly expressed?

If an invariant constituent is unable to address either question, then it is considered not relevant to the experience of the co-researcher, and subsequently, eliminated.

3.7.5 Synthesis

The final step in the technique is undertaken in four stages. The first stage involves the construction of an individual textural description of the experience from the invariant constituents and themes, following validation with the narrative of the co-researcher in the previous step. Next, imaginative variation is used to generate an individual structural description for the co-researcher from the textural description of her/his experience. These descriptions are then merged into a textural-structural description for each co-researcher. Ultimately, the descriptions related to each co-researcher are synthesized into a composite description that explicates the meanings and essences of the experience of the phenomenon, representing the whole group of participants.

3.8 Limitations of Phenomenology

No discussion of a research methodology is complete without an insight into its limitations. Thus, in the section, I will not only highlight some of the limitations of applied phenomenology, but also provide the reasons why these limitations do not diminish its suitability in this research. Some of the limitations have already been indirectly described in section 3.4.3 where the phenomenological method was compared with the case study research method in order to determine the suitability of the former to my research. In this section, these limitations will be stated explicitly.
One of the criticisms leveled against the phenomenological method has been attributed to the failure of some researchers to undertake reductions or bracketing effectively (Davison 1998). In fact, Boland (1985) warns phenomenological researchers against the tendency to generate abstractions of co-researchers' experiences. Moreno Jr. (2002) also speaks in the same strain by reiterating that “generalizations” of findings should not extend beyond the sample of participants who have experienced the phenomenon being studied. Thus, it is important for the phenomenological researcher to retain a high degree of awareness that her/his analysis and interpretations of "lived experiences" should be restricted to the pool of respondents engaged in the study.

Ratner (1993) argues that while phenomenology does provide concrete, detailed, and descriptive accounts into the meaning of human experiences, it does not shed light on the "social character of the individual psychology", i.e. it does not render a systematic analysis of the social factors that contributed to such experiences. This claim is certainly related to the comparison of the phenomenological method with case study research in section 3.4.3. In other words, the focus of the phenomenological method in not on the “actual” social environment that led to the project managers’ experiences, nor does it look at the “actual” actions taken by them. However, as discussed in section 3.4.3, the limitations of applied phenomenology, while demanding the researcher’s attention, does not hinder the choice of the method in view of the objectives of this research project. The following section highlights an important issue in qualitative research: the evaluation of empirical data.

3.9 Data Evaluation

The researcher who is presenting a qualitative study needs to provide the reader sufficient information to evaluate the findings and the conclusions reached (Harmer 2003). The credibility of the research is ensured by means of the explanation provided by the researcher with regards to evaluation of the data. In the modification of the van Kaam Method of Analysis of Phenomenological Data, discussed in section 3.7, the statements of experience and their accompanying themes are validated against the complete narrative provided by the co-researcher. Furthermore, Moustakas (1994b) sheds light on the issue of data validation by citing an example where the investigator sent a synthesis of the textural-structural descriptions to the individual participants for their feedback. However, LeCompte and Preissle (1994) together with Guba and Lincoln (1990, 1994) warn against the usage of the term "validity" owing to its association with
positivist approaches. Besides, the issues of reliability and validity in qualitative research are evaluated quite differently (Kirk and Miller 1986, Altheide and Johnson 1994, Bernard 1988). The main difference lies in the premise behind qualitative research as being primarily interested in the accounts and constructions of social reality, imparted by a group of participants in the study, which are compared to those of other groups of participants or observations of an informed observer with experiences in a similar situation (Ambert et al. 1995). For the purpose of this study, the word "evaluation" will be used instead. While there are a number of evaluative criteria that have been suggested by qualitative researchers, such as Klein and Myers (1999), Creswell and Miller (2000) and Gerhart et al. (2001), four evaluative criteria have therefore been adopted for the purpose of this thesis projects, which have been previously been used by Drisko (1997), and in phenomenological research by Harmer (2003).

First, there is the issue of credibility or truthfulness (Reid 1994, Altheide and Johnson 1994). In this regard, the researcher, through the analysis of empirical data, needs to present the experience of the participants within their local context (Leininger 1994). Thus, the interpretations of the researcher should accurately depict the narratives of the co-researchers. Drisko (1997) contends that the establishment of credibility can be attained by extensively presenting "raw data in the form of the participant’s own words or the researcher’s descriptions of behaviour". The objective is to enable readers to determine the accuracy of the researcher’s interpretations of the experiences of the co-researchers. Thus, the use of verbatim examples in the discussion of empirical findings is strongly encouraged.

The second criterion includes the explicit discussion of the context in which the experiences of the co-researchers occur (Lincoln and Guba 1985, Leininger 1994). With regards to the issue of the context, Drisko (1997) states that:

"Readers can assess the cogency of the analysis, the accuracy of the researcher’s interpretations of meanings, and the transferability of findings when they have before them data oriented in the participant’s context."

One of the criteria for evaluating interpretive research is confirmability, which essentially describes the researcher’s substantiation of empirical data and attempts at instituting (or questioning) interpretation or theory (Drisko 1997, Reid 1994). In addition, confirmability can be brought about by presenting the investigation in such a way that the reader, who assumes the perspective of the researcher, is able to view the same picture as that seen by the researcher, regardless of whether she/he is in agreement with the view (Giorgi et al. 1975). According to Drisko (1997):
"Multiple, repeated instances of some phenomena, obtained from direct observation or reports from primary sources, enhance both credibility and confirmability."

In this regard, the evaluation of data in a phenomenological investigation is similar to the concept of triangulation pertaining to case studies. Triangulation is the approach to validation of data from multiple participants and multiple methods of data collection within the same study (Gillham 2000, Yin 1994). Brewer (1989) propose triangulation as a means to evaluate the interpretations presented in a research study as this imposes recursive checks on the validity of the empirical findings. Harmer (2003) speaks in the same vein by indicating that the confirmability of the conclusions of a researcher’s interpretations is achieved when she/he provides evidence from multiple sources of data. Therefore, the validity of a researcher’s interpretations are strengthened by a combination of the in-depth investigation of phenomena associated with a qualitative inquiry along with the act of triangulation of data (Denzin 1978) as well as cross-checking the data from multiple sources (Douglas 1976). In this way, the confirmability of the empirical findings can be significantly enhanced. The importance of the transferability of results to the target audience of the qualitative investigation was also emphasized by Drisko (1997). At this stage, I emphasize the usage of the term “confirmability” rather than “generalizability”, owing to the ongoing methodological debate over claims of the latter (Wilson and Hutchinson 1991, Forbes 1999). This particular issue will be re-visited in chapter 7. However, the fourth research objectives needs to be rephrased to take into account this issue of terminology, which is undertaken in chapter 4.

The fourth evaluative criterion applicable to qualitative research is the issue of completeness or saturation, which explains the degree of comprehensiveness of the data collection and analysis undertaken by the researcher (Drisko 1997). Saturation of data collection implies that the participants of the study have nothing new to convey, apart from what they have already stated. The researcher decides that the data collection act has reached saturation when all she/he is able to gather are repetitions, i.e. no new data is emerging. When it comes to data analysis, saturation takes place when additional themes, describing the essence and meaning of the participants’ experiences, cease to emerge from the data.

These criteria for evaluating a qualitative study are further discussed in the context of this study in the next chapter.

3.9 Summary

To understand and elucidate the experience of project managers from their dealings with stakeholder concerns in the implementation of WBIS, a constructivist/subjectivist perspective has been taken, which undoubtedly requires a rich set of data, thereby necessitating qualitative
research. Moreover, this is a relatively new area of study, as existing literature on the subject does not adequately cover what the study intends to discover. As a result, an interpretive philosophy has been adopted in order to allow an understanding and description of the phenomena to emerge from the empirical data through a method of induction.

In view of the research questions objectives and the philosophy underlying the choice of research methodology, the application of the phenomenological method has been deemed to be more appropriate than case studies. In addition, the main objectives of phenomenological data collection and analysis, as well as quality assessment have also been discussed. The next chapter discusses the details of the actual research design of the thesis project.
Chapter 4: Research Design

4.1 Introduction

According to Yin (1994), a research model is an "action plan" from a starting point, (referred to as "here") or an initial set of research questions, to a point of conclusion (or "there"), and involves a number of constituent steps associated with the collection and analysis of relevant data. As concluded in the literature review in chapter 2 and further explained in chapter 3, the thesis problem area is complex, dynamic, and insufficiently covered by previous research, owing to which a qualitative study in the interpretivist approach was hence initiated. Prior to embarking on a study, the researcher should have been interested in a particular phenomenon that she/he feels is worthy of in-depth examination (Maggs-Rapport 2000). However, the researcher does not need to have an advanced understanding of the phenomenon, as this will be gained in the course of conducting the study. Rather, the researcher just needs to have knowledge that is sufficient enough to formulate the plans for and the goals of the study. Since development practices were to be investigated in the context of multiple projects with the aim of establishing whether the essence of the experiences of various project managers can be understood, interviews were conducted with a number of project managers in various organizations (Creswell 1998). As I mentioned in chapter 1 (section on Conventions), a number of methodological issues from chapter 3 will undergo repetition and overlapping in this chapter to reflect the cycles of hermeneutic refinement.

4.2 The Empirical Domain

As the study takes special interest in requirements evolution across a WBIS domain, it was imperative to ground the work in a comprehensive study of a particular domain. A suitable commercial domain was recommended by two independent e-Business management consultants during informal exploratory elite interviews (Marshall and Rossman 1989, Carroll and SWATMAN 2000). The consultants suggested web-based Human Resource (HR) and payroll systems, collectively referred to as Employee Service Systems (ESS), as potentially of interest to this research. A number of terms have been used to describe the migration of traditional HR business processes to a web medium,
which include ESS, HRMIS (HR Management Information Systems), e-HR (electronic HR), and HR portal (Hawking and Stein 2002). However, the term “ESS” will be used throughout the thesis to refer to this type of web-based solution. At the time the empirical studies began, the adoption of web technology by outsourced payroll providers and HR departments was relatively new, though it had gained some popularity in the US a few years earlier (Lapointe 1997). ESS is a web-based solution based on the Business-to-Employee (B2E) model, and is designed to grant employees, or clients of payroll companies, access to HR services (Hawking and Stein 2002, Turban et al. 2002). The main objective of web-based support for HR solutions was to replace paper-based documents and the multiple steps of the HR process with online data entry and interaction by employees and managers themselves (Hamerman 2002). Furthermore, the adoption of such services was greatly influenced by the organizational strategic plans that basically translate into operational goals of improved productivity, data accuracy, and the reduction of paperwork and administrative overheads.

In recent times, according to the Association for Payroll Specialists, the adoption rate in Australia has accelerated to a point where one in 10 Australian firms now have web-enabled HR systems in place for employees to view and update their details online (Nixon 2003). Despite the optimism and success stories, these systems have their share of obstacles. One of these obstacles is the plain fact that only a fraction of employees have access to the web and computers (Lapointe 1997). Such systems necessitate infrastructure support in the forms of increased security features, workflow and transaction management, and web administration. Moreover, these systems have been designed keeping in mind that the users will be casual and untrained. Also, the stakeholder base will be far wider than that of conventional non-web HR systems, which are traditionally used by HR staff alone (Lapointe 1998). The broad and diverse stakeholder base raises the issue of multiple and possibly conflicting viewpoints regarding the various facets of the web system (Easterbrook 1994, Sommerville et al. 1997). The web-based HR domain is also characteristic of systems having multiple stakeholders with conflicting concerns. It was thus clear that the domain of web-enabled HR management, or ESS, is representative of systems which have a very complex stakeholder base and which are rich in stakeholder concerns, both of which factors made this domain eminently suitable for the study. Hence, the experiences of the project managers involved with ESS projects were exactly what the aspiration of the study is to uncover and capture in order to understand the
phenomenon of interest, i.e. the experience of web project managers in their dealings with the concerns of stakeholders.

4.3 Selection of Interview Participants

The "who" aspect of the study is determined by focusing attention on those participants who are the bearers of the experience under study or are able to shed light reliably on the phenomena (Sanders 1982). The key criteria for the selection of participants for the phenomenological interview include the fact that the phenomenon of interest has been experienced by the participants, the participants' expression of interest to participate in an in-depth interview session and to understand the meanings and essences of their own experience, approving the audio or video taping of the interview session, and finally, agreeing to the investigator's publishing of the narratives in a thesis or publications (Moustakas 1994b).

For the purpose of conducting the interviews, I contacted several Melbourne-based organizations, which had begun the process of implementing ESS, but received positive responses from six of them. Four of these organizations were universities, and the other were two outsourced payroll companies in Melbourne adopting web technology to provide payroll services to their clients.

As part of a sound design of a qualitative study, its data collection had to be sharply focused on the primary holders of the relevant experience (Marshall and Rossman 1989, Creswell 1994), in this case the project managers' experiences in dealing with concerns of the prime web-system stakeholders in the HR environment. In ESS projects, the baseline stakeholders include project initiators, namely the HR divisions of the universities and the outsourced payroll providers, IT personnel (if separate from HR/client services of payroll), clients of outsourced payroll companies, employees, and supervisors. Thus, the project managers in the six ESS-implementing organizations were targeted for the in-depth interviews, as they were delegated the job of realizing the organization's strategic web initiatives and thus responsible for the effective adoption and smooth roll over of the WBIS. The project managers were members of the ESS teams, and consisted of managers from HR divisions, marketing and client relations departments in payroll companies, and
IT managers. This definitely highlights the significance of their experience in dealing with stakeholder concerns.

In some of the enterprises approached for the empirical investigations, the project teams comprised of both HR and IT personnel, but their respective units were separate departments, each with its own divisional goals, culture, budgets, and standard operating procedures (SOPs). In such situations, it was deemed imperative to also interview the senior-most IT managers involved with the project, due to their own unique experiences with the implementation of the technical aspects of the web-enabled services and also to gather another perspective on the project.

4.4 The Data Collection Process

The potential interviewees were approached through their contact details (i.e. email, telephone, or both) posted on the HR projects and company websites. Those who expressed interest to participate were sent a copy of the research synopsis in order to give them a brief yet comprehensive idea about the intended research, its objectives, and the potential benefits for the study participants. Having read the research synopsis, some agreed for face-to-face interviews, mainly at their premises.

It should be noted that the phenomenological interview is characterized by the establishment of mutuality of trust between the researcher and the interview, and the fostering of an environment congenial to both in their joint search for a shared understanding of the phenomenon of interest (Massarik 1985). To instil this kind of environment in the interview sessions, the research synopsis stated quite explicitly the objectives of the interview session were gathering and forming an understanding of the phenomenon from their viewpoints. The session was meant to be a discussion between the two parties. At the outset of the interview session, the co-researcher (participant) was given a Consent Form indicating that their participation was entirely voluntary and they were allowed to refuse an answer to a particular question or terminate the session. Their identities were guaranteed anonymity and the names of their organizations were also to remain strictly confidential, even in academic publications. The assurance of anonymity and confidentiality, as stipulated in the Consent Form, were instrumental in encouraging
the participants to impart their experiences with the ESS projects freely and in a relaxed manner. This was indeed a significant factor as the establishment of mutual trust commonly takes place over a period of time, whereas I was unknown to some of the participants prior to the interviews. After agreeing to the contents of the Consent Form, the participants signed the forms and returned them to me. Furthermore, it was made known to them that they would receive copies of the interview transcripts and related reports before any publication was derived from them, thereby allowing the participants the opportunity to provide additional information, express their views on my interpretations of their narratives, or make amendments to any part of the information they had conveyed. However, none of the participants proposed any major changes, except for some additional and clarifications to be added to the transcripts.

A set of open-ended questions was used for conducting the initial in-depth interviews with the participants who had headed the web projects. The interview protocol used for the interviews consisted of questions that were interested in eliciting the experiences of the project managers with the implementation and continual evolution of ESS, such as the strategic initiatives of the organization and its business needs for a WBIS, characteristics of the baseline stakeholders, and the roll-over of the web-based solution. The questions were also directed at obtaining information about the project manager’s experience with the concerns of stakeholders, their viewpoints regarding the issues of dissonance voiced by the users and the various players in the organization’s power structures, as well as the perceived consequences of measures taken by the project team to alleviate discord or lessen user resistance toward the usage of web-enabled HR services. In companies that provided outsourced payroll services, the protocol also focused on the experience of project managers with the impact of promotional campaigns and incentives offered to clients in order to motivate their signing up for web services. Most of the interviews sessions lasted from 60-90 minutes. In some cases, follow-up interviews were conducted by revisiting the participants in their offices or by email communication to seek clarifications on narratives or to urge additional information.

After interviewing the first two participants, I was able to refine the questions so that further discussions could focus on issues of greater relevance to the phenomenon of interest. A set of sample interview questions can be found in Appendix A1. In fact, recurrent themes began to arise from different interview sessions, owing to which I was
able to move into a less rigid interviewing protocol for the subsequent sessions. Yet, I ensured that my focus on the relevant issues did not inhibit the co-researchers from the free expression of their experiences. What was also of great importance was my engagement with the practice of epoche prior to embarking on the data collection phase as well during the interviews as a preventive measure against my preconceptions and biases from influencing my conduct of the interviews and my interactions with the participants (Moustakas 1994b). The practice of epoche is discussed in section on the disclosure of my biases. All the sessions were audio taped and then transcribed in order to subject the narratives to the analysis. The textural questions that guided the interviews with the co-researchers were:

1. What were the forms of requirements elicitation undertaken?
2. What were the feedback issues perceived as user concerns?
3. What were the concerns perceived as most critical?
4. What actions that were perceived as solutions to these concerns?
5. What were the consequences – perceived positively and negatively - of these actions?
6. Who were the stakeholder groups perceived as the most difficult to deal with?
7. What was the final outcome of the project? Describe in terms of factors perceived positively and negatively.

4.5 Data Analysis: The Phenomenological Method

In accordance with the modification of the van Kaam Method of Phenomenological Data Analysis (Moustakas 1994c), as previously discussed in chapter 3, I have analysed the data collected from the project leaders involved in ESS implementations. This method is based on the principle of hermeneutics, which is essentially a cyclical analysis of textual data undertaken to produce meanings and interpretations, discussed in chapter 3. In line with the concept, the process of analysis was iterative and it involved the repeated examination of the data until it was determined that no more new issues could be uncovered. Hermeneutic analysis has been employed in the study in order to fathom out the whole, and the relationship between stakeholders (project teams and the user-stakeholders), the organizations, and the web-enabled services. Essentially, data analysis
was conducted on the transcribed interviews with the co-researchers. One such transcribed interview has been included in Appendix A2.

4.5.1 Listing and Preliminary Grouping

Through iterative reading and analysis of the transcribed interviews of the co-researchers, a number of statements covering all explanations of the phenomena of interest were generated. The phenomena of interest were determined from the research objectives. Each and every statement in the individual account (transcription of each project manager’s narrative) was given equal importance in accordance with the principle of Horizontalization, a process inherent within phenomenological reduction. The tables included in the appendices A5 list some of these statements in their verbatim form.

4.5.2 Reduction and Elimination

When the iterative process was deemed to be complete, the statements were subjected to reduction and elimination in order to identify their invariant constituents. Statements that were irrelevant to the experience of the phenomena, overlapping, repetitive, or vague were removed, and the rest presented themselves as the textural meanings and invariant constituents. All the statements in the voice tables (see selection in appendix A5) were obtained through the process of filtering to become invariant constituents.

4.5.3 Clustering and Thematizing the Invariant Constituents

Through clustering and thematizing the invariant constituents, the core themes of the experiences were generated. These include:

1. project manager’s experience with requirements elicitation
   a. the role of concerns in requirements establishment
   b. the role of concerns in the process of system evolution
2. project manager’s experience in dealing with concerns
   a. data entry and validation, view and update concerns
   b. workflow concerns
   c. the most critical concerns
3. project manager’s experience with the outcome of the project.
The first and second themes (1 & 2) directly address the first and second research objectives, stated in the opening section of chapter 3.

4.5.4 Final Identification of the Invariant Constituents and Themes by Application – Phenomenological Validation

All the statements in the voice tables included in appendix A5 had also undergone validation, and found to be explicitly expressed in the transcriptions or compatible with the narratives of the project managers appearing in the transcriptions. The statements that were not explicitly expressed or found to be incompatible were discarded.

4.5.5 Synthesis

The voice tables basically illustrate the textural descriptions of project managers’ experience, and are discussed in detail further in chapter 5. Moreover, through imaginative variation, the structural meanings of the textural descriptions were established. The questions that contributed to the structural themes behind the textural accounts of the experiences of the ESS managers include:

1. Why were these forms of requirements elicitation undertaken?
2. Why were the feedback issues perceived as user concerns?
3. Why were the concerns perceived as most critical?
4. Why were the consequences perceived positively or negatively? Why has the interviewee perceived certain stakeholder groups as those that were the most difficult to deal with?
5. Why were the factors related to the outcome of the project perceived positively or negatively?

It should be noted that these questions came about as a result of the first two interviews, which were largely open-ended. In other words, the questions are based on the issues imparted by the participants in the first two interviews. In chapter 5, the structural meanings behind the experiences of the project managers have been described along with their textural expressions in a composite form. Ultimately, all the textural-structural descriptions pertaining to the experiences of all the co-researchers have been synthesized to provide an elaborate discussion of the commonalities and variations in the experiences.
of project managers in the ESS domain. The patterns, introduced in the next section, and presented in chapter 6 have been used to illustrate the synthesis of the project managers’ experiences or rather the recurrent experiences. At this stage, adequate substance has been gathered to address the third research objective (see chapter 3).

To this end, I conducted interviews with ten participants from the six projects. Apart from enlightening the study with new information in the earlier and intermediate stages of the data collection process, the multiple interviews revealed commonalities in the project manager’s experiences in dealing with stakeholder concerns in the implementation and rollover of ESS. What was also interesting was the fact that the narratives of the project managers in the universities were shared by those involved in the provision of web-enabled payroll services.

In chapter 6, the phenomenological synthesis of the textural-structural accounts of the individual co-researchers involved with the six projects is elaborated.

4.6 Data Representation

This section discusses the two types of tools used to depict the outcome of the data analysis process explained in the previous section. Voice tables will be used to illustrate the textural-structural descriptions of the co-researchers’ experiences. The synthesized descriptions, revealing the essence of the project managers’ experiences, will be represented by means of patterns (see section 4.6.2), which have been used to capture and demonstrate the essence of the experiences, represented in figures and tables useful in visualization of captured knowledge, as claimed by Creswell (1998) and Grigsby and Megel (1995).

4.6.1 Voice Tables

Voice tables are tools associated with the concept of "gemba" in Quality Function Deployment (QFD) (Mazur 1997). Gemba is a Japanese term used to refer to the "true" source of information. Voice tables are used to determine and represent the true needs of the clients of a software project. Thus, these tools are known to assist information system
developers in gathering a comprehensive and accurate set of both explicit and implicit requirements from stakeholders, which are then deployed with QFD.

The voice tables also identify the types of stakeholders and their characteristics (Krogstie 1999). Furthermore, the business needs, the organizational issues that the proposed information system needs to address, are elaborated. What is also important with voice tables is the fact that the tools provide an alignment of system requirements with business needs, i.e. the alignment is based on the contributions of the requirements to the respective business needs. In essence, the tables illustrate a roadmap of the process of requirements specification starting from the statement of strategic concerns and corresponding business needs to the final requirements that are meant for aliment with the business needs. Owing to these factors, voice tables are widely used as tools for discussions and negotiations between system developers and clients during Joint Applications Design (JAD) sessions.

Hence, for the purpose of reporting the empirical findings of the study, I have applied an adaptation of the QFD voice tables to illustrate the textural-structural descriptions depicting the experiences of the project managers (selection of which can be referred to in appendix A5). For each project manager, there will be a voice table showing the strategy-driven concerns and the corresponding business needs, the translation of the business needs into a set of system requirements, and the consequences of these requirements as perceived by the project managers from user feedback. To describe the details of the consequences of the initiator-driven (HR/payroll) requirements, perceived by the project managers, voice tables for each primary stakeholder group will be used to illustrate the concerns of the stakeholder group with regards to each initiator requirement, and the resultant requirements inculcated to alleviate the concerns, along with the consequences of the latter requirements. The mapping of artefacts (business needs, concerns, requirements, consequences) on the basis of the phenomenological analysis of experiences in the voice tables provided a suitable tool for data verification and validation by the co-researchers. In Chapter 5, the voice tables are used to support and elucidate the textural-structural descriptions.
4.6.2 Patterns

Patterns were first proposed by the architect Christopher Alexander in his book entitled *A Timeless Way of Building* (Alexander 1979). Accordingly, a pattern is “a description of a problem which occurs over and over again in our environment and then describes the core of a solution to that problem”. Despite their origins in architecture, patterns found immense popularity in the realm of software engineering, especially by the object-oriented community, namely the Gang of Four (Gamma et al. 1995). Schmidt et al. (1996) define a pattern as “a solution to a recurring problem”. In information systems, a pattern is basically a formal representation, in natural language, of developmental experience gained by software engineers from several projects.

Patterns were formulated according to the most commonly used pattern schema, which consists of the following components (Coplien 2000):

- *Name* of the pattern;
- A statement of the *problem*, which calls for the application of a pattern or set of patterns to resolve it;
- *Context*, a description of the situation in view of which the problem has arisen;
- A set of *forces*, preventing effective application of certain classes of solutions to the problem at hand;
- The *solution(s)*, which describe(s) how the forces could be resolved in order to come up with the best solution;
- The *consequences* of applying the pattern in terms of the expected results and trade-offs;
- *Known uses*, or real-life situations where the patterns have been successfully applied in some form.

Patterns explicitly “capture” developmental experience, facilitate communication of this experience among developers, and are considered an effective learning tool for “non-experienced” developers (Rossi et al. 1997). Patterns enable the knowledge gained by experts to be captured in a form that can be shared and reused (Rising 1999). Rising claims that patterns are not theoretical constructs, but are artifacts derived from experience with multiple systems in a domain or across domains. She also asserts that an
important element of a pattern is the fact that the solution has been applied more than twice. Thus, an action, initiated by a IS team, becomes a pattern when it has effectively been a solution to problems in a number of project.

Patterns have been shown to be particularly effective in enabling expert knowledge to be shared and reused in such applications as architectural design (Alexander 1979), design of organisational processes (Coplien 1995), software development (Fowler 1997, Buschman et al. 1996, Gamma et al. 1995), web-based interfaces (Sarkar and Cybulski 2002b), and multimedia construction (Cybulski and Linden 1998, Rossi et al. 1997), to name just a few. Other types of artefacts, which play the role similar to that of requirements patterns, include problem frames (Jackson 2000) and domain abstractions (Maiden and Sutcliffe 1994).

At this juncture, one might wonder how patterns are applied to problem solving in information systems development (ISD) projects. If the problems and the contexts pertaining to a new project in the domain match with that of the corresponding patterns, we would be in a position to make implicit assumptions about the presence of a similar situation as well as how the solutions of the patterns can be adapted and applied in the new situation. Patterns have been selected to represent the structural descriptions of the experiences of the co-researchers owing to two main reasons. The most fundamental reason is attributed to the fact that patterns are essentially derived from the experiences of IS project managers. Secondly, their format (known popularly as a Coplien form), as illustrated above, lends itself to the explanation of “how” the experience came to be what it is. In fact, the very act of writing a pattern involves the process of imaginative variation, whereby the author of the pattern describes the experience of applying a solution to a particular problem in light of underlying factors, such as the context from which the problem arose, the various associative factors (forces) that had to be considered in order to decide upon a solution, and the consequences of applying the solution. To provide additional explanation to justify the appropriateness of patterns as representations of structural descriptions of experience, I have included a modified version of Coplien’s Organization Structure (for the management of software projects) pattern (Coplien 2001) in Table 8.
<table>
<thead>
<tr>
<th>Pattern Name</th>
<th>Phasing it In</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Problem</strong></td>
<td>Hiring long-term staff beyond the initial experts</td>
</tr>
<tr>
<td><strong>Context</strong></td>
<td>Key project players have been hired and cover the necessary expertise, but the project needs more staff.</td>
</tr>
<tr>
<td><strong>Forces</strong></td>
<td>1. You need enough people for critical mass.</td>
</tr>
<tr>
<td></td>
<td>2. Staff are not plug compatible and interchangeable.</td>
</tr>
<tr>
<td></td>
<td>3. The right set of initial people sets the tone for the project, and it's important to hire the key people first.</td>
</tr>
<tr>
<td></td>
<td>4. Too many people too early create a burden for the core team.</td>
</tr>
<tr>
<td><strong>Solution</strong></td>
<td>Phase the hiring program. Start by hiring experts, and gradually bring on new people, as the project needs to grow.</td>
</tr>
<tr>
<td><strong>Consequences</strong></td>
<td>1. The organization can staff up to meet development load. This pattern is closely related to Apprentice.</td>
</tr>
<tr>
<td></td>
<td>2. This is a well-known management technique that allows the project to establish an identity early on, and to grow graciously.</td>
</tr>
</tbody>
</table>

Table 8. Modified version of Coplien’s pattern

The pattern, entitled Phasing it In, was written on the basis of recurring experience, which was gained from pattern writers’ involvement in software development projects, where the decision to hire managers in phases, starting with the recruitment of experts and then followed gradually by personnel looking for growth in experience. The pattern was perceived as providing a solution to the problem of maintaining a project team in the long term. The problem was perceived as such owing to the fact that despite having experts fill in the key roles, projects still need personnel to fulfil the necessary roles of the project team. However, the forces were the determinants of the choice and formulation of the solution. The application of the solution were viewed positively as not only did it enable the organization to ensure that the project team was adequately staffed, but also it allowed the team to grow steadily in its level of expertise, as the experts, who are hired first, train and act as mentors to the successive batches of team members. Thus, by reviewing this pattern, we understand the structure of the meaning of experience of the project manager.

Returning to this research, the synthesis of the textural-structural accounts of the project managers interviewed as part of the empirical study, enabled the extraction and understanding of the meaning of the experiences in dealing with the various concerns in

87
the terms of the four questions. On close examination, I was to establish a direct connection between the questions with the components of a Coplien pattern, as illustrated in Table 9

<table>
<thead>
<tr>
<th>Question</th>
<th>Pattern Component</th>
</tr>
</thead>
<tbody>
<tr>
<td>• What were the issues perceived as concerns?</td>
<td>The Problem</td>
</tr>
<tr>
<td>• What was the underlying context that contributed to the perception of these issues as concerns?</td>
<td>The Context of the problem</td>
</tr>
<tr>
<td>• What were the associated factors that any solution needed to incorporate?</td>
<td>The Forces</td>
</tr>
<tr>
<td>• What were the solutions adopted to alleviate the concerns?</td>
<td>The Solution</td>
</tr>
<tr>
<td>• What were the consequences of applying the solutions?</td>
<td>The Consequences of applying the solution.</td>
</tr>
</tbody>
</table>

Table 9. Linking the experiences to patterns

Thus, the common experiences of project managers in dealing with a particular concern can be cast into a pattern. The name of each pattern has been generated by me, while the other component, the known uses, was not gathered empirically, but rather was derived from my exposure to general information systems applications. Patterns are used in chapter 6 to represent the synthesis of the textural-structural descriptions of the individual project managers.

### 4.7 Data Evaluation

Data evaluation is relevant to the fourth research objective. The discussion in this section is guided by the suggestions and propositions of prominent advocates of qualitative research, presented in the corresponding section in chapter 3. The first issue in the evaluation of data analysis is truthfulness or credibility. This has been ensured by the extensive use of anecdotes and verbatim examples from the interview transcripts to substantiate my interpretations of the ESS project leaders’ experiences.

The second criterion is the emphasis on the context of the study. The ESS projects of the six organizations in Melbourne are typical of such WBIS ventures being implemented in Australian enterprises with a user-base that is not necessarily computer/Internet proficient.
nor guaranteed access to such facilities. At this juncture, no generalizations are being extended beyond the pool of co-researchers whose experiences on the issue have been investigated (Sanders 1982). Furthermore, I am making no claims with regards to the transferability of the findings to a different context (Leininger 1994), such as for example Internet Banking. This necessitates the revision of the research objectives, undertaken later in this section, to focus on the domain of ESS services selected for the study, with some implications for WBIS in general.

To ensure the confirmability of my interpretations, direct observations were undertaken with a pilot group, and ESS managers in two other universities to evaluate the final product of the data analysis, i.e. the patterns representing the synthesis of the meanings and essences of the experiences of projects managers in the domain of ESS applications. Observational studies complement in-depth interviews by bringing forth additional insights (Stone 1978, Lacey and Luff 2001). Chapter 7 consists of a detailed discussion of all direct observations. Moreover, intersubjective validity was ensured by having an independent academic researcher verify and confirm the interpretations of the study as proposed by Giorgi et al (1994b, 1975) through the “audit trail” laid out in line with the steps of the phenomenological data analysis.

Saturation or completeness was achieved when the emergence of new information began to recede with the subsequent interviews in the later stages of the data collection process. In fact, the accounts of last three co-researchers were mere repetitions of the experiences of the preceding project managers. With regards to the optimal number of participants for a phenomenological study, Sanders (1982) proposes that in-depth interviews with approximately 3-6 individuals could provide the information sought, but the actual number depends on the topic of the study. Moreover, Walsham (1993b) maintains that a limited number of observations do not inhibit the generalization of findings. In fact, a large sample may not necessarily produce more meaningful outcomes. In qualitative research, generalization is not based on statistical validity, but on the plausibility and cogency of logical reasoning employed in generating conclusive results.

In view of the second and third criteria of evaluation, the research objectives of the study will undergo revisions to focus on the selection of the suitable domain and the issue of “confirmability”. Thus, the revised research objectives are:
• To identify the experiences of project managers with regards to the impact of stakeholder concerns on the implementation and evolution of WBIS/ESS

• To determine the experiences of project managers in dealing with stakeholder concerns during the implementation of WBIS/ESS

• To establish whether the commonalities in the experience of project managers can be captured across the domain of WBIS/ESS

• To ascertain the extent to which the collected domain experiences could be confirmed in terms of its relevance and usefulness to managers involved in new projects in the same domain

4.8 Disclosure of Biases

The importance of acknowledging inherent biases and preconceptions early in the research process by the researcher, referred to as “researcher reflexivity”, have been stressed by Creswell (2000). Drisko (1997) speaks in the same vein by indicating the identification of researcher’s biases enhances the credibility of her/his interpretations. Indeed, as already explained in chapter 3, in accordance with the traditions of phenomenology, all presuppositions, prejudices, and biases need to be “bracketed” out so that the reader is able to follow the researcher through the path of her/his analysis (Husserl 1931, Husserl 1965, Kockelmanns 1967, Moustakas 1994d). However, not all preconceptions can be eliminated nor are they necessarily detrimental to the interpretive analysis of the data (Gadamer 1976, Heidegger 1962, Boland 1985, Moreno Jr. 2001). Hence, I have made attempts to ensure that my understanding of the current literature did not influence my interpretations of the experiences of the project managers. Also, I have been able to reflect any inherent preconceptions I have had about stakeholder issues regarding ESS and WBIS in general. The following text passage explains the source of such personal biases that had to be bracketed in the analysis of all collected co-researchers’ statements, i.e.

“I have always been an enthusiastic proponent of web technology, since my introduction to it in 1995. Not only did I find the Internet a useful medium for my post-graduate research and maintaining communication with friends, colleagues, and fellow researchers, but I also regarded as a major source of convenience in a modern
lifestyle burdened with hectic schedules. At the same time, I was aware of, on the basis of existing literature on WBIS and my personal experiences with web development, the concerns some potential users had with regards to services rendered via the web. Thus, I was able to prevent my own favourable experiences as a user of web-based services from trivializing the ESS users’ concerns as conveyed to me by the project managers. Furthermore, being an employee of a university myself, I was able to empathize with my fellow colleagues, who were either overburdened with routine tasks, lacked general IT proficiency, or in the some worse cases, had none or little access to the an ESS kiosk. Yet, I had to be constantly aware and conscious to make sure this feeling of empathy did not influence my interpretation of the ESS projects as an imposition on the workforce.” (Author of this thesis)

4.9 Ethical Considerations

Some of the major ethical considerations have already discussed in the section on the data collection process. The empirical work began once the study was approved by the Deakin University Human Research Ethics Committee (DUHREC).

With respect to the conditions laid out in the research synopsis sent to the participants, I not only sent them the transcripts of interviews and their respective textual-structural descriptions for their feedback (Reid 1994, Drisko 1997), but I also periodically dispatched research publications, written on the basis of the synthesis. It should be noted that most of the co-researchers proposed no modifications, except one project manager who basically clarify an issue. It should be noted that I adhered to the same conditions with regards to the direct observation studies, i.e. the participants were also sent copies of the dialogue which either video recorded or audio-taped, along with relevant publications. Of course, I strictly abided by the conditions of co-researcher anonymity and organizational confidentiality, as a result of which the participants are given names such as O1 project manager, and the corresponding organization referred to as O1. Owing to this factor, my email correspondences with the co-researchers have not been included in the thesis nor in any other publication. Nevertheless, the co-researchers expressed no objections to my use of anecdotes and verbatim examples from the transcripts. All the interviewees agreed to be audio taped, while all the participants of the direct observation studies granted permission to be filmed by video camera, except one project manager who preferred to be audio-taped as she was the only participant in that particular exercise.
4.10 Summary

The empirical work of this study has been designed in line with the principles of applied phenomenological research and in consideration of the boundaries of the collected data (Drisko 1997). In this way, the consistency of the findings to be obtained with the research philosophy and the thesis objectives has been ascertained. Hence, this chapter essentially sheds light on the actual steps designed to carry out the study experiential phenomenology, in which I justified the selection of the domain of study, and in which I also designed the process of eliciting the experiences of the project leaders in their dealings with the users and other relevant stakeholders, the data analysis in accordance with the prescribed phenomenological method and the representation of the outputs of the analysis, and last but not the least, evaluation of my interpretations. The next chapter 5 contains the textural-structural descriptions of the ESS managers’ experience of the phenomenon. Chapter 6 on the other hand offers a synthesis of the descriptions of all the ten co-researchers, and presents the actual patterns that emerged through the process. This is followed by chapter 7 where I evaluated the “confirmability” of my interpretations of the phenomenon with a new set of co-researchers. The relationship between the steps of the phenomenological method and the actual research activities, as discussed in chapters 5-7, is illustrated in Table 10.

<table>
<thead>
<tr>
<th>Phenomenological Method: The Steps</th>
<th>Actual Research Activities</th>
</tr>
</thead>
<tbody>
<tr>
<td>Epoche</td>
<td>Disclosure of Biases (section 4.8)</td>
</tr>
<tr>
<td>Phenomenological Reduction</td>
<td>Textural descriptions of the ESS managers’ experiences (chapter 5)</td>
</tr>
<tr>
<td>Imaginative Variation</td>
<td>Structural descriptions of the ESS managers’ experiences (chapter 5)</td>
</tr>
<tr>
<td>Synthesis of Meanings and Essences</td>
<td>Synthesis of the textural-structural descriptions of the ESS managers’ experience (chapter 6)</td>
</tr>
<tr>
<td>Data Evaluation, although not explicitly included as a step in the phenomenological method, but applied to all forms of qualitative / interpretive research</td>
<td>Evaluation of the “confirmability” of interpretations of the phenomenon (chapter 7)</td>
</tr>
</tbody>
</table>

Table 10 Relationship between the steps of the phenomenological method and the actual research activities.
Chapter 5: Narratives of Project Managers

5.1 Introduction

This chapter marks the beginning of the empirical investigations into the domain of ESS applications, and offers textural-structural descriptions of the narratives provided by the interview participants. In doing so, the chapter aims to meet the first two research objectives:

- To identify the experiences of project managers with regards to the impact of stakeholder concerns on the implementation and evolution of WBIS / ESS
- To determine the experiences of project managers in dealing with stakeholder concerns during the implementation of WBIS / ESS

Even though ten project managers from six organizations were interviewed, this chapter offers textural-structural descriptions derived from a university and an outsourced payroll company, largely for the sake of brevity. Moreover, the accounts of the project managers in the university and the payroll company, referred to in the thesis as O1 and O6 respectively, were extensive enough to be used as representative examples to explain the phenomenon, i.e. the narratives of the O1 and O6 project managers covered majority of the issues pertaining to ESS implementation in the universities and outsourced payroll providers that were investigated as part of the study. Thus, the inclusion of all the textural-structural description would have resulted in a huge amount of material in the chapters of the thesis, thereby hinting at the potential loss of retention by the reader. However, the other main textural-structural descriptions can be found in appendices B1-B6. The experiences of the project managers, gained from their initiation and direct involvement in the implementation of ESS systems, have been discussed in a narrative style, and in an anecdotal form. Their accounts have been derived and explained through a process of phenomenological reduction, and imaginative variation as explained in chapters 3 and 4.

The discussion of the textural-structural properties of the O1 and O6 project leaders’ experiences begins with a brief background of the organizations and their decision behind the adoption to web technology to deliver HR and payroll services. This is followed by an
in-depth description of their experiences in accordance with the underlying themes, explained in chapter 4, which emerged during the data analysis process. These include experiences with:

- requirements elicitation;
- data entry support, view and update;
- workflow concerns;
- process of evolution;
- criticality of concerns;
- and, the perceived outcome of the project.

Each textural-structural description is accompanied with tables depicting the experiences of the co-researchers, derived from the respective voice tables in the appendix A5. The tables are aimed at supporting the descriptions and offering a summary of the experiences.

The interviews revealed that the move toward an ESS facility began with the high-level strategies of the organization. These strategies translated into Business Needs in the HR division that called for the adoption of a web-enabled information system to render services. It should be noted that all the facts and illustrations in the chapter reflect the views of the project managers, and my interpretations, as a researcher, of their views. Furthermore, the chapter contains the textural-structural descriptions associated with three managers. The first and the second co-researchers are the O1 project and the IT managers, respectively. In O1, the HR and IT divisions are two independent units. The project was initiated by the former, and the EES team consisted of HR staff. The manager appointed to lead the team was also a member of the HR division, and will be referred to in the thesis as the O1 project manager. On the other hand, the IT division was a separate organizational unit, which was responsible for the construction of the organization’s IT infrastructure. Since, the IT division was delegated with the job of developing the web system, its leader, referred to as the O1 IT manager, and was also interviewed. In the case of O6, the textural description of the manager, the O6 project manager, in-charge of marketing and customer relationship management has been provided, because he spearheaded the ESS initiative in the payroll company.
Before embarking on the individual textural-structural descriptions, it should be noted that the reader might come across repetitions in the experiences of the three co-researchers. Such repetitions basically reflect the commonalities in their experiences, and are discussed in chapter 6.

5.2 Textural-Structural Description: O1 project manager

O1 is a top-tier tertiary educational institution in Melbourne. In 1997, it decided to adopt a web-enabled application in order to provide services via the Intranet to 7000 or more staff members, which included both full-time and sessional employees. Some of the academic departments and faculties employ a large number of sessional staff, whose pay applications are lodged through timesheets. The decision to adopt web technology was driven by a number of strategic factors, the prominent ones being the need to cut costs (an effect of the decreased government spending on the education sector), and the need to improve the quality of its services. These strategic objectives translated into business needs leading to decision for the adoption of a web-enabled information system by the HR division, to realize these. Owing to the cutback on government spending on education, universities were forced to take up certain efficiency measures. These measures were then entered into the strategic programs of the universities. O1’s cost-cutting drive led the HR division to seek out ways to effect cost-savings in the way it provided its services to staff.

O1 project manager (Quote 5.2.1a):

“So, it was identified that if we shifted the actual keying in of the information out to the departments who were actually entering this anyway (but, into their own heterogeneous systems), then we would actually be able to reduce transactions at the data entry level within HR. That was the underlying intent...the primary aspect was cost savings within HR and there has, in fact, been a budget cut for HR to compensate for the fact that we have now disseminated that data entry to the individual departments”

Many of these business needs were driven by the HR concerns over the achievement of strategic objectives. According to a senior HR manager (O1 project manager), who had spearheaded the organizations web system initiative, the business needs were (Quote 5.2.1b):

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"The underlying intent was pretty simple and straightforward – it was an attempt to save money for the university by reducing duplicate data entry and streamlining processes."

He went on to say (Quote 5.2.1c):

"Secondary to that was by putting in a system form rather than a paper form, you can provide a greater deal of validation with the information... you can place more reliance on the accuracy of the information. Also, the information can be processed more timely."

The university’s first priority was to web-enable the leave applications processes, so that supervisors could make decisions on these applications online. It then went on to extend the web system to provide services to employees through the Intranet, whereby an individual employee could update or modify their personal data or track the status of their leave applications via the web.

O1 project manager (Quote 5.2.1d):

"So, the cost factor was behind our going for the system. Efficiency was another one...we could actually get information quicker to HR as it eliminated all the information flow blockages."

Stakeholders were explicitly identified as supervisors (heads of departments, deans of faculties, course unit chairs), departmental administrators, and employees, all forming the user community. In addition, the other main stakeholders included HR itself, the IT divisions, and top management of the university who can and have had an influence on the project.

5.2.1 O1 project manager’s experience with requirements elicitation

Interviews with the O1 project manager revealed that stakeholder concerns were indeed identified and considered during the requirements specification and pilot testing of the web-based workflow system. The task of holding seminars about the introduction and
potential benefits of the proposed web system, requirements elicitation, and pilot testing were undertaken by ESS team. The seminars were intended to create awareness of the project scope and plan as well as the potential benefits of such a system, and how these could translate into certain efficiencies and productivity gains for the various groups of users as well as for HR and the university in general.

O1 project manager (Quote 5.2.1c):

"...in terms of seeking out requirements from the user community, we invited all stakeholders to our sessions where we discussed the future direction that we were trying to take, and make sure that they accepted and understood what the development would mean to them without being able to give them a great deal of detail because we had not designed the system...we asked them to endorse that and they were more than happy with us to go ahead with the development...they understood the benefits, they understood what the costs were as well as the weaknesses, and had some understanding of the scope of the project...how long it was going to take, the phases it was to go through, the time frames and so on."

Following this awareness program, HR instructed the IT division to develop the prototype of the ESS, which was then subjected to pilot testing with a representative sample of 12-18 users. These people then expressed their concerns about the various features and functionality of the web system.

O1 project manager (Quote 5.2.1d):

"...we had about 18 odd people, who were representatives of various departments and faculties, who attended our pilot testing session, where we demonstrated the prototype as it had been specified by the 12 people. They gave us some more feedback, which we enabled us to make adjustments to the prototype."

Thus, concerns voiced by the representative sample of users were considered in the further evolution and enhancement of the ESS. Apparently, most of the initial nervousness with regards to system usage was raised by academics rather than by departmental administrators. The ESS team sought to ease the anxiety by demonstrating to the academics how easy it was to log in and use the system to approve timesheets and leave applications, as well as the potential benefits that could be gained. Following this, the ESS was rolled out to certain faculties in O1. However, due to the risk averse nature of the top management of O1, the project team had the six members of the sample using
both the ESS and the pre-web work processes in parallel. The system was developed iteratively, interweaving features through prototyping, stakeholder evaluation, and system enhancement.

O1 project manager (Quote 5.2.1e):

"...we prototyped the system, demonstrated it to our clients or stakeholders, and they came returned with a number of changes. Some of these changes we incorporated quite easily at that point...some we took on board and implemented in phase 2 of that particular part...we told them that we could develop the system to do what they expected or wanted."

Some of the enhancements suggested by users were incorporated in successive iterations of the ESS evolution. Others were included in phase two of the project.

O1 project manager (Quote 5.2.1f):

"Some were added gradually...we probably added very few enhancements. Naturally in evolving systems you have some things that don't perform quite the way you'd like them to. I mean, these were bugs, to all extents and purposes, but these were only bugs in their functionality, in terms of instances of circumstances if you did an unusual sequence of data entry, things will not work the way they should and you'll have to start again. So, fixing up those sorts of bugs...the enhancements to functionality we rolled into phase 2."

The feedback received from the users was considered extremely vital to the improvements and enhancements that were embedded into the system in the second phase of the project. Indeed, the viewpoints of the stakeholders, the ESS team not only incorporated additional functionality but also included different ways of completing a workflow to cater to the different types of users. However, there were no major changes to the initial functionality.

To generate requirements for the employee kiosk, two pilot groups were established consisting of users and members of HR staff, respectively. What was considered interesting was the fact that the project manager discovered that both groups came up with similar sets of requirements.
O1 project manager (Quote 5.2.1g):

"...we found out that the second group of people we asked these questions, identically reflected the group of people within HR that we had also used in the combined approach. So, let's use HR users who understand the data and the system, and let's use some external people and see if they come up with the same thing, which they did. Thus, it became a lot easier then to use our central HR staff (as opposed to a sample of users) as a pilot group."

Based on these requirements, pilot testing took place with both groups for a period of two months, following which the employee kiosk was rollover to the larger user community in order to get their feedback. According to the project manager, the feedback was largely positive, despite some initial concerns.

5.2.2 O1 project manager's experience with Data Entry, View & Update, Validation and Support concerns

In line with its business needs of reducing mundane tasks for HR and streamlining business processes, O1 adopted a WBIS that shifted data entry and the approval of pay and leave applications to the users. Table 11 has been derived from the voice tables, pertaining to HR, the supervisors and departmental administrators, employee, and the IT division (samples in Appendix A5). Its role in this section is to support my examination of the O1 project manager’s narration of how the original HR concerns drove the enactment of business needs and subsequent establishment of requirements, and importantly, the consequences of embedding the requirement-driven features. In some cases, the consequences, perceived negatively by the project manager, led to further concerns, thereby initiating another cycle of system evolution. The iterative cycles of ESS evolution is discussed in later section.

Table 11 illustrates that the original HR concern of reducing data entry tasks by HR staff (related to quote 5.2.1a) led to these business needs. This resulted in freeing of HR staff from having to do mundane tasks, and reduced the need for hiring extra staff. Moreover, with the HR staff no longer having to engage in data entry, and chase up supervisors and departmental administrators for the approval of timesheets and leave applications, they were able to concentrate on more core tasks and provide better support to the recipients of their services. However, there was no significant reduction in workload owing to the shift
in the data entry away from HR. This happened because users had some initial resistance
to their involvement with the ESS. As a result, additional requirements, 4 and 5, shown in
the table, for training users and user support facilities were incorporated into the project.

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<tr>
<th>Concerns</th>
<th>Business needs</th>
<th>Requirements</th>
<th>Consequences</th>
</tr>
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<tbody>
<tr>
<td>1. &quot;Reduce transactions at the data entry within HR&quot;</td>
<td>1. Reduction in costs associated with routine transactions, such as data entry, printing hard copy deliverables, postage and mailing of payslips. 2. Streamline workflows</td>
<td>1. Shift data entry to the user-stakeholders (clients) 2. Timesheets and leave applications to be approved online. 3. Deliver pay slips and remuneration reports online.</td>
<td>1. Uneasiness on the part of employees and supervisors with the web system. 2. More time for value-added work. Consequences 1 and 2. 3. Cost savings associated with stationary, printing, and postage Consequences 1 and 2.</td>
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<tr>
<td>2. Increasing technical support and training to the user community</td>
<td>3. Improve client services</td>
<td>4. Provide training and support. 5. Provide on-line Help.</td>
<td>4. Reduces user resistance. 5. Training and user-support diminishing the time saving from reduced data entry by HR</td>
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<td>3. Lack of access of some employees to computer and internet facilities</td>
<td>No associated business need.</td>
<td>6. Initiate parallel web-enabled and manual workflows, and delivery of hard copy payslips (in other words, making the usage of the web-enabled system optional).</td>
<td>Alleviates the relevant concerns. 6. Diminishes some of the projected productivity gains of HR with regards to the implementation of the web system.</td>
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<td>4. Lack of IT and Internet proficiency of some employees.</td>
<td>No associated business need</td>
<td>7. Electronic notification to the employee whose bank account has been changed.</td>
<td>Alleviates the concern.</td>
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<tr>
<td>5. &quot;What if someone (an unauthorized user) diverts my (employee) salary to his/her bank account...how do I know about it?&quot;</td>
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<td></td>
<td>7. Dedication of resources to implement this feature</td>
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<td>Concerns</td>
<td>Business needs</td>
<td>Requirements</td>
<td>Consequences</td>
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<tr>
<td>6. Minimization of data entry.</td>
<td>No associated business need</td>
<td>8. Routine data (such as regular payments from one period to another) can be repeated on to new online documents (timesheets), i.e. standard templates made available</td>
<td>8. Departmental administrators’ data entry tasks made easier.</td>
</tr>
<tr>
<td>7. Data integrity and accuracy of information</td>
<td>4. Owing to the nature of employee services, the workflows need to be secured and the confidentiality, validity, and accuracy of information flowing through is of great importance.</td>
<td>9. Embed input validation rules that check with the database to ensure that data entered is correct</td>
<td>Alleviates the concern</td>
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<tr>
<td>8. ‘Being able to rely on the information (such as leave data) that is entered into the system or put on hold’</td>
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Table 11. O1 Project Manager: Experience with Data Entry & Validation, View and Update concerns

O1 project manager (Quote 5.2.2a):

“"Yes, we have been able to reduce resource levels that were required for data entry, but we’ve had an increase in resources for technical support training area to educate people how to do this...there has actually been more of a shift of work from one to the other rather than essentially saving workload."”

This implied that one of the prime objectives of cost-savings from the implementation of the ESS had not been achieved as expected (consequence 6 in Table 11). But, the project manager accepted such a consequence as he considered the interactions and training of the user community as of paramount importance to the purpose of ESS introduction, which is why the improvement of HR services was the third business need (see table).

O1 project manager (Quote 5.2.2b):

“"To some extent, that’s (shifting data entry tasks) a cost-integral change, but there are development opportunities for HR staff...more value-added work for them. Rather than sitting in front of a PC entering and data from a form, they are out there interacting with employees and staff and training them how to use the system. This gives HR more of a personal front than just sitting in front of a computer keying in data from a paper form."”
It should be noted that the training programs were primarily aimed at departmental administrators and supervisors whose involvement with the web-enabled business processes was vital to the effective rollover of the ESS. On the other hand, it was viewed by the O1 ESS team as a massive undertaking to administer a training program for the few thousand employees at O1. Moreover, the component of the ESS meant for the usage of employees was the Employee Kiosk, a relatively simple and user-friendly module that did not require a high level of IT proficiency or familiarity with HR policies. Therefore, user-manuals and online Help facilities were deemed adequate to familiarize employees with the functions of ESS they were going to be involved with. At the same time, employees were allowed to continue doing things with paper-based forms, i.e. they were still able provide personal details, submit pay claims, and apply for leave through the non-electronic medium. Of course, one of the consequences of pursuing this was the scepticism of the ESS team about the effective rollover of the web services. This is discussed in the next section.

Another requirement of the ESS was the delivery of payslips and other deliverables (requirement 3 in the table) via the web. This was aimed at further streamlining of the workflows, as the HR division no longer needed to print hard copies of employee payslips and mailing them. Thus, the requirement was meant to meet the business need to save costs, namely on stationary and postage costs. In this way, the project team had hoped that offsets in cost-savings due to the administration of training programs, aimed at the supervisors and departmental administrators, would be counter-balanced.

O1 project manager (Quote 5.2.2c):

"That was directly, again, based on a financial decision. University spends close to $29000 a year on pay slips, which includes stationery and postage. Therefore, if we can eliminate that, it will be cost-effective."

Furthermore, the one-time ESS manager contended that, unlike hard copy pay slips, more comprehensive information, such as banking and superannuation details, could be provided with online payslips. However, to counter the perceived negative consequence of user resistance, the ESS team allowed employees to choose whether they wanted to opt for online payslips or receive them by post, which came about as a result of requirement 6 in the table. The usage of the web system had to be kept optional as the distribution of
computer and Internet facilities were not widespread, and the level of IT proficiency of many of the academics varied greatly across the various departments and faculties. This is reflected by the concerns 3 and 4 in Table 11. Optional involvement with the ESS undoubtedly reduced user resistance to a significant extent, but it also diminished the expected benefits of cost-savings for the HR division.

Another requirement came about as a result of security concern. Since, employees were able to log into the ESS and modify their personal details, there were employee concerns with regards to changing banking information, as indicated by the fifth concern in the table. To alleviate this concern, the ESS team initiated a requirement to automatically sent an email to the employee informing her/him of the change in the details of the bank to which the salary will be diverted. While acknowledging that this measure was not “full-proof”, the O1 ESS manager was of the view that this would dramatically reduce the likelihood of an unauthorized entry into an employee account going undetected, even though this added one more task to the configuration of the web system.

O1 project manager (Quote 5.2.2d):

“So, not only does an unauthorized user need to hack into the system under your (employee) user name and password into the employee kiosk and perform a transaction, he or she also needs to intercept your email.”

One of the main challengers the ESS team was faced with was the reduction of user resistance to the ESS. One way of minimizing user resistance to the shift of data entry to them, reflected by concern 6, was by inculcating features onto the ESS that provided support to the task. Departmental administrators were entering employee-working hours onto web-based timesheets. Some of the employees, hired on casual basis, were working a fixed number of hours and days per week. Thus, instead of entering the same data at the end of each pay cycle, the ESS team embedded features that automatically or by default transferred the hours of the previous pay period (or the hours in the contract). Thus, templates for standardized data (requirement 8 in the table) were built and offered as system features to enhance ease-of-use.
O1 project manager (Quote 2.2.2c):

"What the administrations would now do is that they would replicate the pay data from the previous pay cycle to this period. What he or she will need to do is change the data that is different for this pay period. For those receiving regular payments from one period to another, the administrator's task will be easier. This is part of the user requirements to save them from having to manually key in routine data..."

A prime concern of HR (concern 7), which drove its decision to adopt the ESS, was related to the accuracy and reliability of data. This concern was also shared by employees and supervisors, (concern 8) owing to its significance when it came to the leave entitlements for an employee. In the pre-web days, employees and their supervisors were not always sure of the number of leave days eligible. Thus, there were mistakes made at times when an employee had applied and received approval for a leave period that was greater than the balance allowed. This resulted in increased workload from the supervisors and the HR division of having to check the actual balances and then undertaking the resolution of the problem, not to mention the potential disappointment to the employees on the rejection of the inaccurate leave application. This concern led to the business need for an information system that would not only ensure the security and confidentiality of workflows but also maintain the accuracy and validity of relevant information (business need 4 in the table). With the ESS, an employee was able to view her/his leave balances. Likewise, supervisors were provided with the functionality of checking the leave balances of all the members of their staff. Moreover, data integrity rules were enforced (requirement 9 in the table) onto the ESS whereby a leave application was rejected if an employee had applied for leave duration longer than the balance. This issue was also related to workflow concerns.

O1 project manager (Quote 2.2.2f):

"...if you applied for leave duration that was greater than the number of days entitled, the system (ESS) will reject your data. So, the system can enforce rules that its paper-based counterpart was unable to do. Therefore, the supervisors can rely on the information coming through the web workflow system, and this enables them to make their decisions faster."
5.2.3 O1 project manager’s experience with Workflow Concerns

The streamlining of workflows was undoubtedly one of the key motivators behind the implementation of a web-enabled system in the organization. A number of HR concerns over business processes led to the establishment of business needs for the web system. First and foremost, there was the issue of supervisors being able to track outstanding leave requests by supervisors, and the monitoring of such requests by HR.

O1 project manager (Quote 5.2.3a):

"...you have two weeks left to go (quitting the organization), you often take some annual or recreational leave in the last few days. In this case, we would be very diligent in paying out our employees benefits and leave entitlements on the day they leave (it is a requirement for their getting their pay on the day they leave)...then 4-5 days later, through the mail postage, we would receive their leave application stating that they were actually on leave on the last 3 days of their tenure with us yet we had paid for their working with us for those days. So, we end up chasing them as they have taken the pay as well as the leave."

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<tr>
<th>Concerns</th>
<th>Business needs</th>
<th>Requirements</th>
<th>Consequences</th>
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<tbody>
<tr>
<td>1. Paying exiting employees for the last few days of their work, while, in actuality, they were on leave—the problem of over-payment. 2. &quot;No idea that an application for leave was sitting on someone’s desk waiting to be decided upon.&quot;</td>
<td>No associated need.</td>
<td>1. Provide electronic in-tray for supervisors and departmental administrators.</td>
<td>1. Electronic in-tray enabling better monitoring of workflows</td>
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<td>3. Supervisors or employees may be late or forget to submit timesheets on time.</td>
<td>No associated business need.</td>
<td>2. Electronic reminders, such as emails.</td>
<td>2. Alleviates the concern. 2. May not effective for those supervisors or employees who don’t check their emails regularly.</td>
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<td>Concerns</td>
<td>Business needs</td>
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<td>4. Supervisors prefer a list of applications that have been approved,</td>
<td>No associated business need</td>
<td>3. Indicate status of the applications in the workflow.</td>
<td>Alleviates the concern</td>
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<td>disapproved, or need attending to.</td>
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<td>3. Minimizes the need of users to phone HR on routine</td>
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<td>5. Supervisors and administrators will be concerned with the</td>
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<td>processing of the documents, such as timesheets (after these are</td>
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<td>approved) carried out by HR/payroll.</td>
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<td>6. Employees expect transparency of the process in a web</td>
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<td>environment.</td>
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<td>7. Employees will be concerned with the outcome of the</td>
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<td>decisions made (approved or rejected) on their timesheets and leave</td>
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<td>applications.</td>
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<td>8. Supervisors may not be willing to spend too much time on</td>
<td>No associated business need</td>
<td>4. Allow supervisors to reject applications without</td>
<td>Alleviates the concern</td>
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<td>administrative tasks.</td>
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<td>providing explanatory comments</td>
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<tr>
<td>9. Many supervisors prefer to communicate informally with their</td>
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<td>employees.</td>
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<tr>
<td>10. Rejection without explanation will cause disappointment and</td>
<td>No associated business need</td>
<td>5. Supervisors are encouraged to provide explanations</td>
<td>4. Reduced queries and complaints by employees</td>
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<td>frustration with employees.</td>
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<td>behind rejections on the web, though it is not</td>
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<td>mandatory.</td>
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<td>Table 12. O1 Project Manager: Experience with Workflow concerns</td>
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So, the requirement (requirement 1 in Table 12)\(^3\) that came out of this consideration, perceived as a concern by HR, was the Electronic In-tray for supervisors. This functionality enabled supervisors to track and view all outstanding leave requests made by their staff. Also, the ESS management was able to effectively monitor the process of leave applications, and thus, the problem of over-payment to employees was noticeably minimized.

O1 project manager (Quote 5.2.3b):

"So, previously we had no idea that an application for leave was sitting on someone’s desk waiting to be decided upon, but now, we do because it is sitting on the electronic in-tray and accessible by us (HR) as well as by the supervisor who can approve it straight away...certainly a benefit in terms of the cost and the amount of effort spent in recovering over-payments significantly."

Hence, the electronic in-tray feature enabled supervisors to check the leave balances and other relevant details of employees. There was a user concern regarding the HR requirement for the submission and approval of documents, such as timesheets and leave applications online. Departmental managers and administrative personnel were concerned that supervisors might forget or be late in getting these applications through to HR, owing to busy schedules. This concern was echoed by employees, who expressed the need to be reminded of due dates for submissions. This resulted in the requirement for electronic dispatch of remainders informing both employees and supervisors of the need to submit and approve documents within a specified due date, and is illustrated in Table 12 as requirement 2. However, dispatching electronic remainders (via email) was found to be ineffective when it came to staff with no access to computers, a situation that was prevalent in some faculties at O1. Consequently, the inability to participate in the web-enabled processes brought about concerns for these users. To deal with this situation, the initiators had to allow the manual processes to continue in parallel to the ESS workflows, as illustrated in Table 11 (concerns 3 and 4 resulting in the requirement 6) and discussed in the preceding section. Thus, those employees with no access to computers were allowed to keep on submitting paper-based applications to their supervisors, who continued to approve them on paper. Of course, at some point, the transaction needed to

\(^3\) Table 2 had been derived from the O1 voice tables in appendix B1 in the same way as Table 1.
be entered into a computerized system, a task that most administration staff in the various departments had been trained to do.

Ol project manager (Quote 5.2.3c):

"So, we were still going to accept paper forms and the normal process for updating information, but if they (users) wanted to do it electronically, they could do so.... Those people who did not want it (the web system), they did not have to involve themselves with it. So, they did not put up any resistance to it."

Allowing the parallel processes, one web-enabled and the other manual, to continue appeared to be more of an attempt by the ESS team to eliminate resistance from power groups and potential users, opposed to the project, by implicitly discouraging their involvement.

The explicit indication of the status of applications (timesheets and leave submission) at every stage of the workflows was a requirement (requirement 3 in the table) the project team inculcated into the ESS to allay the projected concerns of both supervisors and employees. Supervisors prefer the presentation of documents, for their perusal, to be flagged according to the order of priority. Essentially, the web interface needs to show explicitly the status of documents sitting on the electronic in-trays so that the supervisors are able to clearly differentiate from the list the applications that have already been approved or rejected or pending approval. Furthermore, supervisors and departmental administrators also wanted to be kept informed of the status of these documents once they had been sent to HR for processing. This issue of transparency in the web-enabled workflows was also found to be important for employees. Indeed, the inclusion of the status indicator requirement was used as a motivator to encourage employees to opt for the web-based services. Hence, they (the employees) were able to view online the decision made by their supervisors on their applications, as well as obtain information on what stage of processing the documents had undergone, without having to make direct inquiries with HR. In fact, this requirement was instrumental in reducing the number of telephone calls and face-to-face queries by users that the HR staff had to attend to, (consequence 3 in Table 12).
5.2.4 The Process of Evolution

This section describes the process of evolution of the ESS, which involved continuous enhancements and improvements by incorporating further requirements, gathered through the feedback mechanism. The process is depicted in Figure 2 and shows that initiator (HR) concerns lead to business needs for the ESS through the direct arrow. Business needs were translated into system requirements by the HR-appointed ESS team. I begin the elaboration of the process of evolution of the O1 ESS using verbatim examples from the transcript, which are also presented comprehensively in the O1 voice tables (see Appendix A5).

The strategy for competitiveness brought about the HR concerns for increasing its productivity. Due to this concern, the HR division in O1 engaged itself in the formulation of business needs for a system that would reduce costs associated with routine transactions, such as data entry, printing hard copy deliverables, postage and mailing of payslips, as well as streamline the business processes, which, I turn, that brought about the shift in data entry and in the employee pay and leave approval process to the user community. However, the enactment of this requirement as a feature had some expected consequences, chief among them being the need to train and provide technical support to the users in the usage of the web system, not to mention the steps to overcome the initial resistance put up by them.

Thus, the business needs translating to the requirements for shifting data entry to the users caused a new concern with HR. If users were not trained and made familiar with the web system, they would resist the use of the new ESS services, thereby making it impossible to enforce the requirement. The new concern, in turn, brought about additional requirements of data entry support. This rather indirect impact of the business need on initiator concerns is depicted by the broken arrow in the figure.
Some of the initiator requirements were gathered from the sessions with the representative groups of users, as discussed in section 5.2.1, while others were selected from an implicit experience base, comprised of requirements and resultant features derived from the university’s earlier web projects, such as the student information systems. Figure 2 shows the presence of the implicit experience base and its relation to the initiator requirements. The relationship is depicted by the broken arrow owing to the fact that the reuse of developmental experience within the organization was not entirely institutionalised. The reuse of experience from past projects was the undertaking of IT division, shown by the Dev (web developer) triangle. In fact, the IT division was responsible for the maintenance of this experience base, and relevant details are discussed in the textural-structural description of the experience of the O1 IT manager later in the chapter. The pilot testing of each facet (or phases as described later) was begun with these requirements manifesting as system features on the ESS. The target users then validated these requirements on the basis of their concerns, which led to modifications or additional
requirements, also referred to as resultant requirements. This validation process reflected the consequences of the initiator requirements, perceived by the O1 project team.

Resultant requirements also had consequences, the positive ones alleviating the user concerns, while the negatively perceived ones caused HR concerns, therefore necessitating further enactment of initiator requirements and consequent validation by the user community, in an iterative manner. Examples of such causal relationships are also illustrated in the O1 voice tables (see Appendix A5).

5.2.5 Criticality of Concerns and the Existence of Conflict Antecedents

There were a number of issues that were perceived as highly critical concerns by the ESS team, owing to the existence of latent conflict between itself and the other stakeholder groups, namely the IT division. The main point of dispute was the security requirement involving the use of digital signatures that was proposed and enforced upon the system, by the developers (IT division) in line with their culture of technological innovativeness. Furthermore, the IT division received full support from the top management of O1 to proceed with this technology. But, this was not perceived favourably by the ESS team.

O1 project manager (Quote 5.2.5a):

"While it is certainly true that digital signatures are far more secure than ordinary usernames and passwords, the administrative burden of maintaining digital certificate technology, at the level of technology that was around at that time, far exceeded any benefits gained from the increased security. The burden of administration fell onto us (HR), but we were inadequately resourced to do this."

The end-users of the system, the supervisors and departmental administrators, were likewise, not keen on digital signatures either. From their feedback, it was revealed that they considered the implementation of this technology as a burden because it was time consuming to install (consequence 3 in Table 13) and required additional training for effective usage of the technology (consequence 4). To make matters worse, it was an obstacle to the escalation of approval authority. In other words, when an approver was absent, it became difficult to escalate the approval authority to a substitute supervisor because the digital signatures were not easily portable (consequence 5).
O1 project manager: (Quote 5.2.5b)

"...you can’t readily transfer the digital certificate mechanism to someone else (substitute approver) if that person has not been set up for. It takes half an hour, and they need to be present coz they need to key in the password, they need to approve themselves, because the process was forced to jump through these hoops. So, they complained that the feature was of no advantage to them as it was so difficult to administer.”

The ESS team had to assign a team member, on a full time basis, to look into the implementation of digital signatures, but it still proved to be cumbersome. Even though the HR division was cynical about the technology, they felt compelled to go along with it due to the justification put forward by the top management, upon the advice of the IT division. However, the enterprises that had been involved in the early adoption of digital signature technology in Australia started to become aware of the difficulties associated with actual usage, but it was apparently too late for the ESS team, as the university had already proceeded along that path.

O1 project manager (Quote 5.2.5c):

"This digital signature initiative was railroaded by the developers, it was not an HR requirement...nor was it a requirement by finance for their part in the workflow (for which they use their own digital certificates). Since, the IT division (developers) knew how to use the technology (in line with their culture of going for cutting-edge stuff)... everyone else should use this... this was their justification. This impeded our progress in the roll-over and further evolution of the web system."

Ultimately, the feature was dropped as a consequence of the conflict. This issue led to the broader complaint by HR about IT personnel lacking proper understanding of business processes (concern 1 in Table 13). To remedy this, they suggested programs to train IT staff, particularly the relatively new recruits, about these processes (requirement 1).

O1 project manager (Quote 5.2.5d):

“We tend to find, from our experience, that our programmers, who have not been involved with business issues at the same level, don’t make the same sort of decisions. We tried for a little while to engage them in the business but the response has been largely against us. As part of the induction program for new IT staff, we
bring them into the business for little while so that they can see what we do, and understand the way we do things..."

HR also revealed the fact that it was unable to gather adequate backing from the top management on this issue. Furthermore, IT expressed objection to the claim by arguing that it is inadequately staffed, and its few members are occupied with completing on-going projects (the specifications for which had been set earlier) and carrying out the evaluation of various ERP products. The potentiality of conflict between the HR-created ESS team and the IT division loomed over their joint-setting the requirements for the WBIS, as indicated by the cloud of conflict antecedents in Figure 2.

According to the O1 project manager, O1 responded to the drop in the inflow of government funding by adopting a cost-reduction strategy, which translated into various efficiency-driven business needs in various divisions. Thus, the case for a web-enabled workflow system was established and justified. These manifested into HR requirements that were then presented to the top management for approval. However, there were concerns expressed by some "power groups" in the user community with regards to their involvement with the web system. These issues of contention originating from certain academics were revealed during the various cycles of ESS validation, shown by the cloud of conflict antecedents hovering over the validation process in Figure 2.

O1 project manager (Quote 5.2.5e):

"...there are varying degrees of technical expertise and competence within the organization. I mean we’ve got heads of departments and deans who have no computers at their offices. So, when you ask them to approve things electronically, they voice their strong objections. Keep in mind that some of these people are high up in the organization and hold great influence. So, this is the biggest impediment in our organization – cultural change, being able to do things differently than the way they’ve always done it."

Therefore, it was apparent that top management was not keen on enforcing the usage of the web system on academics. This concern, the risk averseness of top management, led it to stipulate the requirement that HR allow both the web-enabled workflows and the "old way" of providing HR services simultaneously for the first few months following the implementation of the system (requirement 4 in Table 13).
Some of the resistance experienced from the user community originated from departments, which had already developed and were using their own complex information systems to support their administrative processes. Having invested departmental resources into such systems, their advocates were not keen on simply abandoning them for the ESS. They confronted the ESS team by demanding to be informed of the immediate benefits to be gained by them for their adoption of the ESS.

O1 project manager (Quote 5.2.5f):

"The main thing we had to battle was when the stakeholders asked 'what's in it for me or for my department?' If there was not much to be gained by them, they showed resistance to the system."

To ease the resistance, the ESS team undertook actions, such as the gradual migration to the ESS, which basically allowed the departments to continue using their own information systems though the departmental administrators were still required to engage in data entry via the web. Furthermore, the team negotiated with these stakeholders by highlighting the actual benefits that the WBIS would yield in due course. They essentially discussed the business objectives, such as the streamlining of workflows, faster processing cycles, and improved HR services, in order to encourage them to consider using the ESS.

Last but not the least, the loss of team members with expertise was looked upon as a critical issue by the project manager. The team members with their accumulated experience from several HR-initiated projects were considered a highly valuable asset to the implicit experience base.

O1 project manager (Quote 5.2.5f):

"...the manager of our group left, and I assumed the role of manager. Then, the next most experienced person to me left, and we went down from cumulatively 14 years of experience to 6 years, and basically lost a lot of that organization knowledge, and the value-added developments, such as the delivering pay slips to all staff or timesheets through self-service took a back seat to core business operations and I had to step up to a managerial role rather than a system design specification role and the people who stepped into my role, probably did not have the experience and the background and the time to do these things."
This was one of the major factors behind the delay in the implementation of the final phase of the project. The other factor was the organization's acquisition of an ERP system, which amounted to the diversion of all effort from the original ESS. This is further discussed in the next section.

<table>
<thead>
<tr>
<th>Concerns</th>
<th>Business needs</th>
<th>Requirements</th>
<th>Consequences</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Lack of IT understanding of business processes.</td>
<td>No associated business need</td>
<td>1. Familiarize new IT staff about business processes. (Refer to Quote 5.2.5d)</td>
<td>1. Not apparent whether the familiarization of IT staff with business staff has had an impact or not.</td>
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<tr>
<td></td>
<td></td>
<td></td>
<td>2. Potential to alleviate the concern.</td>
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<tr>
<td>2. “Risk averse” nature of the top management</td>
<td>1. Optimal level of security.</td>
<td>2. Digital signatures for approvals of timesheets and leave applications</td>
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<td></td>
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<td>3. Time needs to be devoted to get digital signatures installed on computers.</td>
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<td></td>
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<td></td>
<td>4. Requires training on the usage of digital signatures</td>
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<td></td>
<td>5. Not a portable technology</td>
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<td></td>
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<td></td>
<td>6. Adds to the user resistance</td>
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<tr>
<td></td>
<td></td>
<td></td>
<td>(Refer to Quote 5.2.5b)</td>
</tr>
<tr>
<td>Consequences 3-6.</td>
<td>No directly associated business need</td>
<td>3. Provide another level of security to supervisors for approvals by means of special logins and passwords.</td>
<td>Alleviates the concern.</td>
</tr>
<tr>
<td>3. “Biggest impediment to our organization – cultural change”, or the resistance put up by power groups to changing their ways of doing work (Quote 5.2.5e).</td>
<td>No associated business need</td>
<td>4. Initiate parallel web-enabled and manual workflows.</td>
<td>7. Parallel web-enabled and manual workflows off-setting some of the productivity gains.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>8. Parallel web-enabled and manual workflows reduced resistance from some users.</td>
</tr>
</tbody>
</table>

Table 13. O1 Project Manager: Experience with the most critical concerns
5.2.6 Perceived outcome of the project

The project was implemented in three phases. The first phase involved the web-enabled approval process for timesheets. This was deemed as a high priority as the university hired a sizable number of staff on a casual basis. Data entry of casual pay data was diverted to departmental administrators, and approval was to be undertaken online. The employee kiosk, aimed at the individual employees, was introduced in the second phase. In the third phase, additional functionality and enhancements to the workflows were planned for implementation. This included the inclusion of web-enabled timesheets for casual employees to fill in themselves. Each phase comprised of a number of successive iterations of modifications and enhancements.

The outcome of the first phase instilled confidence in the ESS manager. Despite having to allow the non-web processes alongside the ESS workflows (i.e. certain departments were carrying out both processes in parallel) the results and satisfaction levels of the users were favourable, thereby enabling the project team to rollover the system to the rest of the university. In the midst of doing this, the team faced some opposition from some rather powerful stakeholders, who, according to the project manager, had not attended the awareness seminars and training programs. These stakeholders, mostly members of various political cliques within O1, were concerned with their involvement in the ESS, which would increase their already over-burdening administrative workload. The fact has also been discussed in the previous section as a critical concern and potential source of conflict and hindrance to the ESS project. The ESS team was able to tactfully deal with these concerns by referring to the invitations to seminars and training programs, and the ensuing documents of requirements and specifications, and reports that were sent out to the academics holding positions of authority and power within O1. These documents proved to be effective in minimizing the brewing conflict. As a result, the implementation of the web-enabled approval workflows took place at the expected level.

O1 project manager (Quote 5.2.6a):

"So, it (the documents) becomes a very valuable tool in convincing the opposers and eliminating the resistance after we had actually gone live with the system, and we grew reasonably rapidly to having 60-70 % of the transactions performed electronically. So, that's where we are sitting about now."
The positive outcome was stressed by the fact that most of the efficiencies owing to the ESS implementation occurred in the larger departments, which happened to be the primary organizational units targeted by the ESS project. The productivity gains came about despite the dual processes (non-web processes in parallel with ESS workflows) employed in the larger departments as part of the pilot study for phase one. Since, the magnitude of pay and leave processing in smaller departments was considerably less, the ESS team did not devote a great deal of effort in motivating the managers in those units to use the services rendered by the web system.

O1 project manager (Quote 5.2.6b):

"...we then instigated the dual process with some of the simpler departments which were less complex in their requirements, but not necessarily the smallest departments...in fact, one of them (forming one of our pilot groups) employed the largest number of casual staff...nearly 10% of their staff were casual, but they had no automated system. Therefore, the system was a big benefit to them. So, there was an advantage in getting them out (basic form of the ESS in phase one). By getting this department on board, we automatically reduced 10% of the data entry in HR...so there was a big goal to be kicked immediately."

One of the main disputes, explained in the section on the criticality of concerns, in the project were conflicting viewpoints of the HR division, and the IT division, over the system requirements for the ESS. Apart from the differences in norms, values, and aspirations of the two departments that resulted in the conflict over the usage of digital signatures, the project team alleged that some of the conflict antecedents were related to the fact that IT personnel often lacked an adequate understanding of the relevant business processes, i.e. approval of timesheets and leave applications. Hence, they were having difficulties designing the web system from a perspective other than a strictly technical one.

O1 project manager (Quote 5.2.6c):

"...when the decision has been made below the senior analyst level (in other words, by the programmers themselves), there could be some ambiguous decisions made...this does not happen all the time, but more than half the time such a decision has been made, it tend to be made in the wrong direction because it is made strictly from a technical system perspective rather than a business perspective."
However, the same IT personnel were a lot more successful when it came to building the employee kiosk in phase two of the project. The project manager attributed this phenomenon to the fact that the web developers were employees themselves, and hence, were able to adopt the viewpoint of the employee, the target user of the module.

O1 project manager (Quote 5.2.6d):

"There are self-service functions... employee kiosk functions... this is a good supporting case for us... did not suffer the same fate because the people working on the code and scripts were employees themselves and thus, were familiar with the needs and expectations of a typical employee using the system... were able to make sensible suggestions as to the different or alternate ways of doing things because they were able to see things from the perspective of the employee user... they had a more efficient period of programming. They were able to understand how things with such a system worked. They were able to understand what the business catch was, why we were doing it, for whom were we doing it."

Therefore, the development and implementation of the employee kiosk was relatively less cumbersome. However, work geared towards the development of some of the modules in phase three was halted because the organization decided to purchase an ERP system. This brought about a diversion of resources to the acquisition and configuration of the new system. As a result, the construction of web-enabled timesheets and other advanced features were never completed.

O1 project manager (Quote 5.2.6c):

"... 1 year ago the university launched its program with the ERP project, and they decided to put a halt to in-house development work on our core systems, as we'll be replacing our system with the ERP solution. So, given that most of the development resources are now going to the ERP project, there's not going to be anyone doing it anyways, therefore we put it on hold."

To return to the perceived outcome of the project, the manager revealed that he was unsure of the extent of the cost-savings gained as a result of implementing the ESS. Even though there were productivity gains in the reduction of data entry and other mundane tasks within HR, and the streamlining of business processes across the institution, the ESS team had to increasingly dedicate their efforts towards web management issues, such as user training, Helpdesk provision, maintenance of user names and passwords,
managing the approval hierarchy to accommodate contingencies and consequent 
estivals.

O1 project manager (Quote 5.2.6f):

"We probably did not anticipate enough what the impact of the change in business 
processes was going to have on our other bits of the business. We looked at the end 
results and said that this particular item will be eliminated or reduced but all these 
other little bits along the way were harder to quantify (have they changed?) Maybe 
we did not quantify them as well as we should have, and say that these particular 
transactions and activities have become more complex and require some additional 
support."

On the whole, the project was considered to have generated several positive outcomes as 
some of the more significant business needs had been met.

5.3 Textural-Structural Description: The O1 IT Manager

The IT division in O1 was assigned with the development of the ESS. The division was 
responsible for most in-house development projects and overseeing the management of 
the university’s IT facilities. It also played a key role in the formulation of organization-
wide IT policies, for which it had the support of top management. An in-depth interview 
was conducted with the leader of the division, referred to in the thesis as the O1 IT 
manager. For the purpose of developing the WBIS, the IT division had embraced the 
business needs behind the ESS, inculcated the requirement specified by HR, and added 
some of its own requirements, on basis of its experience with previous web projects. The 
latter was supported by a semi-institutionalised infrastructure within the IT division, due 
to which it is referred to as the implicit experience base in the thesis.

5.3.1 O1 IT Manager Experience with Requirements Elicitation

It was not the responsibility of the IT division to undertake requirements elicitation or 
provide training to the target users. They worked according the specifications sent to them 
by a “client” division, such as the HR in the case of the ESS project. However, some of 
the requirements specifications were suggested by them on the basis of their experience 
with previous projects, implying the existence of an experience base, constructed and 
maintained by the IT division, which is discussed later.

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O1 IT Manager (Quote 5.3.1a):

"If they (HR) specify the way the interfaces should look, we take that into account. If not, we develop a set of interface designs of our own and present these to them. Then, they test them, and decide what features they like and those they don’t want, and suggest changes. It is their role (HR) to involve individual users from the departments and faculties during testing and eliciting the latter’s feedback on issues like user-friendliness..."

Furthermore, the actual pilot testing of the ESS was conducted by the HR-appointed ESS project team. Thus, the elicitation and consideration of user feedback was regarded by the O1 IT manager as the responsibility of HR.

O1 IT manager (Quote 5.3.1b):

"It is their role (HR) to involve individual users from the departments and faculties during (beta) testing and eliciting the latter’s feedback on issues like user-friendliness..."

5.3.2 O1 IT Manager’s experience with Data Entry, Validation, View & Update Concerns

As discussed in the preceding sections, the tasks and responsibilities of IT were different from their HR counterpart, even though they worked jointly on the web services project.

O1 IT Manager (Quote 5.3.2a):

"We are providing support to HR, but not to the individual users. So, if individual personnel in a department have queries (regarding the web system), they need to consult HR."

Thus, the IT division was responsible for the development of the web-based system in accordance with the specifications of HR. It also provided support to the members of O1 ESS team on the various intricacies of the system and its features. But, it was not responsible for the implementation of the proposed system throughout O1, or with the collection and reconciliation of stakeholder viewpoints. Moreover, the division was not involved with the user training either.
O1 IT manager (Quote 5.3.2b):

“Well, we manage the development of the systems, while HR decides on the priorities, such as what functionality will be included and in what order and then provide us the specifications.”

Hence, what IT actually did was to obtain these requirement specifications from the ESS team and translate these into the various features of the web system. These included the enforcement of data entry and validation rules into the system (requirement 2 in Table 14), the flashing of precise errors messages when data was entered incorrectly (requirement 3), the display of employee leave and pay statuses (requirement 4), etc. Basically, the IT division shared HR’s views on the business needs for the ESS.

O1 IT Manager (Quote 5.3.2c):

“Basically we are following the philosophy of data entry at the source. The users (employees) are the originators of the data. So, they know the data best. With this web interface, employees are able to enter data through kiosks. These data include things like salaries paid into, their qualifications, bank account details through the kiosk…basically all the items filled in a paper-based form. This is more efficient as HR personnel don’t have to do the data entry anymore.”

Owing to the significantly large number of employees, the IT division understood the difficulty of administering user-training programs. Thus, the interfaces and the functionality of the system had to be designed in such a way that a minimum level of computer and Internet proficiency was required to be able to use the ESS.

O1 IT Manager (Quote 5.3.2d):

“...if I go into the employee kiosk as an individual person...I can look at my leave information...so this shows a “history” of my leave taken...I can also look at my personal details from the kiosk (as an individual employee), the leave requested (including status, i.e. approved/rejected/waiting) and also look at my balances (annual leave – days remaining).”

In addition, the rules associated with data integrity and validation, and HR policy were embedded into the WBIS. For example, if an employee had applied for a leave period greater than her/his entitlement, the application was automatically rejected. Moreover,
some of the rules had been programmed into the data entry interfaces in order to inform users precisely of the fields that had been entered incorrectly.

<table>
<thead>
<tr>
<th>Concerns</th>
<th>Business needs</th>
<th>Requirements</th>
<th>Consequences</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Minimization of data entry.</td>
<td>No associated business need</td>
<td>1. Routine data (such as regular payments from one period to another) can be repeated on to new online documents (timesheets), i.e. standard templates made available</td>
<td>1. Departmental administrators’ data entry tasks made easier.</td>
</tr>
<tr>
<td>2. Data integrity and accuracy of information</td>
<td>1. Owing to the nature of employee services, the workflows need to be secured and the confidentiality, validity, and accuracy of information flowing through is of great importance.</td>
<td>2. Embed input validation rules that check with the database to ensure that data entered is correct</td>
<td>Alleviates the concern</td>
</tr>
</tbody>
</table>
| 3. Rejection of applications without precise error messages with cause frustration. | 2. Improve client services                                 | 3. Precise error messages                                                                                                                           | 2. Alleviates the concern – “It will inform you of the fields that have been entered incorrectly (onto the web form)”.
3. Some error messages need to be supported by appropriate Help features as assistance for rectification. |
| 4. Supervisors prefer a list of applications that have been approved, disapproved, or need attending to. | 4. Indicate status of the applications in the workflow. |                                                                                                                                                    | Alleviates the concern                                                                                  |
| 5. Supervisors will be concerned with the processing of the documents, such as timesheets (after these are approved) carried out by HR/payroll. |                                                                                                          |                                                                                                                                                    |                                                                                                        |

Table 14. O1 IT Manager: Experience with Data Entry & Validation, View and Update concerns
5.3.3 O1 IT Manager’s experience with Workflow Concerns

Similarly, the IT division inculcated requirements onto the web system that addressed the concerns and the administrative staff and supervisors. One such requirement was the electronic in-tray.

O1 IT Manager (Quote 5.3.3a):

"Basically we are automating things that used to come into their tray on their desks. Formerly, various documents (finance, payroll and HR-related) would come into their office in-trays. We wanted the application to automate this in the same manner. In their online in-trays, managers found various documents."

Moreover, there were various levels of supervisory privileges established in the system. A course coordinator was able to view details of all the tutors working on the course, but not those of staff in other courses. As timesheets and leave applications were required to be approved online, a feature to indicate the status of submitted documents in the electronic in-tray was incorporated.

O1 IT Manager (Quote 5.3.3b):

"Approval takes place after the timesheets have been entered into the system. Once entered, these are sitting on the "pending" table on the web interface and awaiting authorization. Once it is approved, the transaction is diverted over to payroll."

5.3.4 Criticality of IT Concerns and the Existence of Conflict Antecedents

The IT Manager narrated issues that were of grave concern to her unit. She expressed her disappointment with the client, the HR division and the ESS management team, for not appreciating IT-initiated requirements specifications and features. One of these points of contention was over digital signatures, a specification that was viewed with scepticism by the ESS team.
O1 IT Manager (Quote 5.3.4a):

"We set the features...we put in digital signatures so that authorized personnel could sign online very securely. HR will then say, 'what's that?' to which we give our explanation. So, sometimes, when it's a new technology, it's our suggestion. But when it comes to the nature of transactions - what will be implemented and in what order - it is their specification."

The feature had to be ultimately dropped owing to the negative response to it from the ESS team, and brought to the surface a rift between the two units involved with the ESS project. Hence, the O1 IT manager expressed her deep regret at the conflicting between her division and the ESS team.

O1 IT Manager (Quote 5.3.4b):

"I think we are not at all behind in terms of the web-enabled HR system that we've developed. In fact, most applications in the domain don't have digital certificates for authorization. So, we are using leading edge technologies."

Being a support unit within the organization, the strategies of O1 undoubtedly had an impact on the IT division, thereby causing certain concerns. One of the strategic initiatives of O1 was to opt for an ERP system, which caused grievances with IT. As a result, IT was compelled to halt new work on all of its web projects, and focus its work on the features required by taxation or government legislation (in light of the broader HR system, which included the non-web internal aspects), and evaluating the various ERP products. The IT manager also expressed her doubts about the extent of integration of the various O1 systems by the ERP solution. She claimed that her unit was already working on the integration of the various information systems being used within the organization before the decision to purchase the ERP product was made by top management.

O1 IT Manager (Quote 5.3.4c):

"Well, we are doing the integration ourselves. We are using I-Planet products to do the EAI (Enterprise Application Integration). Of course, the ERP vendors sell software for 4-5 million dollars for HR, payroll, finance, and the student administration system. Whereas, I am getting a million dollars a year to do the same – integrating payroll, HR, finance, student administration, research, all the web development stuff...everything for a million dollars a year. Of course, we can't
necessarily compete in terms of how fast we produced the application as some of the larger (ERP) vendors”

Furthermore, the task of evaluating various ERP products was also perceived as a significant addition to the already heavy workload. One of the prime reasons behind the apprehension was the fact that the IT division would be continually be engaged in incorporating the new features that keep on being released by the ERP vendors. The relatively small size of the O1 IT division and the total number of personnel allocated to undertake the ERP implementation also raised concerns with the IT manager. Thus, the ERP implementation was viewed as an evidently arduous task. Added to this was the disappointment over the abandonment of the ESS that the division had spent considerable period of time developing.

Another issue of concern to the IT division with regards to the ERP decision was the configuration and customisation of the proposed system. According to the IT manager, the customization of the ERP system was going to be a highly expensive endeavour. This was due to the plethora of university policies and equivalent exceptions to these policies. Thus, the incorporation of these exceptions was indeed spelling out a huge expenditure for the university. On the other hand, her division could have dealt with the exceptions without incurring extra costs, had O1 decided not to abandon the existing ESS. Thus, the interview uncovered ill feeling on the part of the IT manager with regards to top management lack of acknowledgement of the efforts of her division to develop information systems with few personnel but using the latest technology. Instead, she was asked to divert her efforts towards the proposed adoption of an ERP system.

O1 IT Manager (Quote 5.3.3d):

“Well, you know, I really don’t mind the fact that the university’s going for the ERP system. But, we have always taken into account all the specifications that were given to us. There’s nothing we have not done that was specified. We are using leading edge technologies to develop web applications. We are using Forte, I-Planet integration environment...we are using tools of the latest technology. It’s just that we have limited resources.”
5.3.5 The Existence of an Experience Base

The IT division was reusing its experience from its previous web projects and its application extended to developmental work on the ESS. Artifacts that were reused comprised of requirement specifications, interface designs, and codes, derived from its work on the web-enabled student information system.

O1 IT Manager (Quote 5.3.5a):

"We developed a prototype because we considered the SIS (student information system) pretty much as the prototype for the staff (ESS). Initially, (while developing the student system) we developed the prototype and showed it to student administration for feedback. With ESS, we showed the student prototype to HR and asked them if they wanted something similar."

Thus, several requirements specifications for the SIS were found to be applicable to the ESS, and web-based interfaces were adapted for the latter. Likewise, codes for earlier web systems had been written in a way to support reuse in new projects.

5.4 Textural-Structural Description: O6 Project Manager

O6 is a renowned provider of outsourced payroll services, and has a global presence. Its main client base include small and medium sized enterprises (SMEs), which have inadequate resources to undertake payroll operations in-house. Traditionally, O6 has provided services to its clients via conventional modes of communication, such as telephones, faxes, and documents being dispatched by courier services. In recent years, it has adopted a web-based information system as a medium through which it aims to change its mode of interactions with clients. This is in line with its web or e-business strategy of enhancing the value of its services to its existing clients, attracting new clients using its website, and streamlining certain internal operations, such as data entry. According to the O6 project manager (Quote 5.4a):

"We are a customer-focused organization, and thus, we need to maintain the level of our services, regardless of the medium we use to effect transactions with our clients."

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As stated in the introduction section of the chapter, the O6 project manager was the head of the outsourced payroll company’s ESS venture. The web services were introduced to existing clients and promoted to potential clients through an awareness program, consisting of advertisements on the web, monthly newsletter, and phone messages, informing clients when they call that the web timesheet has been launched. Apparently, one of the prime goals behind the implementation of web-based payroll services was not only the reduction of costs associated with payroll processing, but also the improvement in the quality of services O6 renders its clients, as mentioned by O6 project manager (Quote 5.4b):

“"Oh yes!!! The thing is (a few months ago) when we initially wanted to go down that track (the web project), we were asked by top management whether we (the objective was) wanted to reduce staff. But, this was not what the web project was aimed at. It's not at all aimed at staff reduction. What we want to do is to use the existing staff to work in such a way that we add more value to the services we offer to our clients. We also want to add a personal touch to the services for our clients. Our staff should be available to answer client queries, rather than spend time keying in data. Thus, the main objective was to add more value to our services rather than merely reducing the cost of the payroll process.""

Even though the web solution were purchased from a vendor, the company set up a team, comprising of both marketing and IT personnel, to configure and implement the web application with aim of providing optimal services (or rather e-services) to its clients, many of whom possessed a minimum level of Internet proficiency. The main stakeholders identified include the clients of O6, and the O6 payroll division, the latter comprising of marketing, client services and web (IT) support personnel. The payroll division was the initiator of the project, and formed the ESS team. The web system did not require the direct involvement of the individual employees of the clients. In fact, they were not granted access to the system at all. Clients submitted the timesheets containing the pay hours of their employees prior to due date for the specified pay period via the web. These timesheets were then manually checked and validated by O6 staff (after the business rules embedded into the application have checked the data entered for correctness and integrity). Once this was done, they sent an email to the clients to inform them that the timesheets were being processed. Once the timesheets were processed, clients were once gain notified by email that the payroll reports were available at an URL. They were also sent hard copy reports by conventional modes if they opted for this type of delivery.
Clients were required to hold a direct debit facility whereby their accounts were debited 24 hours after the receipt of these reports.

5.4.1 O6 project manager's experience with requirements elicitation

The development was carried out using an incremental methodology, whereby a simplified version of the website was put up for pilot study for a period of six months, during which feedback was gathered from the clients. According to the O6 project manager, the web system went “live” following the study and consideration of client feedback. It claimed to follow an incremental and evolutionary approach, by continuing the process of eliciting feedback. Indeed, in the words of the O6 project manager (Quote 5.4.1a):

“What this (the development method) has provided us is some very useful feedback from the clients on we could make our web system better, and (it’s amazing) it’s always good to get the user point of view, because, at the end of the day, the clients are the users. Thus, their feedback was definitely very worthwhile.”

Thus, the project team placed considerable emphasis on the elicitation of concerns voiced by its clients through the feedback mechanism. To further confirm this claim, the O6 project manager stated (Quote 5.4.1b):

“Clients should be able to make recommendations so that we know what we should improve”

5.4.2 O6 project manager's experience with Data Entry Support & Validation, View & Update concerns

The fundamental initiator-driven requirement of shifting data entry (requirement 1 in Table 15) to the clients onto web-based timesheets caused a number of concerns, one of them being the fact that many of them were small businesses with not necessarily a high level of IT proficiency.
O6 project manager (Quote 5.4.2a):

"...most of clients are small businesses. So, they may not be at a stage where they could claim to be PC-ready or Internet-ready. These technologies might be new for them."

This was one of the potential negative consequences of the employment of the ESS, even though the project brought about increased productivity for O6 personnel. To alleviate the client concern arising from this consequence (consequence 3 in Table 15), a number of solutions were put in place to motivate clients. These included a simple-to-use and user-friendly interfaces (requirement 2), and online Help and demos and the provision of concise and easy-to-follow instruction booklets (requirement 4), as well as the establishment of a web coordination team to provide optimal user support and client accounts management (requirement 5). Furthermore, clients were offered training periodically (requirement 3), and a number of O6 personnel were assigned to provide assistance to them via telephone or email. These solutions necessitated the dedication of resources to plan and organize training sessions, incorporate online Help features, and establish the web coordination team, but efforts proved to be fruitful as an expansion in the client base for web services was reported.

Another concern was the correctness and validity of data entered (concerns 2 and 3 in Table 15). Not only was the issue a concern for the O6 ESS team, but clients also wanted to make sure that the data they were entering through the web-based interfaces were correct. To alleviate these concerns, the O6 ESS team embedded data integrity and validation rules at the web interfaces and the servers (requirement 6). Though the both concerns were being addressed as a consequence of the requirement-driven feature, some timesheets were being rejected without appropriate explanation or guidance, thereby creating client disappointment with the web system (consequence 8). To counter this concern, the system had to be configured in order to enhance its capability to furnish precise errors messages (requirement 7 in Table 15). This, in turn, made it necessary to set up the online Help facility in such a way that it could support the error messages by providing appropriate suggestions (consequence 9).
O6 project manager (Quote 5.4.2b):

"So, on the web UI, the client presses the CANCEL button for Paul’s (an employee of the client) record, but does not remove the value in the Hours field. Then, the SUBMIT button is clicked so that the data is sent to the web server. In this case, no submission will take place as the client cancelled Paul’s record without deleting data in Hours field, and this fact will be made explicit through an error message. This is where the first validation takes place."

Most ESS applications provide online query and look up facilities. However, in the O6 ESS, this feature was restricted (requirement 10). One of the reasons for this restriction, according to the O6 web policy, was security. However, the key reason was the concern of the project team over the reduction in revenues owing to the provision of free online queries and look ups (concern 5 in Table 15). The payroll company has a fee structure attached to the ordering and downloading of ad-hoc reports that can actually be generated by online queries. O6 treats the end result of each web-based process as a deliverable, and thus subjects a price structure to it in line with its e-business strategy. Thus, the project team had no intention of letting go of that margin. Being aware of the fact that such a restriction will not reduce client queries via non-web modes of communication, the co-researcher expressed his non-aversion to interacting with clients through these conventional modes.

O6 project manager (Quote 5.4.2c):

"...he’s (the client) got a few options to queries. He could ring us, and we’ll tell him. He could fax the query to us, and we’ll respond in writing. Or, he could check his reports (clients get printed or hard copy reports). Or, he could get soft copies of these reports from the web...he just needs to go to the web and check the reports from there – the information’s all there. There’s, of course, a charge for each additional report."

Of course, remuneration and annual reports, included as part of the contract, were made available on the web at the end of each cycle of pay processing and financial year. Another feature that was included to reduce client concern regarding restrictions on online queries was the Report Maker, a report template generator that allowed the customization of the report fields and format of as per the preference of the clients (requirement 10). This feature was being planned for implementation at the time the
interview was conducted. The O6 project manager believed that this feature would offer the clients the flexibility to choose the format of their reports and even merge several reports onto a single document as per their presences. Hence, he put forward that the client concern with regards to their having to pay for additional reports generated by online queries could be minimized by the customizable report template, even though the project team would have to devote time and effort toward the development and maintenance of this feature.

O6 project manager (Quote 5.4.2d):

"This report will be presented on the web to the clients as a template with 10 columns ... in essence; the clients are able to create the format of their reports by choosing what fields they would like to be displayed.""

<table>
<thead>
<tr>
<th>Concerns</th>
<th>Business needs</th>
<th>Requirements</th>
<th>Consequences</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. &quot;...they (payroll staff) don’t need to enter the data themselves as they had to previously.&quot;</td>
<td>1. Reduction in costs associated with routine transactions, such as data entry.</td>
<td>1. Shift data entry to the clients</td>
<td>1. &quot;...all they (payroll staff) have to do is get the timesheet data (comes as a file) through the web, press a button, and the data all goes in straight into the database...&quot; 2. Frees up time for payroll staff to better serve clients. 3. &quot;...they (clients) may not be at a stage where they could claim to be PC-ready or Internet-ready.&quot; (Quote 5.4.2a)</td>
</tr>
<tr>
<td>Consequence 3</td>
<td>2. Improve client services</td>
<td>2. Web interfaces should be simple and user-friendly 3. Provide training and support. 4. Provide online support, such as manuals, online demonstrations of workflows and Help features. 5. Set up web coordination team</td>
<td>4. Dedication of resources. 5. Reduces user resistance to the web system</td>
</tr>
<tr>
<td>Concerns</td>
<td>Business needs</td>
<td>Requirements</td>
<td>Consequences</td>
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<tr>
<td>2. Accuracy and integrity data entered by the client-users.</td>
<td>3. Accuracy and integrity of data</td>
<td>6. Embed input validation rules that check with the database to ensure that data entered is correct</td>
<td>6. Reliable and accurate data. 7. Clients are informed of incorrect entry 8. Rejection of documents without explanation causes frustration with client-users.</td>
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<tr>
<td>3. Knowing whether the data entered onto the web-based forms are correct and accurate.</td>
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<td>7. Precise error messages</td>
<td>Alleviates the concern. 9. Messages need to be supported by appropriate Help features as assistance for rectification.</td>
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<td></td>
<td>Consequence 8</td>
<td>8. Deliver remuneration reports online.</td>
<td>10. Reduction of paperwork. 11. Revenue margin lost due to elimination of mailing and courier costs.</td>
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<tr>
<td></td>
<td>Business need 2</td>
<td></td>
<td>Consequence 3 (Quote 5.4.2a).</td>
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<tr>
<td>4. Reduction in payroll workload from routine tasks.</td>
<td>4. Streamline transactions</td>
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<td></td>
<td>5. Profitability</td>
<td>9. Restrict online queries and look-ups</td>
<td>Alleviates the concern</td>
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<td></td>
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<td>12. Clients will make queries through conventional modes of communication.</td>
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<tr>
<td>5. Losing the margin on additional and ad-hoc reports.</td>
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<tr>
<td>6. &quot;Since our clients are mostly SMEs, they are very price conscious.&quot;</td>
<td>Business need 2</td>
<td>10. Provide customisable reports on the web.</td>
<td>13. Accords clients the flexibility to choose the format for a report.</td>
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<td></td>
<td></td>
<td></td>
<td>14. ‘‘…the information that they are actually interested in might be included in a few reports. But with our proposed Christmas (customisable) report, clients will able to choose the data fields that they would like to be published in a single report.’’</td>
</tr>
<tr>
<td>Concerns</td>
<td>Business needs</td>
<td>Requirements</td>
<td>Consequences</td>
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<td></td>
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<td>15. Dedication of payroll resources to develop and maintain this feature.</td>
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</table>

Table 15. O6 Project Manager: Experience with Data Entry & Validation, View and Update concerns

5.4.3 O6 project manager’s experience with workflow concerns

The workflow associated with the O6 ESS was relatively simple, with the client entering employee records and timesheets at one end, and the O6 staff processing these documents at the other end. Employees do not form part of the user group. Their timesheets are entered into the system by the client (who is usually the proprietor or an administrative assistant authorized to access the system) after they have already been approved. Thus, the aspect of online approvals of timesheets and leave applications, along with associated factors, are irrelevant in this case.

However, clients did voice concerns the workflow, which comprised of the status of documents sent via the web, reminders and confirmation messages, and the general transparency of the web-enabled process itself. The requirements that were put forth as solutions to these concerns included status indicators, email messages reminding clients that timesheets were due, and confirming the receipt of documents for payroll processing or the successful completion of the payroll process.

Then, there are special situations, one of which takes place when an employee is going on leave and needs to be paid in advance as shown under concerns in Table 16. Since, the improvement of client services was one of the main business needs behind the adoption of the ESS, the project team established a requirement that allowed clients the flexibility to submit timesheets in advance.

O6 project manager (Quote 5.4.3a):

“The client could fill in the timesheet for that employee in advance so that he/she gets paid for the current pay cycle as well as for the period(s) of leave.”
<table>
<thead>
<tr>
<th>Concerns</th>
<th>Business needs</th>
<th>Requirements</th>
<th>Consequences</th>
</tr>
</thead>
<tbody>
<tr>
<td>Some employees may need to be paid in advance (a client concern)</td>
<td>Improve client services</td>
<td>Allow clients to submit timesheets beyond the current pay cycle.</td>
<td>Alleviates the concern.</td>
</tr>
</tbody>
</table>

Table 16. O6 Project Manager: Experience with Workflow concern

5.4.4 The Process of Evolution

The process of ESS evolution in O6, in Figure 3, shows that the business needs were set on the basis of the initiator (O6) concerns as indicated by the direct arrow from Initiator Concerns to the Business Needs. Next, the initial requirements for the pilot testing of the ESS were established by the O6 project team. During pilot testing, these initial requirements were validated by a representative sample of clients, and feedback was obtained from them. From the feedback, the project team identified client concerns, and additional or new requirements were inculcated into the ESS to address the concerns. Of course, some of these resultant requirements also resulted in further concerns, which is illustrated by the arrow leading from the callout representing the consequences of initiator requirements (or user validation) to the Initiator Concerns. Thus, the evolution of the web-enabled services took place in an iterative manner with features being incremented to the ESS in every cycle. The process is further explained with examples from the project manager’s experience in the subsequent paragraphs.

As illustrated in Table 15 and Table 16, the initial concerns of O6 regarding productivity and competitiveness led it to devise appropriate business needs for an WBIS for the delivery of payroll services, and to the subsequent establishment of its ESS project team. Several requirements were enacted or selected to satisfy these business needs, including the shifting of data entry to the clients (requirement 1 in Table 15) and the delivery of remuneration reports (requirement 9 in Table 15), the main deliverable to the clients, through the web. These led to a number of consequences, some positive and others that raised further concerns. One example of a negatively perceived consequence was the fact that some of the clients were not necessarily Internet savvy, and this, resistance to the web services was expected from them (consequence 3 in Table 15). This concerned the O6 project team, which then devised a few more requirements to alleviate client resistance, which have already been discussed in section 5.4.2.
Some initiator concerns and business needs, instead of continuing to further the evolution of the ESS, halted the migration to a fully web-enabled medium, which is represented by the broken arrows leading to initiator requirements in Figure 3. A prime example is the issue of the pricing structure described in the section 5.4.2. The business need to maintain profitability (business need 5 in Table 15) in any venture (not surprisingly a characteristic of any project initiated by a commercial enterprise) raised the concern with the company that it would lose the margin it had always charged its clients for additional and ad-hoc reports, if free queries and look ups were allowed though the ESS (concern in 5 in Table 15). To alleviate its own concern, the project team applied a restriction on online queries and look-ups (requirement 10), i.e. clients were allowed to use the features and view reports generated by the query engine, but they had to pay a fee for the service. The solution, in turn, raised a concern with clients, and triggered another cycle of system evolution, by generating additional requirements to address this concern.

![Figure 3. O6 evolution model](image)

**5.4.5 Criticality of concerns**

Some business needs also caused concerns for payroll, shown by the broken arrow from Business Needs to Initiator Concerns in Figure 3. One such business need was related to
cost reduction due to the delegation of data entry to the clients and the streamlining of routine transactions that virtually translated to the lowering of service charges for clients. But, this did not materialize by the deployment of the web system,

O6 project manager (Quote 5.4.4a):

"Since our clients are mostly SMEs, they are very price conscious. They've got this mentality (don't know whether this is true or not) that doing things on the web have got to be much cheaper than other modes. Therefore, if the client is moving from a non-web system (where transactions are carried by phone/fax and reports were received by courier services) to a web-based system, the charges are expected to be lower. The clients expect cost savings."

But, O6 was concerned that the reduction of transaction processing charges would affect its revenues, as additional resources were needed for the management of the web services and catering to client expectations, which indicated a whole range of tasks and responsibilities that the project team had to undertake. Apart from the technical aspects of web management, the team also had to make sure that its personnel had the right blend of interpersonal and technical skills to provide support to the web clients. This was even more crucial in light of the rise in number of clients opting for the web services. On the contrary, the streamlining of workflows and general improvement in productivity should translate to reduction in transaction processing charges from clients. Hence, the reduction in the charges was indirectly compensated by the introduction of a web service fee (see requirement 1 in Table 17).

O6 project manager (Quote 5.4.4b):

"So, we are thinking of introducing a charge with our web services instead, and call it a web service fee (perhaps). The fees are justified in terms of the web management."

Indeed, O6's strategic need to retain its reputation as a well-known provider of outsourced payroll services by streamlining transactions and reducing costs was at odds with its profitability goals. This is why it held reservations on how it translated the cost savings to its clients, whose main motivation was to receive improved services at lower
charges. Such was the dilemma that the project team decided to reconsider aspects of the further evolution of the web service.

O6 project manager (Quote 5.4.4c):

"Once we release these (electronic pay slips and invoices), we will essentially be offering a full web product. I am sure that the day we release this product, clients will ask about its potential benefits to them. One of the charges they will expect to be exempted from is the Distribution and Handling charge, which varies on whether the reports are sent by Australia Post or by other courier services. However, from our side, the problem is that we make a margin on this charge. So, if the clients opt for the full web service with the expectation of exemption from the Distribution and Handling charge, we lose that margin. This is why we’ve been holding the release of the product because we cannot afford to lose this margin.”

Furthermore, as discussed in the preceding paragraphs, increased web management and user support as a result of the migration to web-enabled workflows, also raised concerns about discarding the margin. On the other hand, the O6 project manager realized that in order to encourage and promote the further adoption of web services by its existing and prospective clients, the company needed to come up with a different pricing structure. Thus, the need to replace the charges associated with the pre-web services with fees for web services. The other requirement selected as a solution to the increased web management issue involved the formation of the web coordination team comprising of staff with an in-depth understanding of both the business processes as well as the functions of the web system (requirement 2 in Table 17). This was also required in light of the need to provide assistance to the clients.

O6 project manager (Quote 5.4.4d):

"...we are interested in providing our clients with the best impression the first time they access our web site. When our clients first register for web services, we want to avoid saying something like ‘thanks for registering, we’ll get back to you in three days time’. This is why we created the role of the web coordinator – a role specifically designed for managing the expectations of the clients with regards to the web services. Our viewpoint is that if clients have had a very bad experience using the web, they’ll never ever adopt the services we offer through this medium.”
The web coordination solution enabled the company, in view of its customer-focused orientation, to offer premium services to its clients via the web. Client registrations for the web services have been processed in 24 hours, troubleshooting undertaken within the same period of time, and new passwords (to replace forgotten passwords) furnished within a few hours. Thus, web coordination had played a vital force in the implementation of web-based payroll services, and the consequences (3-6 in Table 17) of this solution were perceived as being beneficial to the continuity of the project.

Moreover, O6 undertook a number of significant measures to ensure the accuracy and integrity of data and at the same time minimize client disappointment and frustration due to incorrect entries. These included data validation at four layers, namely at the web interface, the web server, the DBMS, and before the records were committed into the database, a manual validation check by O6 personnel, after which the client were informed of the success of the transaction.

<table>
<thead>
<tr>
<th>Concerns</th>
<th>Business needs</th>
<th>Requirements</th>
<th>Consequences</th>
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<tbody>
<tr>
<td>1. &quot;So, if the clients opt for the full web service with the expectation of exemption from the Distribution and Handling charge, we lose that margin.&quot; (Quote 5.4.5c)</td>
<td>1. Profitability</td>
<td>1. Place web services fee.</td>
<td>1. Pays for increased levels of web management.</td>
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<td></td>
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<td>2. Clients expect cost savings from the adoption of web services.</td>
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<td>2. &quot;This need to provide full-fledged IT support will be greater as more and more clients opt for the web services”</td>
<td>2. Improve client services</td>
<td>2. Set up web coordination team</td>
<td>3. “Every time, there’s a fail report, perhaps due a change in the email address of a client that we’ve not been informed of, we’ve been able to ensure that the client is contacted within 24 hours”</td>
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<td>4. Enables payroll “to track the traffic on the web system ...”</td>
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<td>5. Increased levels of web management.</td>
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<tr>
<td>Concerns</td>
<td>Business needs</td>
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<td>6. Reduces client resistance to the adoption of web services.</td>
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</table>

Table 17. O6 Project Manager: Experience with the most critical concerns

5.4.6 Perceived outcome of the project

The feedback received from the clients, who had volunteered to participate in the pilot testing of the two phases of the project, the O6 project manager was optimistic about the outcomes. According to him, there was a general satisfaction among the clients and within the payroll company with regards to the web services. The rise in number of clients opting for the web services had already been evident in the first stage of the project.

O6 project manager (Quote 5.4.6a):

"So far, we've had 30 clients requesting this service (since Monday, July 9, 2001). We asked them to register for the service through the web (this access is pretty secure for both clients and for us). Before July 9, 2001, the rate of new registrants was 10 per day. Since this date, the figure's risen to 29 per day. Thus, clients, who've registered for the web service, are keen on using the web for filling in and sending timesheets, and receiving reports."

Added to project manager's enthusiasm was the fact that these were clients, which had been recipients of O6's payroll services for a while. It suggested the willingness of the clients to adopt and try out the web services. At the same time, O6 staff were relieved of data entry, and able to devote themselves to crucial tasks.

At this point, it should also be noted that O6's concerns about retaining its competitive edge led it to promulgate the strategies that ultimately led to the implementation of the web-enabled workflow system.
O6 project manager (Quote 5.4.6b):

"We hope to have one of the best web-based payroll systems, including the best support and services behind it. I want to ensure that we get things right the first time, even though it may take time to deliver this – first impression is important."

However, the company was also concerned with the rate of adoption of the full-fledged web services, a factor that could determine the changes to its pricing structure.

O6 project manager (Quote 5.4.6c):

"While it’s true that we are going to have cost savings through our web services but we are unable to ascertain the magnitude of these savings at this point in time. This is very much dependent on the volume of clients that adopt the web services. If 6 percent of our clients use the web system, then our paper costs (incurred with the old way of doing things) go down significantly. In this case, the benefits of cost savings will be mutual. But, if we get only 5 percent, then it’s a different story. This explains why we can’t let go of that margin (Distribution and Handling charge)".

Therefore, O6 was still taking a cautious approach to the further evolution of the ESS, despite the increase in client adoption. This can be attributed to the payroll company’s concerns over the profitability of the project, which depends on a certain critical mass of clients opting for the web services. This is explicitly mentioned in the Quote 5.4.6c.

### 5.5 Summary

The accounts of project managers involved with ESS implementation in O1 and O6 have been described. Each story described the promotional efforts to facilitate the rollover of the web-delivered services, the hurdles faced in the process of implementation, and the actions pursued to overcome these hurdles, and then motivate the stakeholders to become engaged with the project. Most of the hurdles were primarily of a social and political nature, even though some manifested as technical issues. The ESS projects in O1 and O6 shared similarities in different ways. In fact, both organizations were pioneers in the adoption of web-based HR services. The project teams in both cases undertook some form of formal requirements gathering, and reached out to the various key stakeholder groups. In the case of O1, some of the friction even occurred between the members of the ESS team and their counterparts in the IT division. The textural-structural descriptions of project managers’ experiences in O2-O5 can be referred to in Appendix A4.
In all the six projects, the project teams realized that the achievement of project goals ultimately rested with the acceptance of the ESS by the user community, and thus took actions to elicit their viewpoints and fathom out the underlying concerns, though the degree of commitment varied. From the analysis of the narratives provided by the project managers, it can be established that the concerns of stakeholders do have a profound impact on the implementation and further evolution of the ESS, even though the perceived intensity of the impact varied according to the criticality of the concerns. This definitely addresses the first research objective. The key points regarding the attainment of the first research objective are outlined in Table 18.

<table>
<thead>
<tr>
<th>Research Objective</th>
<th>To identify the experiences of project managers with regards to the impact of stakeholder concerns on the implementation and evolution of WBIS</th>
</tr>
</thead>
</table>
| **Key Points**     | • Stakeholder concerns are perceived to have a profound impact on the implementation and further evolution of the ESS, even though the perceived intensity of the impact varied according to the criticality of the concerns.  
                • As the concerns were capable of slowing the evolution of the ESS, project managers perceived the consideration of concerns as a crucial activity  
                • The consideration of concerns led to the establishment of system requirements.  
                • Hence, project outcomes were perceived to be determined by the actions initiated by project managers to alleviate stakeholder concerns. |

Table 18. Summary of key points regarding the first research objective

To pursue the fulfilment of the second research objective, the experiences of the project managers were examined in accordance with the steps of phenomenological data analysis. Some of the enterprises conducted focus group sessions with representative samples of users to create awareness of the project, and obtain user perceptions and attitudes towards such information systems. In others, attempts were made to anticipate user concerns by observing similar projects in other institutions or recommendations for the purpose were sought from the actual developers or vendors. However, the most substantial concerns were uncovered by conducting pilot studies of the ESS and from the various iterative
cycles of system evolution. The key issues induced from the examination of the experiences of the ESS managers are summarized in Table 19.

<table>
<thead>
<tr>
<th>Research Objective</th>
<th>To determine the experiences of project managers in dealing with stakeholder concerns during the implementation of WBIS / ESS.</th>
</tr>
</thead>
</table>
| Requirements Elicitation | • Focus group sessions  
• User Feedback mechanism  
• Setting requirements by observing ESS projects in other enterprises. |
| Process of evolution | • Iterative  
• Successive evolutionary cycles triggered by the consequences of applying requirements to alleviate stakeholder concerns |
| Data entry support & validation, view, and update | • Adequate consideration of these concerns served as motivators to the involvement of users with the projects.  
• Ready access to the WBIS, convenience, and ease-of-use were perceived as major motivators.  
• Failure to address these concerns simply led to user resistance or indifference to the project, but not necessarily into the culmination of conflict. |

| Concerns |  
|----------------|----------------------------------------------------------------------------------------------------------------------------------|
| Workflow | • There was evidence of uneasiness (and even discomfort) of the stakeholders with the migration to web-enabled business processes.  
• Thus, stakeholders expected additional benefits from their administrative involvement in the ESS workflows.  
• Failure to address workflow concerns heightened user resistance, and subsequently, exposed the conflict antecedents through the “cracks” in the often-fragile inter-stakeholder relationships within organizations.  
• In some projects, the antecedents did manifest into conflict.  
• In payroll companies, project managers were anxious that the failure to address the critical workflow concerns could lead to clients’ dissatisfaction with the web services. |

Table 19. Summary of key points regarding the second research objective
Chapter 6: Synthesis

6.1 Introduction

The textural-structural meanings of three co-researcher’s experiences, the by-products of phenomenological reduction and imaginative variation have been described in chapter 5. This brings us to the final product of the process of phenomenological analysis – the synthesis of the meanings and essences of phenomenon of interest (see section 4.5.5).

Before proceeding further, it is important to highlight the main research objective addressed by this chapter on the synthesis of all the project managers’ experience with the implementation of ESS. This includes the third objective (modified in section 4.7), which is:

- To establish whether the commonalities in the experience of project managers can be captured across the domain of WBIS / ESS.

This research objective is in line with the three fundamental premises surrounding the method of phenomenological research as stipulated by several social researchers (Colaizzi 1978, van Kaam 1959, Moreno Jr. 2001, Moreno Jr. 2002). These include:

- the phenomenon of interest is commonly experienced by individuals, owing to its prevalence in society,
- experiences that are commonly perceived are identical,
- and, identical experiences are conveyed in a similar manner or expressed under the same label.

Chapter 5 indicated that the first premise was found to be applicable, i.e. all the participants experienced the stakeholder concerns due to their direct involvement in the implementation of ESS in their respective organizations. The process of synthesizing the descriptions of the ESS project managers should uncover the inherent commonalities and variations in experiences. Hence, at the end of the chapter, the issue related to the third research objective will be apparent. As the synthesis is essentially an analysis of the
communalities in the experiences of the project managers, this chapter also adds depth to the first two research objectives.

The chapter begins with an examination of the communalities in the perceptions of the project managers with regards to the role played by stakeholder concerns in the implementation of the ESS. This adds depth to the first research objective of determining the perceived impact of stakeholder concerns in the introduction and rollover of web-based services, already addressed in chapter 5. This is followed by an elaboration of the synthesized experiences of the project managers with regards to their dealing with stakeholder concerns, which forms the prime segment of the chapter. From the discussion, the emergence of the patterns is illustrated. Each pattern, as explained in chapter 4, is a representation of an aspect of the synthesized experience. In fact, the patterns (except the Known Uses component) are illustrated in tables to summarize the discussion of these aspects. Part of the contents of this chapter has appeared in a publication sent to the 12th International Conference in Information System Development (ISD) (Sarkar and Cybulski 2003a).

6.2 Role of Stakeholder Concerns in the Implementation of ESS

This section further enriches findings geared towards the first research objective:

To identify the experiences of project managers with regards to the impact of stakeholder concerns on the implementation and evolution of WBIS

The six ESS project teams, investigated as part of the study, were directly involved with system implementation, rather than development. The actual developers were either vendors or an IT division (in the case of O1), who had no actual contact with the end users and were, at the most, only partially involved with implementation. Thus, the elicitation of requirements and ESS configuration were undertaken in their entirety by the project teams.

Of the organizations O1 – O6, whose project managers were interviewed, only O1 and O2 employed formalized requirements elicitation in the form of focus groups and scenario-based techniques. To maintain its reputation as an elite university, O1 followed a rather
conservative approach towards the implementation of web-enabled HR services, which brought about the formal requirements gathering process. O2, on the other hand, followed a formalized process, as it was keen on obtaining a consensual agreement on the adoption of the ESS from the various power groups in the organization. The other university ESS teams were selecting requirement specifications either by observing or learning from projects in other institutions, or on the basis of vendor suggestions. They went along this path as they found it difficult to endure the high cost and time allocation associated with formal requirements gathering.

As elaborated in chapter 5, stakeholder concerns did indeed have an impact on the rollover and evolution of the ESS, the degree of the impact varying according to the criticality of the concerns. This is illustrated in Figure 4 below. Though the model is a synthesized representation of the ESS evolution processes, some of the components, such as Dev (the web developer or vendor) and conflict antecedents, were not explicitly reported by all the project managers. However, the components were implicit in those projects, as discovered from the structural descriptions of the co-researchers’ accounts. Another profound artefact in the evolution model is the experience base, the use of which was widespread in all the six projects, albeit informally, i.e. the existence and use of the experience base was seldom found to be institutional.

The accounts of the project managers revealed that stakeholder concerns, including the concerns of the project managers themselves, were the key drivers of the further evolution of the ESS. In fact, the original concerns of the initiators, the HR division, led to the business needs for a WBIS. Moreover, the set of requirements inculcated into the very first version of the WBIS were an attempt to address the original HR concerns. Since ESS project teams were established and its members appointed by HR divisions, the teams embraced the HR concerns and values. Thus, their very first task was to configure the newly acquired applications with features that served to diminish the initiator concerns while meeting business needs. In some organizations, developmental experience from previous web projects was utilized to generate requirements aimed at alleviating projected user concerns. Other ESS teams applied their experiences from observations of similar projects or were assisted by the experiences of the vendors. This is further explained in a later section in this chapter.
But, the services provided by the web systems (through the features) still had to be validated by the prime stakeholders, i.e. the potential users. Interestingly, the project managers were aware that the validation by the potential users was vital to the actual uptake of the ESS. Hence, the ESS applications were subjected to pilot testing with particular groups of stakeholders in order to elicit their viewpoints. In universities, pilot testing took place in faculties with large numbers of staff or in those with an avid interest in the projects. Outsourced payroll companies sought existing clients to voluntarily participate in the pilot testing of their own ESS. The pilot testing stages brought the viewpoints of the stakeholders into focus for the project managers to understand and contemplate upon. The viewpoints were the result of the validation provided by the stakeholders in the form of feedback on the initial system requirements. Most project managers discovered that stakeholders held viewpoints with regards to particular aspects of the ESS owing to their concerns over those aspects. If the concerns were not considered, the stakeholders could put up resistance to their adoption of the web-enabled HR and payroll services. On the other hand, consideration of the concerns, and the subsequent incorporation of requirements, referred to as resultant requirements in Figure 4, reduced the resistance and scepticism of the stakeholders and instilled interest with the services the ESS was capable of offering. These were the positive consequences of the consideration of the stakeholder concerns, and signalled the projects managers to continue with the evolution of the ESS in the form of new and enhanced features, introduced iteratively. Consequences perceived negatively by the project managers invariably led to further initiator concerns over the feasibility of the project and the attainment of the business needs. To address these concerns, the resultant requirements were modified, and presented to the user-stakeholders in another iterative cycle. Hence, concerns had a profound impact on the rollover of the web-enabled services to cover a wider user base and on the progress of the projects.
6.3 The Experiences

This section is also directed at the second research objective of the study:

To determine the experiences of project managers in dealing with stakeholder concerns during the implementation of WBIS / ESS

From the textural-structural descriptions of the various managers involved with ESS projects, it is evident that a plethora of issues appeared and were perceived as concerns. Though a great number of these issues were expressed by the actual users and in some cases the higher echelons of management, the divisions directly involved with system implementation, comprising of HR and IT, had their share of anticipated concerns.

As described in the chapter 5, two primary thematic concerns that emerged from a phenomenological data analysis of the interview transcripts were those related to data entry & validation, view & update, and workflow. My understanding of the essence and meaning of the project managers' experiences in dealing with these concerns was guided by the following questions:
- What were the issues perceived as concerns?
- What was the underlying context that contributed to the perception of these issues as concerns?
- What were the associated factors that any solution needed to incorporate?
- What were the solutions adopted to alleviate the concerns?
- What were the consequences of the applying the solutions?

In the next two sections, the experiences of ESS managers are discussed in light of the questions above.

6.3.1 Data entry support & validation, view & update concerns

In this section, the relevant experiences of the project managers, discussed in chapter 5, have been synthesized. Since data entry and updates, and the actual viewing of relevant employment histories and reports were web-enabled and shifted to the users, the ESS teams anticipated resistance to the adoption of the web-delivered services. After all, the ESS had nothing to do with the primary tasks of employees and their supervisors in the academic institutions. This was also applicable to the firms that were clients of payroll companies, which were the key reason behind their outsourcing of the payroll and HR tasks, i.e. their main business was not the usage of the WBIS. Thus, the ESS initiators, namely the HR divisions and the payroll companies, were aiming to encourage the recipients of their services to move to a web-based electronic medium, from conventional paper-based documents, and telephone and fax messages. Undoubtedly, the ESS teams had to embark on measures that either brought about user motivation or minimized user resistance, which, in turn, resulted in a number of requirements. One such requirement ensured that the web-based interfaces were simple, easy to use and navigate, and involved the minimal number of steps from the start to the finish of a particular work process. After all, if the interfaces did not demand a great deal of time and effort, users would not be averse to opting for web-based services.

However, simplistic and user-friendly user interfaces solely were found to be inadequate in fostering adoption, especially among administrators, which included the clients of payroll companies and managerial and administrative staff in academic institutions. In
universities, the involvement of administrators with the ESS was at a higher level of complexity than that of employees. Administrative users in many of the projects had to enter and validate timesheets, approve leave applications, and insert certain business rules, such as special pay rates, and work categories. There existed ample room for confusion and difficulty for this stakeholder group as these tasks were being undertaken in a web environment. Moreover, ESS project managers felt strongly that administrative users needed to be trained in such a way that the rules of data integrity were taken into account by them while entering data. Although administrative users may be familiar with the usage of computerized systems and even web-based applications, ESS systems might be completely new to them. In view of this, they needed to be made familiar with the intricacies of this WBIS and especially, the prevalent business and data integrity rules. Therefore, the provision of training to users involved with the more complex aspects of web-enabled workflows was perceived as a solution to the concern. While the proposition succeeded in instilling user familiarity with the system and reducing resistance, it necessitated the dedication of resources to the setting up of training programs. The pattern, *The Usage Trainer*, in Table 20, emerged from the synthesis of the experiences of the ESS project managers from the respective implementations.

<table>
<thead>
<tr>
<th>Pattern Name</th>
<th>The Usage Trainer</th>
</tr>
</thead>
<tbody>
<tr>
<td>Problem</td>
<td>How to familiarize client users with the various facets of the particular web application?</td>
</tr>
<tr>
<td>Context</td>
<td>With web interfaces, the task of entering personnel records, leave and pay data into the database is shifted to the clients. The interface is presented as a data entry form, which requires the clients to fill out the appropriate fields. However, this means that clients need to be trained in such a way that the rules of data integrity are taken into account while entering data. Thus, data integrity rules need to be imparted directly to clients or embedded into the application. Although clients may be familiar with the usage of computerized systems and even web-based applications, the particular HR/payroll application might be completely new to them. In view of this, they need to be made familiar with the intricacies of the application and especially, the prevalent business and data integrity rules.</td>
</tr>
</tbody>
</table>
| Forces       | 1. Clients may not be familiar with the data integrity rules of the application.  
2. An application that flashes data-entry errors frequently while clients, who are largely unfamiliar with the application, enter records may cause frustration, and consequent abandonment of the web-based solution. |
| Pattern Name |  
|-----------------|-----------------|
| 3. Redundant or inaccurate data entered by clients may result in poor data management. | **The Usage Trainer**  
| 4. The imposition of data integrity rules as constraints without training might be viewed as “complex” restrictions on their usage of the application. This aversion could discourage from using the application |  
| Solution |  
| **The system shall necessitate the provision of training in the usage of the system** |  
| The adoption of the web application by the clients could be facilitated by training client contacts (or other authorized members). The importance of ensuring the integrity of data and the steps taken to ensure this should be incorporated into the training. An example of this is a situation where HR/payroll trainers, during a demonstration of the application at the client site, depict different scenarios of faulty data-entry and its consequences, and then show how data should be entered properly |  
| 1. Training and effective demonstration of the solution will ensure that clients gain an understanding of data integrity rules and its enforcement during data-entry. |  
| 2. Training clients involves the dedication of HR/payroll managers in designing relevant materials and conducting training sessions. Thus, this undoubtedly involves the commitment of the resources. |  
| Consequences |  
| **Known Uses** |  
| The adoption of new applications in work settings is often accompanied by the provision of training to users. In the domain of web-based HR/payroll services, this is an essential obligation on part of the service provider, and is included in the contractual agreements with clients. Training is offered on most of the features of the application, but the issue of data entry and validation is crucial, and applies to all information systems, whether web or non-web, intra-organizational or inter-organizational. |  
|  |  
| Table 20. The Usage Trainer Pattern |  
| Yet, it becomes difficult to impart training to entire community of users in large organizations, especially in circumstances where the user community extends to hundreds and thousands of members, many of whom are generally using the simpler aspects of the system. Moreover, training programs, owing to organizational politics and consequent bureaucratic resistance, could not be made mandatory, a situation that was especially prevalent in universities. In the case of payroll companies, the problem existed to a certain extent owing to situations in which clients hired and delegated data entry tasks to personnel after the training program had already been administered. Despite receiving |
training in the usage of the ESS, some administrators found it difficult to remember all
the system features they had been introduced to. Hence, the ESS teams included online
demos as requirements aimed at motivating users, which took the user on a guided tour of
the sequential steps of the various processes. Online demos were also incorporated with
the aim of showing users how to enter data correctly and in line with data integrity and
business rules. In addition, users could refer to this program when they were confronted
with errors and were unable to contact ESS team members. The Demo pattern in Table 21
illustrates the synthesized experience regarding this particular concern of users wanting to
re-experience the training program.

<table>
<thead>
<tr>
<th>Pattern Name</th>
<th>The Demo</th>
</tr>
</thead>
<tbody>
<tr>
<td>Problem</td>
<td>How to re-experience the training program?</td>
</tr>
</tbody>
</table>
| Context      | Clients may not remember the various features of the web
               application that were introduced in the training program. Besides,
               the actual task of keying in data might be delegated to members of
               client organization, who may not have received the training. |
| Forces       | 1. Organizing another training session will require
               commitment of resources of both the client and the payroll
               company.  
               2. It is may not be possible, nor desirable, to provide training
               to the client each time new personnel are delegated data
               entry tasks. |
| Solution     | The system shall include an online demonstration |
               The introduction of web-based services could be accompanied by a
               multimedia demonstration program, offered as a feature in the
               application, which will take the client through a step-by-step tour of
               the application, with particular emphasis on data integrity and
               proper data-entry. Thus, clients could refer to this program when
               they are confronted with errors and are unable to contact payroll
               managers at the time. |
| Consequences | 1. A demo program can facilitate the clients’ usage of the
               application. This is especially relevant in a scenario where the task
               of data-entry, within the client firm, has been delegated to someone
               who has not received training, e.g. a temporary or newly recruited
               administration staff.
               2. From the viewpoint of the payroll company, however, this may
               also involve development costs, especially when the demo needs to
               be upgraded with every new version, of the application. |

Table 21. The Online Demo pattern

Shifting data entry and part of the processing to the “source” signalled the possibility of
correction data entry in violation of data integrity and business rules in all the ESS-
implementing organizations investigated. Even though training provided by the ESS teams to administrative users sought to instil familiarity with the relevant issues, it was deemed inadequate to ensure data integrity and compliance with business rules. Thus, these rules were enforced by means of insertion into the data validation engine of the ESS. The experience of all the project managers in dealing with this concern is illustrated in the pattern, The Automated Input Validator, in Table 22. Consequently, error messages flashed onto the screens when data was entered incorrectly or failed to comply with business rules. This, in turn, raised new concerns for the project teams as complaints were received from users regarding the confusion and frustration caused by the error messages. To lessen the effects of the concern, the requirement calling for more precise error messages evolved. Accordingly, the pop-up messages were designed to pinpoint the specific fields on the web-enabled forms onto which the data was entered incorrectly. This was supplemented by online Help features that could be accessed by a direct link from the error messages. In other words, an error message provided a direct link to the relevant part of the online Help facility, which explained exactly why the data was incorrect as well as examples of the proper format. The pattern, Effective Help Features, in Appendix C1 reflects the essential meaning of this experience of the project managers. Though these requirement specifications alleviated user frustration when errors occurred, the project teams had to constantly update the list of error messages and corresponding online Help features to keep pace with the evolution of the web-delivered services. In addition, the ESS teams consisted of Helpdesk members, referred to as web coordinators in some projects, who were dedicated with the sole task of providing assistance in such circumstances. The Web Coordinator pattern in Appendix C1 was derived from this.

<table>
<thead>
<tr>
<th>Pattern Name</th>
<th>The Automated Input Validator</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Problem</strong></td>
<td>How to enforce the integrity of data entered by clients through the web-based interfaces?</td>
</tr>
<tr>
<td><strong>Context</strong></td>
<td>Even though training provided by the payroll outsourcer or the HR department will familiarize client users with the various features of the web application, it may not, on its own, be able to ensure data integrity sufficiently, due to various reasons, which are described in the forces. Furthermore, many of the forces related to the previous pattern, The Input Validation Trainer, are also relevant in this context.</td>
</tr>
</tbody>
</table>
| **Forces**   | 1. Clients may not be familiar with the data integrity rules of the application.  
2. Service providers may not be present while clients are |
<table>
<thead>
<tr>
<th>Pattern Name</th>
<th>The Automated Input Validator</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>entering data. In such situations, complex data-entry procedures may force clients to consult the on-line help of the application, which they may be averse to.</td>
</tr>
<tr>
<td></td>
<td>3. Clients may receive training in proper data-entry, but still enter records in violation of data integrity rules. Moreover, clients may attend training sessions, but the actual data-entry task might be assigned to someone employed as a casual/temporary staff. Thus, training may not guarantee that clients follow the rules.</td>
</tr>
<tr>
<td></td>
<td>4. The data entered by clients through the web application is directed to the database held by the payroll legacy system. In view of this, redundant or inaccurate data entered by clients may result in poor data management.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Solution</th>
<th>The system shall embed data integrity and business rules into the application</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Data integrity rules could be enforced as non-functional requirements or constraints into the applications. There should be a mechanism that prevents the submission of the data entered incorrectly into the system. The constraints should prevent the record being committed to the database until the error is corrected. A related pattern is Unambiguous Format</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Consequences</th>
<th>1. Embedding data integrity rules into the application will further enforce integrity by preventing data inaccuracy and redundancy.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>2. The embedding of data integrity rules into the application requires significant development hours spent by the company’s IT staff.</td>
</tr>
</tbody>
</table>

Table 22. User Input Validation pattern

6.3.2 Workflow concerns

The two business processes that were commonly web-enabled in ESS included payroll and leave applications. In the universities, timesheets were sent to the ESS by administrative staff in the individual departments on behalf of the employees. Employees submitted hard copy timesheets, excel spreadsheets, or filled the timesheet data onto the departments’ own systems. Once the timesheets were entered, supervisors approved them over the web, upon which they were automatically sent to HR for processing. The process was the same for the web services offered by payroll companies. In the case of leave applications, employees themselves submitted leave requests through the web.
All the project managers encountered several significant user concerns when it came to the web-enabled workflows. A primary concern was the transparency of the workflows. Employees in universities were found to be concerned with the outcome of decisions made on their pay and leave applications that were being processed, and wanted the capability to track down the particular stage in the process the documents were in. Likewise, managerial staff in both the universities and in the client firms of payroll companies expressed their concerns with the processing of the documents carried out by HR/payroll, once these had been approved and submitted by them. Moreover, the ESS teams were aware that if the transparency issue was not dealt with adequately by bringing forth appropriate system requirements, they (ESS personnel) would often be inundated by user queries via conventional modes of communication, which was a major reason for adopting the web medium for delivering services. Thus, the requirement for informing users of the status of their submissions in the workflows was included as a specification. Indeed, all project teams configured the systems to dispatch confirmatory emails to the users each time documents were submitted over the web. Such notices were also sent to all relevant web service recipients when the processing by the HR/payroll was complete. Furthermore, users were informed of the status once they logged into their profiles in the ESS. The status appeared as Approved (by supervisor and sent to HR/payroll), Rejected, Waiting (supervisor is yet to review the timesheet or leave application), On Hold/Pending (supervisor has viewed the document but has deferred its approval or rejection), and Complete/Successful (once HR/payroll had completed processing). This solution was perceived by the project managers as being highly effective in view of the positive feedback received from the user community. The Status Indicator pattern in Table 23 is a representation this general experience voiced by all the project managers who participated in the study.

<table>
<thead>
<tr>
<th>Pattern Name</th>
<th>The Status Indicator</th>
</tr>
</thead>
<tbody>
<tr>
<td>Problem</td>
<td>What is the status of the application process?</td>
</tr>
<tr>
<td>Context</td>
<td>Once timesheets and leave applications are filled in and submitted, employees and other pay recipients have not much to do except wait for the actual pay check or leave acceptance. However, there is the period of time involved with the processing of the timesheet, during which the timesheet may be approved, rejected, or withheld by the supervisor or payroll.</td>
</tr>
</tbody>
</table>
The Status Indicator

<table>
<thead>
<tr>
<th>Pattern Name</th>
<th>The Status Indicator</th>
</tr>
</thead>
<tbody>
<tr>
<td>Forces</td>
<td>1. Employees and supervisors expect transparency of the process in a web environment.</td>
</tr>
<tr>
<td></td>
<td>2. Employees will be concerned with the outcome of the decisions made (approved or rejected) on their timesheets.</td>
</tr>
<tr>
<td></td>
<td>3. Likewise, supervisors will be concerned with the processing of the documents, such as timesheets (after these are approved) carried out by HR/payroll.</td>
</tr>
<tr>
<td></td>
<td>4. Supervisors prefer a list of applications that have been approved, disapproved, or need attending to.</td>
</tr>
<tr>
<td></td>
<td>5. The purpose of a web system is to reduce status queries by more conventional modes of communication.</td>
</tr>
<tr>
<td>Solution</td>
<td>The system shall indicate the workflow status</td>
</tr>
<tr>
<td></td>
<td>It is important to inform both employees and supervisors of the status of the work processes. There should be about four states that indicate status, namely Approved (by supervisor and sent to HR/payroll), Rejected, Waiting (supervisor is yet to review the timesheet or leave application), and On Hold (supervisor has viewed the document but has deferred its approval or rejection). This is a subject for the next pattern, the “In-tray”.</td>
</tr>
<tr>
<td>Consequences</td>
<td>1. Indicating the status of the timesheet processing will alleviate the concerns of the employees and supervisors.</td>
</tr>
<tr>
<td></td>
<td>2. Timesheet rejections (as shown on the web interface) could cause anxiety.</td>
</tr>
</tbody>
</table>

Table 23. The Status Indicator pattern

The success of ESS projects in universities hinges significantly on the participation of supervisory users. The involvement of supervisors ensures that employees submit timesheet documents within a due date and leave requests prior to actually taking leave, followed by supervisory decisions on whether to approve or reject these documents. In the pre-web days, these documents would arrive on the physical in-trays sitting on their desks, but the advent of the ESS called for the migration of administrative tasks onto the web. Project managers encountered concerns from this group of users, who were worried that the shift from the paper-based work processes to a web-based electronic workflow system may disrupt the way their work was organized. In a paper-based office, supervisors typically have a number of trays dedicated to the various tasks and contain relevant documents. Most managers were comfortable with such arrangements. Moreover, HR divisions considered it important to keep track of documents awaiting
supervisory approval in the workflows. To alleviate these concerns, it became a general requirement to include an electronic in-tray, which could be viewed by supervisors upon entry to the system. The in-tray was virtually a web-based electronic simulation that displayed all the transactions that were awaiting approval. Not only were these documents confined to HR-related matters, but the web systems were also configured to interact with the other organizational systems, such as inventory and procurement systems, to extract purchase orders and budget statements. The ability to view and deal with transactions from a single interface did indeed minimize the resistance of supervisors, as they did not have to navigate through the entire organizational intranet to find all the documents that were awaiting their approval. Likewise, the requirement specification equipped HR with the ability to track and monitor documents awaiting supervisory approval during emergencies, thereby contributing to the marked reduction of unnecessary processing work and the streamlining of HR operations. The discussion of how ESS managers shared their views on the consideration of the supervisory concern of organizing work in an electronic medium is summarized in the Electronic In-tray pattern in Table 24.

<table>
<thead>
<tr>
<th>Pattern Name</th>
<th>The Electronic In-Tray</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Problem</strong></td>
<td>How do supervisors find the documents submitted to them by employees via the web?</td>
</tr>
<tr>
<td><strong>Context</strong></td>
<td>The context of this pattern is related to that of the Status Indicator (Table 23), except the prime stakeholder here is the supervisor. It is assumed that a supervisor will have a number of subordinate employees who are expected to submit timesheets and leave applications for approval. Furthermore, the web system may not be confined to the sole purpose of HR-related processes. Rather, it may incorporate other administrative tasks undertaken by the supervisors, such as the purchasing, and project management. In a paper-based office, a supervisor will typically have a number of trays dedicated to the various tasks and contain relevant documents. Most managers are comfortable with such an arrangement, and will expect the web-based system to be an online implementation of this.</td>
</tr>
</tbody>
</table>
| **Forces**   | 1. There is some resistance from supervisors towards the shift from the paper-based work processes to a web-based electronic workflow system, as they hold the view that the latter may disrupt the way their work is organized.  
2. HR needs to keep track of documents awaiting supervisory approval in the workflow.  
3. Supervisors resent having to navigate through several interfaces to find all the documents that are awaiting their approval. |
<table>
<thead>
<tr>
<th>Pattern Name</th>
<th>The Electronic In-Tray</th>
</tr>
</thead>
<tbody>
<tr>
<td>Solution</td>
<td>The system shall provide a web-based in-tray for each supervisor. This requirement will ensure that all documents sent to a supervisor via the web are available and easily accessible in the electronic simulation of a physical in-tray that sits on office desks. Once a supervisor logs into the system, he/she should be presented with the in-tray that contains all the transactions (e.g. leave applications, timesheets, purchase orders) that are awaiting approval.</td>
</tr>
</tbody>
</table>
| Consequences | 1. Alleviates the concerns of supervisors related to disruption in their *modus operandi* and work organization.  
2. HR is able to access all documents awaiting approval from a particular supervisor, in case of emergencies (see *The Authorizer* for such a situation).  
3. Requires greater web management (see *The Authorizer* and *The Web Coordinator*)  
4. Ineffective for supervisors who don’t log into the system regularly (see the *Aide Memoire*). |

Table 24. The Electronic In-tray pattern

One of the most critical concerns related to ESS workflows was the issue of approval escalation. The systems were configured in such a way that documents submitted by employees were automatically sent to their respective supervisors’ web in-trays for approval, which had to be reconciled with the supervisors need to go on leave, or on work-related off-campus trips. Project managers held the view that the situation had to be managed appropriately, otherwise, timesheets and leave applications would keep on piling up onto the absent supervisor’s in-tray, leaving employees anxious on the status of their pay claims and leave requests, and consequently, lead to much added work for HR to resolve the situation. This was especially a major concern for the O2 project, as the system initially had not been configured to deal with the issue. Hence, the ESS teams made it mandatory for each of the university departments and faculties to provide detailed accounts of the approval hierarchy. On the basis of this information, the approval structures in the ESS were embedded to facilitate the escalation of approval authority during contingencies. Thus, if a supervisor was unavailable to attend to documents posted to her/his in-tray, then after a certain period of time, the documents were automatically diverted either to the next managerial level or to a “substitute approver”. This resulted in
the *Approval Escalator* pattern shown in Table 25. However, for the optimal functioning of the escalation process, communication between the departments and the ESS teams were vital. In other words, the latter needed to be informed about the supervisory absences or resignations and substitute approvers in advance, so that the contingency rules could take effect. In the case of O2, where the concern was even more pronounced, there seemed to be a lack of adequate communication between the individual departments and faculties and the ESS management. To further reduce any likelihood of obstacles to the approval workflows in contingency situations, many of the systems were equipped with features that allowed administrative staff and secretaries in the departments (who often play a vital role in the web-enabled HR processes), to monitor the flow of documents sent electronically by employees. The pattern depicting this issue is *The Authorizer* pattern in Appendix C1. This was arranged in order to shift some of the responsibility of escalation to the departments as well. The escalation feature was complemented with the workflow status and electronic in-tray requirements, shown in Table 23 and Table 24, respectively. The status indicator requirement was also included to inform employees about the current approver. Monitoring of document submission by administration staff was made possible by being able to view the web-enabled in-trays of supervisors.

<table>
<thead>
<tr>
<th>Pattern Name</th>
<th>The Approval Escalator</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Problem</strong></td>
<td>How to maintain the role of the approver when a supervisor is not attending to documents in the electronic in-tray?</td>
</tr>
<tr>
<td><strong>Context</strong></td>
<td>Supervisors may be on-leave, resign from the organization, or simply be unavailable to attend to documents submitted via the web medium. This situation can cause disruption in the workflow, as documents sent via the web keep piling up in the absent supervisor’s in-tray.</td>
</tr>
</tbody>
</table>
| **Forces**   | 1. Delays in the approval documents owing to supervisor absences can cause anxiety for employees and disrupt administrative processes.  
2. HR will need to attend to complaints by employees that their applications have not been attended to.  
3. Unnecessarily increases the workload of the ESS team, as effort is needed to redirect or divert all applications piling up in the absent approver’s in-tray. |
<table>
<thead>
<tr>
<th>Pattern Name</th>
<th>The Approval Escalator</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Solution</strong></td>
<td>The system shall automatically divert the documents pending approval to the next supervisory level or to a designated supervisor. This requirement necessitates the configuration of each organizational unit's supervisory structure into the web system. Once the approval hierarchy has been established, documents are automatically escalated to the electronic in-tray of the supervisor of the absent approver or to that of a manager who has assumed the role of the substitute approver, after a pre-specified period of time has elapsed. Another prerequisite to this requirement is the uninterrupted flow of communication between the departmental administrators and the ESS team.</td>
</tr>
<tr>
<td><strong>Consequences</strong></td>
<td>1. Workflows are not disrupted despite changes in supervisory roles.</td>
</tr>
</tbody>
</table>

Table 25. The Approval Escalation pattern

The project teams were also concerned with late submissions of timesheets and leave requests, which invariably led to increased workload in their processing. Since, one of the prime objectives behind the implementation of web-based services was to improve productivity, this was certainly an issue the project teams needed to deal with. The teams also discovered that users often forgot to send documents through on time, and then would contact HR in a state of panic once they realized that they were late. This was certainly what the project teams sought to avoid. Thus, another workflow requirement that came about as a consequence of this concern was the electronic dispatch of reminders to all users. In view of this, both employees and supervisors received electronic reminders, such as emails or notifications on the profile page, instructing them about the due dates for timesheet submissions and approvals, respectively. Likewise, supervisors received reminders to take action on leave requests. The ESS personnel configured the system to send automated dispatches for timesheet reminders a few days prior to a pre-specified due date. The same scenario applied to ESS projects initiated by payroll companies, in which clients were reminded electronically about due dates for pay cycles. However, some project managers in universities complained about the solution as not being sufficiently effective in the case of users who hardly checked their email or logged into their ESS profiles, especially in the earlier stages of system implementation. This necessitated the continuation of their efforts to promote the rollover of the web services throughout the universities and embark on appropriate change management programs to
motivate user adoption. The meaning of this experience is represented in the *Aide Memoire* pattern in Table 26. The problem was much less prevalent with the clients of payroll companies, one of the primary reasons attributed to the greater extent of contact between the two parties via conventional modes of communication, owing the nature of the business relationships. A related requirement to the electronic reminders feature was the transmission of confirmation messages once an action was taken on the web system by a user. Hence, employees and clients received an email message once timesheets were sent through the system. Confirmation messages were also sent to an employee once the supervisor approved her/his online applications. The *Application Confirmation* pattern can be referred to in Appendix C1.

<table>
<thead>
<tr>
<th>Pattern Name</th>
<th>The Aide Memoire</th>
</tr>
</thead>
<tbody>
<tr>
<td>Problem</td>
<td>What happens if employees and supervisors forget to submit timesheets or approve leave applications to HR/payroll on the due date?</td>
</tr>
<tr>
<td>Context</td>
<td>Timesheets should be sent to payroll for processing prior to the due date of the pay cycle. Likewise, leave applications should be approved and recorded electronically before the employee goes on leave. Otherwise, late submissions, if it becomes routine practice, undoubtedly increases the workload on HR/payroll, and diminishes any productivity gains from a web-based application.</td>
</tr>
</tbody>
</table>
| Forces       | 1. Employees and supervisors may forget or be late in submitting timesheets or leave applications (especially at the earlier phases of implementation of the web-based system).  
2. Informing individual employees and supervisors of late submissions creates unnecessary payroll work.  
3. Limit communication via conventional modes |
| Solution     | The system shall dispatch automated timesheet reminders  
To alleviate all relevant stakeholder concerns, an electronic reminder should be dispatched to all the employees and supervisors a few days prior to the actual due date. This is related to *The Electronic In-tray* and *Status Indicator* patterns. |
| Consequences | 1. Electronic reminders will ensure that employees and supervisors have been notified of timesheet and other online documents (such as leave applications) submissions on the due date.  
2. Electronic reminders may not be effective if employees and supervisors work with computers very rarely. |

*Table 26. The Electronic Reminder pattern*
6.3.3 Experiencing Stakeholder Concerns and the Manifestation of Conflict

Despite the differences in the organizational setting of the universities and the payroll companies, I discovered remarkable similarities in the perceptions of project managers with regards to the issues they considered to be stakeholder concerns. At any point, if a concern was ignored or could not be dealt with, tension between the stakeholders surfaced (see sections 5.2.5 and 5.3.4)!

The modification of the resultant requirements, discussed earlier in section 6.2, needed tact on the part of the project managers to ensure that the concerns of the potential users had not heightened as a result. In some of the projects, such situations uncovered the existence of conflict antecedents and the progress of the projects was decelerated owing to growing resistance. The presence of conflict antecedents was found to be hovering over the concerns and the consequent establishment of requirements, as illustrated in Figure 4. This brought to light the power structures prevalent in organizations and the fragility of relations between certain power groups and cliques (Walsham 1992, Giddens 1987). In the case of outsourced payroll companies, the dilemma between the ESS teams' profitability goals and their business needs to provide optimal services to their clients, as part of a competitive package, was revealed.

It should be noted that concerns also varied in their degree of criticality. In other words, though antecedents of conflict were apparent in all concerns, only in some situations did the failure to address the concerns appropriately result in full-blown conflict. The less critical concerns, on the other hand, exposed points of disagreement that could be sorted out without "drawing swords".

What was interesting was the fact that I discovered variations in the criticality of these concerns between the universities and the outsourced payroll companies. Project leaders in universities experienced a significantly greater number of highly critical concerns than did their payroll counterparts. Thus, the former had to be a lot more careful and tactful in how the concerns were dealt with. This was relatively straightforward in payroll companies. The matter could be attributed to the different business settings and nature of stakeholders prevailing in the two types of cases. The power structures and relationships,
and vested interests in universities were inherently complex and politically charged. Though they had gained support from the higher echelons of university administrations, the project teams had to convince the stakeholders that the ESS was to going to generate a broader range of benefits for everyone than just productivity gains for the Human Resource (HR) divisions. Added to this complexity was the fact that even within a particular stakeholder group, there was a lack of uniformity in their viewpoints with regards to their involvement with the ESS. Thus, no two academics or departmental administrators shared the same set of characteristics. Some of them were IT proficient and willing to become avid users of the web system, while others, already overburdened with their regular tasks and having no PC on their desks, viewed the project as an imposition on their work lives.

With outsourced payroll companies, the situation was definitely less volatile. They were basically offering the same set of services to their clients but through a web medium, in line with their web or e-business strategy of enhancing the value of services to existing clients, attracting new clients from their websites, and streamlining certain internal operations, such as data entry. In accordance with this new strategy, they embarked upon promotional programs aimed at dispersing the web services to their existing and potential clients. One of the main motivators for clients to become recipients of web-based payroll services, as perceived by the project managers, was the delivery of premium services. Realizing that not all their clients were IT proficient, the payroll companies also kept the option of service delivery through conventional modes, such as fax and courier services. Some of the concerns raised by clients, who had adopted to become web-based service recipients, were significant enough for the initiators to consider, but the level of criticality did not pose the threat of conflict with the clients. This is apparent in light of the fact that the payroll companies were in no way involved with the power structures existing within the client firms. They (client firms) were customers and thus, needed to be served optimally in order to ensure their satisfaction with the web services. This did not imply that conflict antecedents were non-existent in these projects. If the adoption rate of the web services among clients failed to reach the established target, tensions among the power groups within the payroll companies themselves could soar to a point where the structure and composition of the project teams were under threat. Therefore, gaining and retaining customers for the web services were paramount to the success of the projects,
thereby necessitating devotion of resources toward the effective management of the ESS and appointment of competent Helpdesk personnel.

6.3.4 The Implicit Experience Base

As revealed and discussed in section 5.3.5 and further illustrated in the synthesized ESS evolution model in Figure 4, there existed either a wholly informal or semi-institutionalized experience base that was employed in a number of projects. The usefulness of an experience base was apparent in the generation of preliminary ESS requirements and subsequent fine-tuning of features. In the O1 project, the head of the development team, the IT manager revealed the reuse of requirement specifications and more downstream artifacts, such as designs and chunks of code, from previous web projects, such as the student information system. The ESS managers in O3 and O4 clearly stated that their selection of initial requirements was driven by a “vanilla” approach, or in other words, reusing the experience gained by observing similar projects being implemented in other institutions and consulting with their counterparts over there. Thus, “learning from others” undoubtedly took place. In the case of the payroll companies, O5 and O6, the web project teams inculcated requirements and features on the basis of vendor suggestions, by-products of prior experience themselves, and from their own experiences with clients. In the latter case, they reused facets of what they learnt from their dealings with past web clients.

6.4 Summary

At this juncture, the fundamental assumptions with regards to the phenomenological research method can be evaluated in terms of the discussion. As discussed in chapter 4, there has been a significant rise in the adoption of ESS in universities and outsourced payroll companies, due to which individuals directly involved with the implementation of such information systems are expected to have common experiences. The phenomenon presented itself to the consciousness of the project managers in similar ways, as indicated by the commonalities in their experiences. In addition, the project managers expressed their experiences, in which commonalities surfaced, using the same labels. Thus, the same terms, such as “concerns”, “roll over”, “configuration”, “business needs”, “Data Entry & Validation, View & Update”, “Workflow”, “Approval Escalation”, “Concerns”, “Status
Indicator", to mention a few, were used by the various co-researchers to refer to the common aspects of their individual experiences.

The accounts of project managers revealed that the examination of issues they perceived as stakeholder concerns (including their own) played a key role in the selection of requirements for subsequent iterations in the evolution of the web systems. In fact, with the exception of O1 and O2, the elicitation of stakeholder concerns through the feedback mechanism was the sole manner in which requirements were established. Thus, system evolution was driven by the solutions put forward by the project teams in response to their consideration of these concerns. Moreover, they believed that the inadequate addressing of concerns could lead to rising levels of user dissatisfaction and resistance, the seeds of conflict and turbulence in inter-stakeholder relations. It was also brought to light that some project teams had in place an implicit experience base, from which they extracted relevant pieces of information and applied them according to the context of the phenomena. Some of the experience was derived from learning by observing the experiences of counterparts in other similar projects.

Even though a number of themes of invariant constituents were generated as a result of the phenomenological analysis of the transcribed data, the main cluster that was of relevance to the thesis was the experience of the project managers in dealing with concerns. Thus, patterns were developed to illustrate the commonalities in their individual experiences, despite the differences in organizational cultures and industry orientation of the enterprises in which the projects were initiated. Hence, the discovery of commonalities in the experience of the individual co-researchers suggests that several aspects of the experience can be captured across the ESS projects that were investigated, thereby addressing the third research objective. The summary of the key points of this chapter are presented in Table 27.

Yet, variations in the individual experiences of the ESS managers did exist, largely due to the business setting and particular socio-political climates prevalent in the six organizations. Thus, the criticality of concerns and the possibility of conflict varied greatly between university and payroll company projects, even though the initiators encountered identical concerns from the user community. In addition, the perceptions of the project managers and their attitudes towards the potential users varied even from one
university to the other. This was why some project teams went made great efforts to create awareness of the ESS through a number of focus group sessions, followed by numerous training sessions, while others immediately launched a basic version of the ESS for pilot testing and made enhancements according to the feedback received. Some project managers perceived the same concerns to be more critical than their counterparts in other organizations. For instance, the approval escalation issue during contingencies was a more profound concern in one of the enterprises because the project managers had not configured the associated business rules at the early stages of the project. Thus, they were getting inundated with complaints from employees whose leave and pay claims remained unattended to for a prolonged period of time. Such a concern was less critical in other projects as the issue had been anticipated at the outset of the implementation process and the ESS configured accordingly. The measures undertaken to tackle stakeholder resistance and resolve conflicts also varied from one organization to another. Furthermore, some of the actual concerns were also peculiar to certain projects. A suitable example is the dispute over the usage of digital signatures in one of the projects. However, despite the few variations, large commonalities in the experiences were found.

<table>
<thead>
<tr>
<th>Research Objective</th>
<th>To establish whether the commonalities in the experience of project managers can be captured across the domain of WBIS/ESS.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Key Points</td>
<td>1. Commonalities in the individual experiences of the ESS managers did exist.</td>
</tr>
<tr>
<td></td>
<td>2. Moreover, the characteristics of the common experiences were also found to be identical.</td>
</tr>
<tr>
<td></td>
<td>3. Such characteristics were also expressed using the same labels.</td>
</tr>
<tr>
<td></td>
<td>4. Therefore, the common experiences, expressed with the same terminology, can be synthesized to represent the domain of ESS implementations that were studied.</td>
</tr>
<tr>
<td></td>
<td>5. On the other hand, variations, owing to particular business settings and socio-political structures, were also found to exist.</td>
</tr>
</tbody>
</table>

Table 27. Summary of key points regarding commonalities in the experiences
In the next chapter, the experience patterns serve as the basis for evaluating the essence of the project managers' experience through the direct observation of another group of ESS problem-solvers engaged in a situation related to the phenomena.
Chapter 7: Evaluation

7.1 Introduction

The patterns, introduced in the last chapter, represent the commonalities in the experiences of ESS project managers in dealing with stakeholder concerns. This chapter takes the study further in order to add strength to the issue of confirmability associated with the fourth research objective, which is:

- To ascertain the extent to which the collected domain experiences could be confirmed in terms of its relevance and usefulness to managers involved in new projects in the same domain

Hence, this chapter is concerned with the evaluation of the experience patterns. At this juncture, one might ask – why do we need to formally evaluate the empirical findings? Indeed, in previous phenomenological research studies, validation of empirical data was undertaken by dispatching the synthesis of textural-structural descriptions to the co-researchers themselves, who then responded by indicating whether their accounts were accurately depicted and proposed additional comments when insufficient information was provided (Harmer 2003, Moreno Jr. 2001, Humphrey 1991). In fact, Moustakas (1994a) refers to the thesis of Humphrey (1991) as “a good example of validation of data”. As discussed in the chapter 4, I also validated the data through follow-up interviews with the co-researchers, to whom I not only presented the synthesis, but also the individual textural-structural descriptions in order to gather their comments and feedback. All the co-researchers conveyed to me that they were satisfied with the accuracy of my interpretation and representation of their narratives. But, the commonalities, on the basis of which the patterns were generated, applied only to the pool of co-researchers, from organizations O1-O6, i.e. I was yet to attain a position to firmly claim the commonalities in the experiences of the project managers can be applied to other (previously unexplored) projects in the domain.

Moreno (2002) draws our attention to the underlying objective of the phenomenological method being the identification of commonalities in the observed phenomena as they appear in the co-researchers’ consciousness.
He goes on to say:

"If this was true, the identification of the fundamental elements that are common to different individuals' experiences of a given phenomenon would allow us to unveil the essential characteristics of those individuals' primordial awareness of that particular aspect of their common reality. This notion constitutes, in fact, the mainstay of phenomenological research."

Furthermore, the commonalities uncovered by the application of the phenomenological method should enable the researcher to inductively construct a synthesis of observable phenomena. In this study, it is the experience patterns that form such a synthesis, capturing the essence of a typical ESS application in a Melbourne-based organization. The emergence of a common synthesis necessitates its evaluation with independent domain co-researchers to enhance the credibility and confirmability of the findings (Cf. discussion of confirmability in chapter 3). Thus, additional evaluation studies were initiated with three groups of co-researchers, i.e. a group of novice developers, a new ESS team, and a project manager involved with another new ESS project. Observations were employed as they allow the investigator to study group behavior and complex interactions in a naturally social setting (Fox 1998, Morgan 1988). The main aim of undertaking the observations, however, was to evaluate the perceived usefulness of the resulting patterns as problem solving tools, and their relevance to the experiences of project managers in the ESS domain. Thus, it was important to simulate a situation where the participants will actually have to utilize the patterns in dealing with a set of stakeholder concern in an ESS project.

As it was impossible to get project managers to apply the patterns in their own ESS projects, a case study was created to describe an ESS project in fictitious company called MAGMA was (see Appendix B1 for its full text). This case was written in collaboration with ESS domain experts. Thus, the MAGMA case study, consisting of issues of concern to stakeholders, was employed to simulate a typical problem-solving environment in a project, in which the patterns were provided to the co-researchers. The patterns were to be used to assist problem solving in the case study, and subsequently, to provide extensive feedback on the usefulness of the patterns and their relevance to co-researchers' own experience. However, before conducting the observation exercise, the case needed to be reviewed and the issues related to stakeholder concerns identified and analyzed by an
independent expert in the ESS domain, who had not previously participated in the study. The domain expert examined the MAGMA case and commented on the MAGMA problems and their possible solutions (see Appendix B2). Furthermore, the experience patterns were also subjected to evaluation with regards to their structure and format by a group of patterns experts. This was done by their review at the pattern-mining workshop at 3rd Austral-Asian Conference on Pattern Languages of Program Design - KoalaPloP 2002 (Sarkar and Cybulski 2002b), held in Melbourne, Australia.

In the following sections of this chapter, the details of each observation exercise are reported, starting with a brief background of the co-researchers and description of the steps that undertaken to approach them and organize the observation session. The findings are subsequently discussed to uncover stakeholder concerns by the participants, the actual application of the experience patterns to address the concerns, and the perceived usefulness of the patterns. The discussion is substantiated by quotes and anecdotes from the co-researchers and summarized in Table 28, Table 29, and Table 30.

It is also worth remarking that although the chapter’s main emphasis is on the findings confirmability it also enforces strict adherence of the evaluation process to the spirit of phenomenological enquiry.

7.2 Novice Co-Researchers

The evaluation of the patterns, reflecting the shared experience of ESS project managers, began with a pilot session involving 3 PhD students, all in advanced stages of their research. All three were undertaking research in the areas of E-business and web technology, and thus, were knowledgeable about the general issues relevant to this project, though they were not familiar with the domain of web-enabled ESS. The aim of the pilot study was to gather the co-researchers’ views on the usefulness of the set of experience patterns as a problem-solving tool. Since the student-participants possessed no direct experience in the domain, matters regarding the relevance of the patterns in their work experience could not be gathered. However, what could be gathered was the insight into the usefulness of the artefacts in assisting them to solve problems in an unfamiliar domain.
The participants were sent the patterns well in advance, and a seminar was conducted to familiarize the co-researchers with the general notion of patterns as well as the details of specific patterns. They expressed interest in the general idea of patterns, though they had not used them in their respective PhD projects, and thus, were eager to participate in the problem solving session. A week later the actual study was carried out, and the MAGMA case study was presented to them. They were given about 15-20 minutes to read the case, following which the actual session was conducted and video-taped. For reasons of privacy and confidentiality, as stipulated in the Deakin University Ethics Committee agreement, the names of the three participants will not be disclosed, and instead, PhD 1 – PhD 3 will be used.

7.2.1 Identification of Stakeholder Issues

The first issue identified by the pilot group was that the business rules had not been incorporated into the MAGMA ESS, thereby resulting in some discrepancies, such as the staff meeting hours not being included in the processing of timesheets.

PhD 2 & PhD 3 agreed (Quote 7.2.1):

"HR rules (in the ESS) and contract rules mismatch when it comes to meeting hours."

One of the group members contended that it was actually a configuration issue, implying that the ESS teams should have devoted thorough attention to the enforcement of business rules into the system.

The second issue was the fact that authorizers were not checking their ESS inboxes. The team concluded that as part of the solution to this problem, the ESS system should “hound” the supervisors to attend to their inboxes.

The third issue was the issue of escalating requests to process timesheets and leave applications to the next supervisory level instead of piling up in the absent supervisor’s inbox.
Last but not the least, the issue of error messages appearing despite the user’s claim of entering data correctly was perceived as an issue.

### 7.2.2 Application of Patterns

The first issue of employees not being paid for meeting hours, as identified by the novice co-researchers, triggered an in-depth discussion about HR screens not being in sync with the employees’ timesheet interface. Thus, the HR personnel were not able to see the meeting hours on their screen, even though the employees had filled in the data in the right field, and the timesheets had been approved by their supervisors. They all agreed that that the pattern suitable for application in this situation should confirm the hours received by HR to the employees.

**PhD2 (Quote 7.2.2a):**

"It (the pattern) indicates that these are the hours paid for and please confirm if they are correct or something".

Therefore, the Application Confirmation pattern was deemed to be suitable. The pattern brought about the requirement for a confirmation of the pay data. In this way, the employee could take action and demand an inquiry if the confirmation report had missed out any of the hours. This was considered a better scenario in comparison to the employee discovering the missing hours in her/his payslip. Of course, the co-researchers all held the view that the actual issue lay with the configuration of the ESS, and its integration with the legacy system used by HR personnel to process timesheets.

The novice co-researchers found the application of patterns to the second and third issues relatively straightforward. A combination of the patterns of the Electronic In-tray, Status Indicator, and the Aide Memoire were applied to address the second issue associated with the supervisor not attending to document sitting on his ESS inbox. To the third issue regarding the delegation of approval authority to a substitute approver, the Electronic In-tray, Status Indicator, and the Approval Escalator patterns, illustrated in chapter 6 and in Appendix C1, were applied.
The solution to the fourth issue, on the other hand, was relatively more complex. The MAGMA employees were unable to submit the timesheet despite having entered the hours correctly onto the web-based form. The co-researchers pointed out the need for parallel workflows – web-based as well as manual.

PhD3 (Quote 7.2.2b):

"...if you are going to put in a manual application because the system can’t accommodate what you need it to do, in addition to going into your approver’s in-tray, the fact that you done a manual one should also go some IT manager’s or coordinator’s in-tray – not to approve the leave but to inform the fact that someone felt it necessary to use the manual process. So, they could then chase it up and go – 'look, turns out that we can’t support this kind of application'. So, each time you do a manual application, someone in IT should be informed that this thing is not working as expected”.

Thus, the novice developers held the view that administrators of the ESS should be aware and monitor the cases in which the users were forced to resort to the manual process owing to the failure of the web-enabled workflows. Though there were suggestions about Helpdesk staff helping users fill up the timesheets when the employees were encountering problems in submitting the documents, issues of privacy and confidentiality, related to pay data, discouraged the pilot study participants from pursuing the solution along this path. While not entirely sure about the full application of the patterns to the issue, the co-researchers opted for the Parallel Workflows and Web Coordinator patterns, presented in Appendix C1, as partial solutions. The application of patterns to the respective issues by the novice co-researchers is summarized in Table 28.

<table>
<thead>
<tr>
<th>Issue</th>
<th>Pattern(s)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Employees not getting paid for meetings as the hours were not showing on HR screens</td>
<td>Application Confirmation</td>
</tr>
<tr>
<td>2. Supervisors not checking their web-enabled in-trays.</td>
<td>Electronic In-tray, Status Indicator, and the Aide Memoire</td>
</tr>
<tr>
<td>3. Leave applications not getting approved owing to the absence of the supervisor.</td>
<td>Electronic In-tray, Status Indicator, and the Approval Escalator</td>
</tr>
<tr>
<td>4. Employees unable to submit timesheets online.</td>
<td>Parallel Workflows and Web Coordinator</td>
</tr>
</tbody>
</table>

Table 28. Application of patterns to the issues (Novice co-researchers)
7.2.3 Perceived Usefulness of the Patterns

It was beyond the shadow of doubt that the co-researchers in the pilot study believed the patterns were a useful aid to problem solving of the case study, as indicated in Table 28.

PhD1 (Quote 7.2.3):

"They (patterns) were useful as a starting block as they enabled us to focus on certain things – gives you an idea of what's been done in a similar situation before."

They also contended that the patterns served as a useful guide to approaching issues in the MAGMA case. However, they were also of the view that despite their usefulness as an assistance tool, the patterns were restricting creativity in the problem solver. Furthermore, they claimed that there was room for the pool of patterns to be expanded as they noted that none of the patterns satisfactorily addressed the fourth issue in its entirety.

7.3 ESS-A

ESS-A is a team of five members who work on a number of system development projects in the university, but are currently focussed on the implementation and further evolution of web-based HR services within the university. Having completed the development of phase one of the system, the developers are now examining various stakeholder concerns, elicited via the feedback mechanism put in place, and undertaking steps to roll over phase two. Thus, they expressed great interest when approached for the direct observation study using patterns reflecting project experiences in the domain.

Before the study was conducted, a short seminar was organized to introduce and familiarize the team with the concept of patterns. It was discovered that they were indeed interested in patterns as a design aid and some of them had even consulted the relevant literature. At the same time, they were seeking patterns that were more specific to what they were doing. Prior to the seminar, a brief synopsis of the research project and the actual patterns (attached in the Appendix C1), were presented to them. During the
seminar, patterns-in-general were introduced. Then, the patterns developed as a result of the first phase of the empirical studies were discussed, which stimulated genuine enthusiasm in the developers and they agreed to meet a week later for the actual study. This gap of a week was intended to give them sufficient time to review the patterns.

The study took place around the meeting table in their office. They gathered and sat around the table facing each other in a manner typical of the decision-making sessions held over the web-based HR project. The researcher placed himself at the other end of the table and filmed the session as its progressed. The actual case study for the problem solving session was presented to them first. They were then given about 20 minutes to read the case. When they had done this, the discussion started and filming began. Note that for reasons of privacy and confidentiality, as stipulated in the Deakin University Ethics Committee agreement, the names of the five participants will not be disclosed, and instead, P1 – P5 will be used to refer to them, P1 being the team leader.

7.3.1 Identification of Stakeholder Issues

The first issue identified by the team was the absence of any formal requirements elicitation program employed in MAGMA. The ESS-A team also claimed that the MAGMA executives had not conducted any form of research or fact-finding done on similar HR web offerings employed in other organizations. This was the prime reason why the ESS team at MAGMA were unable to study and understand the expectations of the system users.

P2 (Quote 7.3.1a):

“They should have identified the different types of clients, as well as the issues around the different types of clients”

ESS-A also decided that owing to the lack of formal and proper requirements elicitation, several business rules, meant to be embedded into the ESS, were omitted. This resulted in the employees’ meeting hours not getting processed for payment.

The third issue identified was the fact that supervisors were not checking their inboxes and dealing with applications sent by their staff. The members of the ESS-A crew blamed
this on poor time management in part of the supervisors, and the lack of communication in the relevant business processes.

The fourth issue was related to the issue of the delegation of approval authority during the absences of supervisors. There was no approval contingency set up during escalation of approval tasks. They attributed the problem to the lack of proper and thorough planning prior to implementation.

P5 (Quote 7.3.1b):

"My point was that the person who was going to approve the leave was on leave himself, so obviously there was no contingency, like we're going to have built in, after that escalation period has elapsed. After that, it goes up to the next person and after that a default person. So they had no contingency set up in case the main supervisor was absent."

Last but not the least, the team attributed the difficulties faced by employees in submitting their timesheets to the lack of formal requirements elicitation exercises.

P5 (Quote 7.3.1c):

"I imagine they would have identified the problems earlier on in the piece rather than... and there were two issues they were completely unaware of... one was the user and the other the help desk. Someone is going to the Help Desk and they had no idea how it works, so obviously you've got an application that you haven't put through its paces. You would have picked it up initially."

7.3.2 Application of Patterns

The first and core drawback of the ESS project in the MAGMA case study was the fact that no formal requirements elicitation or awareness programs were conducted. The coresearchers did not think any of the patterns specifically addressed this issue. In fact, they suggested improvements to the pool of patterns, discussed in a later section.

The Application Confirmation pattern was selected to address the issue of meeting hours not getting processed. When it came to addressing employee concerns about supervisors not checking their electronic in-trays, the patterns of Status Indicator, Electronic In-tray,
Aide Memoire, and the Authorizer, previously discussed in chapter 5 and collected in Appendix C1, were considered as suitable. The Authorizer was considered useful as it enabled HR staff and departmental administrators to monitor employee submissions that were gathering in the supervisory inboxes. Thus, if the documents remained unattended after a certain period of time, the ESS management could pursue the matter with the supervisors concerned. One of the ESS-A members was of the view that the supervisors were unaware of how important is the need for checking electronic in-trays from time to time. She added that further training programs, aimed at educating and creating awareness among supervisory staff, should have been designed and undertaken. Thus, the Usage Trainer pattern, discussed in chapter 6, was also considered useful.

To the fourth issue associated with the delegation of approval authority, the members of ESS-A found the application of the Aide Memoire, Status Indicator, Authorizer, and the Approval Escalator patterns to be appropriate. When it came to the final issue of error messages flashing despite employees entering timesheets correctly, the ESS-A co-researchers stated that the error messages failed to effectively explain where the errors were occurring, even though the bugs were responsible for the situation. In view of this, the Automated Input Validator was considered for application, as the ESS-A team believed this would reduce the possibility of data entry errors, thereby ensuring that the problem lay not with the users. In connection to this, they also found the Precise Errors and Effective Help Features patterns to be useful. The latter patterns were considered important as they proposed the need (and documentation) to explain the nature of the errors. The co-researchers felt that MAGMA employees were confused about the steps associated with the timesheet entry process, and decided to apply the Online Demo pattern as well. The Parallel Workflow pattern was rejected on grounds that in an organization in which an ESS was being implemented, manual or pre-web processes are to be discouraged as they offset the effectiveness and investment on the web system. On the other hand, the Web Coordinator pattern was deemed to be useful as user support and guidance was of great importance in this situation. The issues and the corresponding patterns have been matched and illustrated in Table 29.
<table>
<thead>
<tr>
<th>Issue</th>
<th>Pattern(s)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. No formal requirements elicitation, investigation of other ESS</td>
<td>No patterns specifically address the issue.</td>
</tr>
<tr>
<td>projects, or awareness programs</td>
<td></td>
</tr>
<tr>
<td>2. Employees not getting paid for meetings as the hours were not</td>
<td>Application Confirmation</td>
</tr>
<tr>
<td>showing on HR screens</td>
<td></td>
</tr>
<tr>
<td>3. Supervisors not checking their web-enabled in-trays.</td>
<td>Status Indicator, Electronic In-tray, Aide Memoire, and the Authorizer</td>
</tr>
<tr>
<td>4. Leave applications not getting approved owing to the absence of</td>
<td>Aide Memoire, Status Indicator, Authorizer, and the Approval Escalator</td>
</tr>
<tr>
<td>the supervisor.</td>
<td></td>
</tr>
<tr>
<td>5. Employees unable to submit timesheets online.</td>
<td>Automated Input Validator, Precise Errors, Effective Help Features, Online Demo, and Web Coordinator</td>
</tr>
</tbody>
</table>

Table 29. Application of the Patterns to the issues (ESS-A)

7.3.3 Perceived Usefulness of the Patterns and their Relevance to the Experience of ESS-A

Indeed, the participants of the observation study considered the patterns a useful tool not only in dealing with the problems inherent in the MAGMA case study but also to problems in ESS projects in general.

P2 (Quote 7.3.3a):

"This (the case study and the pool of patterns) is so relevant to what we’re grappling with”

In fact, the co-researchers indicated that the patterns had the potential to assist them in solving some of the issues associated with their own ESS project.

P1 (Quote 7.3.3b):

"In that regard your patterns are very useful. We have seen these (problems the patterns deal with) in our work.”
Moreover, the co-researchers stated that the patterns were logical in sequence and structure, and easy to follow for even people with minimal technical leanings. Moreover, they expressed the fact that they were impressed by the patterns.

P2 & P3 agreed (Quote 7.3.3c):

"The patterns were well structured and easy to follow for a non-technical person. These are also excellent for planning."

One pattern that the co-researchers found especially useful and expressed their intention of applying to their own project was The Authorizer pattern, owing to its proposition of monitoring administrative workflows, such as pay and leave approvals.

P5 (Quote 7.3.3d):

"That's an interesting one (The Authorizer) we've got with the administrator because we don't really have anything in place to let us know if the whole process has fallen down until someone lets us know. We know we have 1000 escalations, but do we know who the default approver is during a breakdown somewhere in the system?"

The ESS-A team emphasized the need to monitor the workflows, especially in times of approval escalations. Thus, they decided to insert the monitoring mechanism into their own ESS.

7.3.4 Suggestions for Improvement

The co-researchers at ESS-A also suggested extensions to the experience base of patterns. Firstly, they claimed that none of the patterns focussed on the issue of formal requirements elicitation.

P1 & P2-P5 agreed (Quote 7.3.4):

"There should be more (patterns) about project set-up, like planning and initiation, stakeholders and formal requirements. No patterns for project framework, such as project initiation, risk assessment, and success criteria."
On the other hand, they held the view that the patterns presented to them were effective, with the exception of Web Coordinator pattern. The team leader, P1, shed light on the pattern by explaining that it was not specific enough to be applied into a project. Thus, he recommended the pattern to include aspects such as the synchronization of support areas and so forth.

7.4 ESS-B

ESS-B involves a project manager in charge of the ESS project in her institution. She, along with members of her team, have already undertaken phase one of the project, and were working on the details related to phase two at the time of the study. Even though the manager was enthusiastic about taking part in a direct observation study, she could not get her team engaged owing to the workload. Instead, she offered her own participation for the purpose of this exercise. The statements she made during the exercise were audio taped rather than videotaped.

One week after a short seminar on the use of patterns, a meeting took place in the ESS-B manager’s office to study the MAGMA case. After reading the case, the manager decided to act as a co-researcher and to answer the questions in a manner of discussion.

7.4.1 Identification of Stakeholder Issues

According to the ESS-B co-researcher, the MAGMA ESS team did not understand the business processes. There seemed to be a failure to elicit and discuss user requirements. One of the manifestations of not carrying out in-depth requirements analysis was the meeting hours not getting processed by HR. Another issue identified was the fact that supervisors were not checking their electronic in-trays. She also pointed out that the approval process and the delegation of authority had to been set up properly.

ESS-B Manager (Quote 7.4.1):

"They should have set up the workflows in such a way that if the main approver was absent, a co-approver could assume approval authority...needs to be set according to the structure of reporting relationships."
Finally, she held the lack of proper system testing responsible for the bugs that prevented timesheet submissions by employees.

### 7.4.2 Application of the Patterns

Though she noted that there were no patterns explicitly aimed at addressing the lack of formal requirements elicitation, the Application Confirmation pattern was found applicable to the problem of meeting hours being missed out by HR staff during processing.

With regards to supervisors failing to attend to documents piling up in their web-based in-trays, the co-researchers applied the same combination of patterns as her counterparts in ESS-A, i.e. Status Indicator, Electronic In-tray, Aide Memoire, and the Authorizer. However, she reiterated, based on her own experience, that the usefulness of the Aide Memoire pattern was limited if supervisors were not checking their emails in the first place. In other words, she reconfirmed one of the consequences of the pattern.

ESS-B manager (Quote 7.4.2):

> "Also, the Aide Memoire is useful, but I agree with one of its consequences – it's no good if the approvers do not check their emails regularly. This is sometimes a problem."

The ESS-B manager selected the Status Indicator, Authorizer, and the Approval Escalator patterns to solve the problem that occurred when editors were on leave or on-duty in remote locations, and thus, being able to attend to their administrative duties. She stressed the importance of the Approval Escalator pattern during contingencies in the approval process.

When it came to sessional employee concerns of not being able to submit timesheets, the co-researcher indicated that the Automated Input Validator, Precise Errors, Effective Help Features, and Web Coordinator patterns were applicable. Furthermore, she rejected using the Parallel Workflow pattern as it defeated the purpose of implementing a web-enabled solution.
<table>
<thead>
<tr>
<th>Issue</th>
<th>Pattern(s)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. No formal requirements elicitation, investigation of other ESS projects, or awareness programs</td>
<td>No patterns specifically address the issue.</td>
</tr>
<tr>
<td>2. Employees not getting paid for meetings as the hours were not showing on HR screens</td>
<td>Application Confirmation</td>
</tr>
<tr>
<td>3. Supervisors not checking their web-enabled in-trays.</td>
<td>Status Indicator, Electronic In-tray, Aide Memoire, and the Authorizer</td>
</tr>
<tr>
<td>4. Leave applications not getting approved owing to the absence of the supervisor.</td>
<td>Status Indicator, Authorizer, and the Approval Escalator</td>
</tr>
<tr>
<td>5. Employees unable to submit timesheets online.</td>
<td>Automated Input Validator, Precise Errors, Effective Help Features, and Web Coordinator</td>
</tr>
</tbody>
</table>

Table 30. Application of the Patterns to the issues (ESS-B)

7.4.3 Perceived Usefulness of the Patterns and their Relevance to the Experience of the ESS-B Manager

The ESS-B co-researcher complemented the patterns usefulness as not only of assistance in addressing the issues in the MAGMA case study but also as helpful in reflecting on the issues experienced by her in her own projects. Moreover, what she also liked about the patterns was the fact that they proposed solutions in the form of requirement specifications to issues common in ESS projects.

ESS-B Manager (Quote 7.4.3):

“They (patterns) are generic enough to apply in most situations. In fact, these patterns should be reviewed by project management prior to system implementation. Once the system has been implemented, the application of the patterns will be difficult as it is expensive to alter the features of the system. Thus, the patterns should be used as a learning tool by project managers.”

7.4.4 Suggestions for Improvement

The ESS-B co-researcher suggestions were based on her own experiences with the implementation of the ESS in her organization. She contended that the patterns base needed expansion to include solutions to more basic issues, such as platform compatibility, project planning, and change management. The platform issues were
related to inaccessibility of Apple MAC users to the ESS. According to the supplier of the web-based solution, the system could only be used on PCs.

She also stated that she would prefer to see some patterns to support change management in organizational processes. Some faculties and departments in the institution already had their own systems in place, and were, thus, reluctant to shift to an HR-initiated ESS application. The loss of control of the things were done internally in the organizational units and the perception of being imposed with a new information system were cited as the reasons for resistance to the ESS project, which needed to be overcome in order to ensure project success. She also claimed the fact that some supervisors preferred to approve HR documents on paper, because they were not willing to take responsibility, though they liked having the authority.

ESS-B manager (Quote 7.4.4):

"So, we need patterns for access to basic functionality (PCs instead of Macs), and for effecting change."

She also wanted some patterns aimed at dealing with employee concerns over the fact that the ESS was inaccessible off-campus owing to security reason.

7.5 Outcomes of the Observations: A Comparison

The co-researchers in all the three observation studies identified the main issues prevalent in the MAGMA case study, though these were only a subset of those extracted and established by the domain expert⁴. Moreover, their selection of patterns for problem-solving showed a great deal of overlap - as can be seen from the tables Table 28, Table 29, and Table 30. Table 31 presents a consolidated view of the application of patterns by the observation participants to the issues identified by all of them. The first issue - issue (a) in Table 31 - and the most fundamental weakness in the MAGMA project was identified as the lack of formal requirements elicitation or the lack of learning from other ESS projects by ESS-A and ESS-B. However, this issue was not identified by the novice
co-researchers. With regards to the application of patterns, both ESS-A and ESS-B expressed the fact that they found none of the patterns specifically addressed the first issue (a).

<table>
<thead>
<tr>
<th>Issue</th>
<th>Novice Co-researchers</th>
<th>ESS-A</th>
<th>ESS-B</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. No investigation of requirements, other ESS projects, or awareness programs</td>
<td>Issue not identified</td>
<td>No useful patterns</td>
<td>No useful patterns</td>
</tr>
<tr>
<td>b. Employees not paid for meetings</td>
<td>Application Confirmation</td>
<td>Application Confirmation</td>
<td>Application Confirmation</td>
</tr>
<tr>
<td>c. Supervisors not checking their web-enabled in-trays</td>
<td>Status Indicator Electronic In-tray Aide Memoire</td>
<td>Status Indicator Electronic In-tray Aide Memoire Authorizer</td>
<td>Status Indicator Electronic In-tray Aide Memoire Authorizer</td>
</tr>
<tr>
<td>d. Leave applications not getting approved owing to the absence of the supervisor</td>
<td>Status Indicator Approval Escalator Electronic In-tray</td>
<td>Status Indicator Aide Memoire Authorizer Approval Escalator</td>
<td>Status Indicator Authorizer Approval Escalator</td>
</tr>
<tr>
<td>e. Employees unable to submit timesheets online</td>
<td>Parallel Workflows Web Coordinator</td>
<td>Web Coordinator Automated Input Validator Precise Errors Effective Help Features Online Demo</td>
<td>Web Coordinator Automated Input Validator Precise Errors Effective Help Features</td>
</tr>
</tbody>
</table>

Table 31. Consolidated application of patterns to the issues

The remaining four issues were identified by the participants in all three observation exercises. In fact, the Application Confirmation pattern was applied as a solution to the

---

4 This may have occurred due to two reasons, namely, the shorter time frame within which the co-researchers took part in the exercises (in comparison to that taken by the domain expert), or the level of experience in the ESS domain.
issue (b) in Table 31 by all three groups of co-researchers. Similarly, the Electronic In-
tray, Status Indicator, and the Aide Memoire patterns were applied to issue (c) in which
supervisors were logging into their electronic in-trays and attending to employee
submission. However, the Authorizer pattern was not applied by the novice developers as
a partial solution to this issue. This could be attributed to the lack of experience of those
participants in the domain of ESS applications. A similar discrepancy can be observed in
handling leave applications (d). Moreover, the novice developers selected the Parallel
Workflows pattern (can be found in Appendix C1) to address employee concerns over not
being able to successfully submit the web-based timesheets (e). Interestingly, this pattern
was not applied by neither ESS-A or ESS-B, who held the view that allowing employees
to revert to manual or non-web workflows diminished the productivity gains that could be
obtained from the ESS, i.e. using parallel non-web workflows defeated the very purpose
behind the introduction of the web technology. Once again, this could be attributed to the
experience of ESS-A and the ESS-B project leader with their own ESS projects, or to the
lack of ESS experience of the novice co-researchers. Nevertheless, Table 31 indicates that
the patterns do tackle the problems and suggest partial solutions, as perceived by the
participants of the observation exercises I undertook.

With regards to the perceived usefulness of the patterns, the participants in all three
observation studies stated explicitly that they found the patterns provided assistance as a
set of problem-solving tools. Furthermore, the ESS-A team members and the ESS-B
project manager voiced the opinion that the patterns were potentially useful to their own
projects as well, and recommended their use as a guide or learning tool for project
personnel at the outset of or during ESS implementation. Hence, the findings have been
instrumental in reaching the fourth research objective – the evaluation of the patterns has
established their perceived usefulness as problem solving tools. This is illustrated in the
first row of Table 32 – the patterns were perceived as a useful problem solving tool in
addressing the issues of concern in the MAGMA case. The quotes that support this claim
are included in this chapter, and can be referenced by the quote number, such as 7.2.3,
7.3.3b, etc.

The third objective of establishing whether the commonalities of the ESS managers’
experiences can be captured across other projects in the domain was further accomplished
as the co-researchers in both ESS-A and ESS-B emphasized the high relevance of the
patterns to their own experiences. The fact that the project managers in the two remaining universities acknowledged that they shared the same experiences as that imparted by the patterns, leads to the induction that the synthesis of the textural-structural descriptions of the individual project managers is an embodiment of the confirmed experience in the domain of ESS applications. The relevance of the patterns to the experiences of the project managers in ESS-A and ESS-B are indicated in the second row in Table 32, i.e. the patterns were a reflection of their own ESS experiences. Of course, the novice developers made no comments about the relevance of the patterns owing to their lack of experience with ESS projects.

<table>
<thead>
<tr>
<th>Participants</th>
<th>Novice Co-researchers</th>
<th>ESS-A</th>
<th>ESS-B</th>
</tr>
</thead>
<tbody>
<tr>
<td>Perceived usefulness of the patterns</td>
<td>Perceived as useful</td>
<td>Perceived as useful</td>
<td>Perceived as useful</td>
</tr>
<tr>
<td></td>
<td>(Quote 7.2.3)</td>
<td>(Quotes 7.3.3b-c)</td>
<td>(Quote 7.4.3)</td>
</tr>
<tr>
<td>Relevance of the patterns</td>
<td>No ESS experience</td>
<td>Relevance confirmed</td>
<td>Relevance confirmed</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(Quotes 7.3.3a,d)</td>
<td>(Quote 7.4.3)</td>
</tr>
</tbody>
</table>

Table 32. Perceived usefulness and relevance of the patterns

All co-researchers expressed their views on the limitations of the patterns and suggestions as to their extensions were made. In particular, the professional co-researchers considered patterns to be inadequate in the fundamental areas of project planning, software procurement, formal requirements elicitation, and business process reengineering (see Table 33).

<table>
<thead>
<tr>
<th>Novice Co-researchers</th>
<th>ESS-A</th>
<th>ESS-B</th>
</tr>
</thead>
<tbody>
<tr>
<td>Expansion of the pool of patterns</td>
<td>More patterns about (Quote 7.3.4)</td>
<td>More patterns about (Quote 7.4.4)</td>
</tr>
<tr>
<td>No details provided</td>
<td>Project planning</td>
<td>Project planning</td>
</tr>
<tr>
<td></td>
<td>Project initiation</td>
<td>Project initiation</td>
</tr>
<tr>
<td></td>
<td>Requirements elicitation</td>
<td>Requirements elicitation</td>
</tr>
<tr>
<td></td>
<td>Risk assessment</td>
<td>Risk assessment</td>
</tr>
<tr>
<td></td>
<td>Success criteria</td>
<td>Success criteria</td>
</tr>
<tr>
<td></td>
<td>Change management</td>
<td>Change management</td>
</tr>
<tr>
<td></td>
<td>Platform compatibility</td>
<td>Platform compatibility</td>
</tr>
<tr>
<td></td>
<td>Basic functionality</td>
<td>Basic functionality</td>
</tr>
</tbody>
</table>

Table 33. Summary of suggestion for improvement.
These areas of extension, however, were beyond the scope of this thesis project, which focussed specifically on an investigation of project managers’ experiences, gained from their interactions with stakeholders in the implementation of web-based information systems.

7.6 Summary

In the process of the phenomenological studies (main and subsequent evaluation), a set of common experiences, in the form of patterns, were established to span reflections of project managers working across the ESS domain. Limitations of the pattern set were duly noted. All participants in the observation sessions perceived the patterns as a useful assistance tool in identifying and analysing issues of concern in new projects. As a result, in full adherence to the phenomenological method, this chapter determined the extent of confirmed domain experience in terms of its relevance and usefulness to project managers in the ESS domain, thus, fulfilling the fourth and final research objective of this thesis.

A list the key points, as derived from the observation exercises, is given in Table 34.

<table>
<thead>
<tr>
<th>Research Objective</th>
<th>To ascertain the extent to which the collected domain experiences could be confirmed in terms of its relevance and usefulness to managers involved in new projects in the same domain</th>
</tr>
</thead>
<tbody>
<tr>
<td>Key Points</td>
<td>1. Confirmed experience is perceived as highly relevant to the new project managers.</td>
</tr>
<tr>
<td></td>
<td>2. The confirmed experience is found useful in the identification and examination of stakeholder issues in new projects.</td>
</tr>
<tr>
<td></td>
<td>3. The common experience of project managers has thus been reconfirmed.</td>
</tr>
</tbody>
</table>

Table 34. Summary of key points regarding the confirmation of common experience
Chapter 8: Conclusion

8.1 Introduction

Having addressed all four research objectives in chapters 5-7, I arrive at the final chapter of the thesis – the conclusion. I begin with a discussion of the outcomes of the study, which reflect the inductions that emerged from the pursuit of the research objectives and the resultant enhanced conceptual framework. The latter provides a comprehensive answer to the research question driving the study. This is followed by the contributions of the research outcomes to relevant theories and methodologies (web and general ISD), and to practitioners involved with the WBIS in general and ESS projects in particular. The thesis finally concludes with a brief discussion of research planned for the future.

8.2 Outcomes of the Study

The phenomenological method applied to this study led to the induction of factors that provide insights into the realm of ESS projects, especially with regards to the interactions between project managers and the other stakeholders as well as to the nature of the stakeholder concerns. Such insights indeed lead to the expansion and enhancement of the preliminary conceptual framework presented in chapter 2.

8.2.1 Reviewing the Research Issues

The research issues, as explored throughout this thesis, are explicated by the research question and its constituent research objectives (see section 1.3).

The Research Question

What are the experiences of project managers in dealing with stakeholder concerns in the implementation of web-based information systems?

In search of a comprehensive answer to this research question, four research objectives had been created and were formally addressed in the chapters of this thesis. It should be noted that in view of the empirical method adopted (phenomenological investigation), the objectives have undergone slight modification, e.g. the domain of study emphasises the
ESS rather than WBIS in general (see section 4.7). The summary of findings that rose out of the research associated from reaching these objectives follows.

The Research Objectives

1. *To identify the experiences of project managers with regards to the impact of stakeholder concerns on the implementation and evolution of WBIS / ESS.*

Extensive interviews with project managers in six ESS projects, implemented in prominent Melbourne organizations and deemed representative of WBIS, uncovered the perceptions of the managers regarding the variety of stakeholder issues (see chapter 5). Stakeholder concerns indeed were found to have significant impact on the rollover and evolution of the ESS. The degree of the impact, however, varied according to the criticality of the concerns.

2. *To determine the experiences of project managers in dealing with stakeholder concerns during the implementation of WBIS / ESS.*

Having gained an in-depth understanding of the perceived impact of the stakeholder concerns on the implementation and evolution of the ESS, I probed into the nature of the experiences of the project managers. ESS project managers reported identifying and resolving stakeholder issues in two main groups of concerns, i.e. data processing and workflow management. All such experience was subsequently collected in the narrative form of textural-structural descriptions of project managers’ experience (see chapter 5).

3. *To establish whether the commonalities in the experience of project managers can be captured across the domain of WBIS / ESS.*

The significant commonalities in project managers’ experience ultimately led me to conclude that a set of domain experience can be identified and captured. In the course of phenomenological synthesis (see chapter 6), sixteen (16) experience patterns were used to represent the common core of the ESS domain experience. Such patterns were subsequently thought to be relevant and useful to ESS project managers across the problem domain.
4. To ascertain the extent to which the collected domain experiences could be confirmed in terms of its relevance and usefulness to managers involved in new projects in the same domain.

The direct observation of three groups of ESS co-researchers confirmed the experience captured in the aforementioned patterns as relevant and consistent with the co-researchers’ prior experience and as useful in solving new problems in the ESS domain (see chapter 7). Critiques and comments on the patterns’ limitations were duly noted to determine the extent of their applicability to ESS problem solving. Furthermore, the resulting knowledge base of patterns was considered as easy to learn, easy to use, and readily extensible.

Having reached the four thesis objectives, it can be clearly ascertained that WBIS project managers, as exemplified by those working in the ESS domain, are routinely involved in resolving a variety of stakeholder concerns, drawing upon their significant personal experience, much of which could be shared across an application domain. In the process of the undertaken phenomenological study, the impact of stakeholder concerns on the evolution of a typical WBIS was better understood and then depicted in an enhanced conceptual framework (see the next section).

8.2.2 The Enhanced Conceptual Framework

The enhanced conceptual framework in Figure 5 (see next page) has been derived by expanding the preliminary conceptual framework proposed in chapter 2. The new framework incorporates the model of WBIS evolution based on the insights gained from the ESS study (see section 6.2). Figure 5 shows the process of WBIS implementation and evolution portrayed by the experiences of the project managers in their interactions with stakeholders. In comparison to the preliminary conceptual framework in chapter 2, the "developer" stakeholder has been added to this enhanced version. The developer can either be the in-house IT division or the vendor from which the WBIS has been purchased.
IT divisions definitely hold viewpoints, referred to as vp. Dev in the figure, and are involved in the establishment of system requirements. However, it has not been affirmed from the phenomenological investigations in ESS that vendors make known their viewpoints with regards to the projects of their clients. However, vendors do play a role in the establishment of initial requirements as indicated by the arrow from the Developer to the Requirements.

Project managers, as revealed by the phenomenological inquiry of their experiences with ESS, are responsible for the entire process of implementation, and specify an initial set of system requirements for the WBIS, driven by their personal and management concerns (stages 2 and 3, respectively) (Anderson 1997). These initial requirements are validated by the stakeholders through the feedback mechanism. Thus, the viewpoints vp. A, vp. B, and vp. C are expressed with regards to the requirements. However, the findings of the study uncovered the fact that the underlying concerns behind the viewpoints were linked to the actual or projected consequences of the requirements rather than the requirements themselves. Thus, these concerns were related to the Consequence (stage 4) stage of the SoC in CBAM (Anderson 1997).

![Image of a diagram](image_url)

Figure 5. The enhanced conceptual framework
This is evident in Figure 5 where the entire process of user validation is related to the consequences of the initiator requirements. In other words, stakeholders were primarily concerned with the situations resulting from the effects of the initiator requirements. Thus, they resist the initiator requirements in anticipation of such situations. To minimize the resistance, project managers interact and negotiate with the stakeholders, which is shown by the Action meeting the Resistance arrow in the figure. This can give rise to collaboration (stage 5) concerns on the part of the project managers (Anderson 1997). It is during these interactions that project managers should be able to detect the existence of conflict antecedents. As illustrated in the figure, the resistance is driven by the concerns of the stakeholders. Whenever project managers do not adequately address the concerns, the resistance may intensify, thereby increasing the likelihood of the antecedents manifesting into a full-blown conflict. On the other hand, project managers can alleviate the concerns and reduce resistance by introducing new requirements or enhancing or modifying the existing requirements, hence engaging in some refocusing (stage 6) (Anderson 1997). This is indicated by the arrow leading back to the Requirements from the Stakeholder Concerns in Figure 5. Evidently, the consequences of some of the new and enhanced/modified requirements are perceived negatively by the project managers, and give rise to their own concerns (arrow from Consequences back to Initiator concerns). Thus, the iterative nature of WBIS projects is demonstrated. It should be noted that the first two stages of concerns in the CBAM approach, namely awareness, and informational, could not be ascertained from the ESS managers’ own experiences, though they implied that such concerns were voiced by some of the user groups.

The Experience Base, however implicit or semi-institutional, provides assistance to the IT developers and project managers alike. The arrow is double-headed to suggest the dual flow of information between the experience base, and the project managers and the developers, i.e. they also feed and augment the experience base with what they learnt from the current project, while availing the assistance provided by the knowledge infrastructure.

It is, thus, clear from the preceding discussion that the pursuit of the research question and its constituent objectives lead to the induction of an enhanced conceptual framework
for the concerns-driven evolution of WBIS. It is worth noting that stakeholder concerns, in this enhanced model, are clearly the elemental precursors of the WBIS requirements.

8.3 Contributions of the Study

At this juncture, I am able to claim that the outcome of the study, involving phenomenological investigations into the experiences of project managers, contributes to the relevant theories, web development methodologies, as well as having implications for the practitioners. The individual contributions are discussed in the following sections, and summarized in Table 35.

| Theory                                                                 | • Stakeholder concerns play a key role in the establishment of system requirements and the evolution of WBIS / ESS.  
|                                                                      | • Understanding impact of stakeholder concerns on system requirements provides insights to stakeholder, viewpoints and expectancy theories of IS development.  
|                                                                      | • CBAM approach can be applied to the investigation of IS implementation projects. |
| Methodology                                                           | • The enhanced conceptual framework depicting the model of WBIS / ESS evolution and the correlations between stakeholder concerns, resistance, and conflict.  
|                                                                      | • Opportunities of “front-end” extensions and enhancements to existing WBIS methodologies, e.g. WISDM and ICDM. |
| Practice                                                              | • Patterns can serve as an experience base guiding WBIS / ESS project managers resolving stakeholder issues.  
|                                                                      | • Better understanding of project and configuration management issues for developing WBIS / ESS applications.  
|                                                                      | • Increased appreciation of human/social factors in IS projects. |

Table 35. Summary of Contributions

8.3.1 Contributions to Theory

This thesis explained how stakeholder concerns impact the establishment of system requirements and the subsequent evolution of WBIS, as exemplified by ESS services.
This very link between stakeholder concerns and the establishment and evolution of system requirements makes a direct contribution to multiple perspectives and viewpoints theories (see section 2.3.1-2) in IS, and WBIS in particular. The study can also contribute to the expectancy theory (see section 2.3.4), which elevates expectations of stakeholders to the state of "essential variables" that affect the project managers' perceptions of the outcomes of IS ventures (de Abreu and Conrath 1993). With regards to IS implementation in general, a model of the IS project presenting an elaboration of an implementation process, is provided by the enhanced conceptual framework (see section 8.2.2), which depicts the structure of a typical ESS project and the interactions taking place between the project managers and the primary stakeholder groups. The enhanced conceptual framework can be applied to add breadth to the longitudinal approach of examining stakeholders and their viewpoints in a project, involving an iterative process proposed by Pouloudi (1997). In fact, extensions to the IS stakeholder concept are offered in the context of web ventures, whereby project managers encounter stakeholder concerns iteratively, and are able to understand the changes in their viewpoints over the course of time. This adds credence to the concept of stakeholder concerns, discussed in chapter 2 (section 2.4), and its relevance to the implementation of WBIS. Though, attempts have been made to relate SoC of the CBAM approach to the discussion of the enhanced conceptual framework in Figure 5 by hinting at the possible stages the various steps of the implementation process may be in, no clear relationship could be ascertained from the analysis of empirical data. In fact, the first two stages of concerns, awareness, and informational, on the part of the project managers could not be obtained directly as they were interviewed after the projects had already undergone implementation. However, the remaining stages, namely personal, management, consequence, collaboration, and refocusing, did indeed take place with regards to the concerns of ESS managers. Therefore, it is fair to state that CBAM, an approach originating from the realm of innovative education research, can be applied to research in IS implementation.

8.3.2 Contributions to Methodology

The outcomes of the study, in particular the emergence of the process governing the ESS / WBIS requirements evolution in response to stakeholder concerns (see sections 6.2 and 8.2.2), can contribute to the establishment of a comprehensive web development methodology. Yet, another opportunity for the methodological contribution is due to the
identification of an explicit link between the stakeholder concerns, stakeholder resistance to change and the potential of conflict developing between concerned stakeholders and unresponsive project initiators (see section 6.3.3).

Indeed, one of the main contributions can be to complement the web engineering approach (see section 2.2.1), which stresses the importance of devising a suitable process model for developing large WBIS. Such information systems are inherently complex, and thus, a suitable process model will make it possible to split the project into "manageable coherent phases", and importantly, facilitate iterations between the phases. The model of ESS / WBIS evolution can be used as the basis for such a process model. Web engineering encompasses a number of activities from system conception and development to implementation, performance evaluation, and continual refinement (see section 2.2.1). The enhanced conceptual framework of ESS / WBIS projects, covering prominent stages from strategic concerns to the formulation of business needs, and subsequent translation into system requirements and stakeholder validation of requirements, can indeed contribute in-depth substance to the web development methodology.

The outcomes of the study can also provide material to fill in the gaps in various recently proposed web development methodologies, such as WISDM or ICDM (see section 2.2).

8.3.3 Contributions to Practice

The contributions of this project's outcomes to developers and project managers of ESS applications are manifold.

First, a significant contribution of the study to practitioners is the set of experience patterns, representing confirmed experience in the ESS / WBIS domain. ESS managers perceived the patterns as relevant to their own experiences and useful as assistance tools that can be applied to their own projects (see chapter 7). Hence, the patterns can feed the experience base (see also section 6.3.4), which is often regarded by project managers as an essential component of the resources dedicated to ISD. The patterns will be instrumental in assisting initiators in new ESS projects to anticipate issues of stakeholder concerns, and further guide them in their interactions with potential users. In effect, the
patterns can enable the systematic reuse of artefacts, such as requirement specifications, from one IS project to the other (Cybulski et al. 2003, Cybulski 1996, Firesmith 2002, Lam et al. 1997).

Secondly, the enhanced conceptual framework can supplement the work on web configuration management by Dart (1999), as it provides insights on how the continuous modifications to system requirements and functionality occurring in the implementation of web-based HR and payroll systems are accommodated by project managers. The empirical findings also revealed the importance of staffing project teams with personnel holding different skills, knowledge, and capabilities, thereby complementing the skills and knowledge-base hierarchy proposed by Hansen (1999) (also see section 2.3.4).

The consideration of concerns and consequent reduction in organisational conflict is likely to support or ease the resistance of stakeholders to the adoption of new technology in organisations (see discussion in section 2.3). This is especially important in light of cross-organizational workflow systems and virtual work groups, where there are diverse groups of stakeholders with varying viewpoints, owing to intra- and inter-organizational politics and various cliques are prevalent. The consideration of stakeholder concerns contributes to the understanding and appreciation of the "human" factor in information technology.

8.4 Limitations of the Research

Even though this research project has made significant contributions to theory, methodology, and practice, I am aware of some of its limitations.

One of the main limitations, in this regard, is that the experiences of the other stakeholders, such as supervisors and departmental administrators, clients of outsourced payroll companies, and employees, were not investigated. Although, these experiences can add further depth to the research, especially in light of the fact that the concerns of these stakeholders played a crucial role in the evolution of the ESS, this thesis objectives have been firmly scoped to focus on the experiences of project managers.
Confining the empirical domain to the implementation of ESS applications also reduced the transferability of the findings to other domains of WBIS. Inclusion of other WBIS, such as web-based student information systems and web-based Decision Support Systems, could have strengthened the claims with regards to WBIS in general. At the same time, however, as was clearly stated chapter 4, ESS applications are representative of many types of WBIS.

As discussed in chapter 3, the use of the phenomenological method did not shed light on what the project managers “actually” did as opposed to what they described as their experiences of dealing with stakeholder concerns. Moreover, the research did not probe into the power structures and political relationships, and many other issues prevalent in the organizations and also within the ESS project teams, which are all beyond the focus of this study and the adopted phenomenological method.

Some of these limitations, however, can be overcome by pursuing further research into the realm of WBIS implementation. The next section describes my plans for future research.

8.5 Future Research

Future phenomenological investigations will be directed at investigating the experiences of other stakeholders in ESS projects, namely the supervisors and departmental administrators, clients of outsourced payroll companies, and employees using the kiosk module of the ESS. This will definitely enrich the knowledge pertaining to the domain of ESS implementations, through potential insights into the perspectives of these stakeholder groups. Thus, by understanding how stakeholders, apart from those initiating and driving the web ventures, perceive the introduction of ESS applications, a more holistic knowledge of the domain can be derived.

I shall also pursue the determination of the transferability of the confirmed ESS experience to other domains of WBIS, such as web-enabled student information systems, by undertaking phenomenological research into the accounts of project managers as well as students. This can ascertain whether web systems, regardless of their business purpose,
trigger similar concerns in the respective stakeholder groups, and thus, contribute significantly to research on WBIS.

Other areas of IS research planned in the future include the impact of ESS projects on the political structure prevalent in universities and the innate social processes. According to Hirschheim, Klein, et al. (1996), changes in work structures and relationships brought about by IS projects are emergent, historically contingent, socially situated and politically loaded. Thus, social theories are suitable for explaining phenomena associated with IS projects. In particular, attempts, through complementary case studies, will be made at establishing connections between the implementation of ESS and the structuration theory of Giddens (1984), as well as the theories of change management owing to the introduction of new information systems (Keen 1981, Walsham 1992).

8.5 Summary

This section marks the end of the phenomenological inquiry into the experiences of project managers in their dealings with stakeholder concerns in the implementation and further evolution of web-based information systems, namely ESS.

The thesis investigation showed that the decision to adopt ESS to provide employee support and payroll services is often influenced by the concerns of system initiators, such as HR divisions and outsourced payroll companies. In good faith, such organisations believe that requirements for the innovative web-enabled data entry and processing, as well as, the automated workflows, could alleviate these concerns. At the same time, however, the project managers of the newly established project teams soon discover the challenges of resolving not only initiator concerns but also the concerns of the would-be users who commonly resist the introduction of the web-enabled ESS systems.

The outcomes of the thesis enabled me to understand the perceptions of project managers and the intricacies of stakeholder issues and organizational interactions involved with web projects in large enterprises.
The phenomenological study presented in this thesis will be further explored and its methodological framework will be put to future works of research and practical applications of the knowledge derived in the process.
Appendix A1: Sample Interview Questions

The following questions represent a sample of issues discussed with the co-researchers in ESS interviews.

Q1. What were the strategic and operational benefits that you expected to gain from the introduction of the web-based employee support services?

Q2. How did you gather requirements from the user community (assuming you undertook this)? If no formal requirements gathering was undertaken, how did you go about configuring the system for organizational use?

Q3. What were the main concerns expressed by the users, and what actions did you implement to address these concerns? What were the consequences of your actions in addressing these concerns?

Q4. Were there any concerns that were found to be difficult or impossible to satisfy? How did you overcome this situation?

Q5. How would you evaluate the outcome of this project?
Appendix A2: Sample Interview Transcript

The following text represents a transcript of an interview with co-researchers in the ESS domain.

Interview with O1 Project Manager (ESS)

Q. Lady Godiva mentioned to me that you were quite active with the web-based HR system, which is accessible through the employee kiosks around the campus.

That’s correct. The system (guarded by firewalls) enables employees to enter data through employee kiosks. The kiosks were originally designed to be used internally, but given the nature of the work of academics, we implemented it as a system accessible via the Internet. Plus, the university employs large number of casual staff. However, the system does not quite cater to casual staff. I mean, casual employee records can be accessible through the web, but some other things that are relevant to full-time staff only, such as leave applications, are not available to casual staff.

Q. Probably, the only interest casual staff will have is to see their pay history.

Yep.

Q. Could you provide me with a brief background about how you got involved with the web project, what were the aims of the project, what you intended to achieve, and how you set out to implement the project?

The underlying intent was pretty simple and straightforward – it was an attempt to save money for the university by reducing duplicate data entry and streamlining processes. Some studies we have done involved talking to clients or staff members and also HR managers. We found out that in departments and faculties, without keeping additional records as we were at the centre (HR), the staff members would fill in a paper-based form for leave application, give it to their supervisor, who would make a photocopy of it, then give it to the HOD to sign, the HOD would then give it to the admin assst to enter it into a local database, which in some cases, was as simple as an excel spreadsheet, or word document...some had more complex Access databases, or simply writing it onto a planner on the wall when someone was going on leave. Then we could re-key that information into the HR system. So, it was identified that if we shifted the actual keying in of the information out to the departments who were actually entering this anyway (but, into their own heterogeneous systems), then we would actually be able to reduce transactions at the data entry level within HR. That was the underlying intent. Secondary to that was by putting in a system form rather than a paper form, you can provide a greater deal of validation with the information.... you can place more reliance on the accuracy of the information. Also, the information can be processed more timely. One of the other reasons, which was, more of a spin-off and a justification as part of the business case development, that universities in general, but this university in particular, have an issue with the lightness of advice from the departments, and in practical terms, what that means is generally, if you’re going to leave the organization, and you have two weeks left
to go, you often take some annual or recreational leave in the last few days. In this case, we would be very diligent in paying out our employees benefits when they leave entitlements and then, on the day they leave (it is a requirement for their getting their pay on the day they leave)...then 4-5 days later, through the mail postage, we would receive their leave application stating that they were actually on leave on the last 3 days of their tenure with us yet we had paid for their working with us for those days. So, we end up chasing them as they have taken the pay as well as the leave. Thus, one of the benefits of designing the system was to enable HR staff responsible for making payments to essentially see into the electronic in-trays of managers in the university, and check if there are any outstanding leave requests. Now, this does not go all the way to eliminate the problem, but it goes some of the way. So, previously we had no idea that an application for leave was sitting on someone's desk waiting to be decided upon, but now, we do because it is sitting on the electronic in-tray and accessible by us (HR) as well as by the supervisor who can approve it straight away. So, that was certainly a benefit in terms of the cost and the amount of effort spent in recovering over-payments significantly. So, the cost factor was behind our going for the system. Efficiency was another one...we could actually get information quicker to HR as it eliminated all the information flow blockages. The 3rd was with regard to approving the process in terms of supervisors of these transactions that we put through the system...being able to rely on information that is entered into the system or put on hold. If you apply for 10 days leave but actually have 5 days remaining, the supervisors have to go and look into the matter, whereas if the application is coming through the system (electronic workflow and presented on web interfaces), they can rely on it because you actually got those specified number of days leave. This is because if you applied for leave duration that's greater than the number of days entitled, the system will reject your data. So, the system can enforce rules that its paper-based counterpart was unable to do. Therefore, the supervisors can rely on the information coming through the web workflow system, and this enables them to make their decisions faster. So, they save the time spent on looking through employee records to ascertain whether they could approve a leave application presented on a paper form. So, there were all those aspects. But, by far, the primary aspect was cost savings within HR and there has, in fact, been a budget cut for HR to compensate for the fact that we have now disseminated that data entry to the individual departments.

Q. So, in that respect, you have achieved your business needs?

Yes and no. What ended up happening...through doing this and talking with others...colleagues in other universities and organizations...it is actually very difficult to get that change...to actually get that ROI because you get a shift of work. Yes, we have been able to reduce resource levels that were required for data entry, but we've has an increase in resources for technical support training area to educate people how to do this. To some extent, that's a cost-integral change but there are development opportunities for HR staff...it's more value-added work for them. Rather than sitting in front of a PC entering in data form a form, they are out there interacting with employees and staff and training them how to use the system. This gives HR more of a personal front than just sitting in front of a computer keying in data from a paper form. We found that there has actually been more of a shift of work from one to the other rather than essentially saving workload. But from HR perspective, that was a good outcome anyways. We did actually plan to have a reduction in workload, but that did not actually take place as expected.
Q. So, the reduction in the work owing to the shift of data entry to users themselves was not as much as you expected?

No, there was a reduction in work in that respect (keying in data), but there was additional support required for the automation of the processes (as we changed the business processes). We probably did not anticipate enough what the impact of the change in business processes was going to have on our other bits of the business. We looked at the end results and said that this particular item will be eliminated or reduced but all these other little bits along the way were harder to quantify (have they changed?) Maybe we did not quantify them as well as we should have, and say that these particular transactions and activities have become more complex and require some additional support. We now have to maintain peoples’ user names, passwords, and assistance to users to teach them how to do it, answer phone calls when people don’t know what to do, maintain a list of approval hierarchy, rather than just relying on a filled-in paper form and giving it to the right person.

Q. When you started building this system with these aims, did you conduct any form of requirements elicitation?

We had 3 phases, I suppose of the requirements elicitation process. The 1st was putting out an electronic approval process into the university, and putting transactions online through departmental administrators...so they’ll be entering transactions online as they were being approved. This did not impact on all staff...it directly impacted people particularly with regards to casual payroll, which is a large transactional volume task at the uni. The 2nd phase dealt with delivering the employee kiosk, which is the individual employee’s transactional generation tool for maintaining his or her own information and applications for leave, and that had 2 phases to it in terms of its level of functionality. With regard to the first phase in terms of seeking out requirements from the user community, we invited all stakeholders to our sessions where we discussed the future direction that we were trying to take, and make sure that they accepted and understood what the development would mean to them without being able to give them a great deal of detail because we had not designed the system...it was conceptual...we were putting forward this concept that we were going to reduce your data entry, or your data entry may not necessarily be reduced because you are putting in data to a centralised HR database now, instead of into a Microsoft access database. But, the university will be better off with this project, and here are the other benefits for you in terms of the ways you can manage the information and get reports out and that sort of thing. So, we asked them to endorse that and they were more than happy with us to go ahead with the development...they understood the benefits, they understood what the costs were as well as the weaknesses, and had some understanding of the scope of the project...how long it was going to take, the phases it was to go through, the time frames and so on. So, there were no illusions or misconceptions that there were going to get a system that was going to cut their workload in half. So, we did a pretty good job of managing their expectations. That was a pretty important part of the project. We then asked each group of users to nominate amongst themselves 10-12 users as representatives and they formed the pilot groups. We ran through the business requirements with these pilot groups...they helped us find how they want the system to work and how it should behave.
Q. So, did you administer a prototype with these pilot groups?

Not yet. These groups were there to establish the requirements of the system, and to assist us in developing the specifications.

Q. Were these stakeholders the departmental administrators?

Yes, departmental administrators and departmental managers. So, the processes impacted on these people responsible for collecting the information, and those people responsible for approving the information. So, we invited them both along and said that this (the system) is going to change the way things work. I must admit that the reaction was different from both groups. The administrators were more than happy for it. The approvers were happy about it until they saw precisely how easy it was to undertake the process by logging into the website.

Q. Were the approvers academics?

Yes, they were academics. We did not have 100% turnout in our stakeholder group, when you consider that our stakeholder invitations were extended to 150 people. I think it was in 1997 that we started doing this. We had 40-50 people who were representative of that group (approvers), which was still a good turnout nevertheless...a significant sample of that group. They nominated 12 people who helped us with the more detailed specifications, and as that progressed along...by the time we got to...we invited those 12 people and expanded to some other people...so we had about 18 odd people, who were representatives of various departments and faculties, who attended our prototype session, where we demonstrated the prototype as it had been specified by the 12 people. They gave us some more feedback, which we enabled us to make adjustments to the prototype. From that, we gave approval from the organization and senior management to actually rollout a pilot program, which had 6 out of those 12 people actually using the system in duplicate, because there was some nervousness in the organization about the accuracy of this process and how it will work. For an almost 6 month period, the 6 people did their normal paper approval process, and the electronic process in parallel. We did not pay twice (of course) because the electronic process was live but before any of those payments were made, we would cross-reference with the paper work to make sure that payment was not made twice. Very heavy task but that was the university being risk-averse. They were concerned because the money that was being paid was leaving the organization. Previous phase of the electronic approval, the first phase of anything the university incorporated transferring money between the departments of the organization. So, if something went wrong, they figured they could get it back, whereas, with us, if something went wrong, if the employee had left the organization, it's hard to get the money back. So, from a risk-averse perspective, they made us do this dual process of which we have had 100% compliance from our group, and also at the transactional level, which had no problem with the process. So, it worked pretty well and we were able to convince them otherwise. Then, we rolled it out to the rest of the university. What then happened was that the people, when we had started to roll out, who are proactively involved...the power groups...the stakeholder groups who did not bother attending started to hit back at the organization and say "you are just giving us more work. Who approved this (project)? Why are we doing this, cause we don't want to do it." We were actually able to go back and say, "Well, this is the consultative process we've used over
the last 18 months. You were invited to attend, (and we were able refer back), and you chose not to attend. We can't reach out to every single person in the organization personally, and get their opinions. So, it becomes a very valuable tool in convincing the opposers and eliminating the resistance after we had actually gone live with the system, and we grew reasonably rapidly to having 60-70% of the transactions performed electronically. So, that's where we are sitting about now. They are picking up the remaining 30% is justified. We've got most of the large areas given that our intent was to reduce data entry and cost efficiencies. We had been able to achieve this in the larger departments (where it's important to gain large efficiencies), but if you go to the smaller departments where they process a transaction very couple of weeks, you probably spend more time out there training and re-training them (after they've forgotten the instructions you've given them in 3 weeks time) how to use the system. Then, you are actually doing processing on one part of the form every 3 weeks. So, there's a balancing area we hit that 80% of people that can be affected by 20% of the work. The other 20% require 80% of the effort. So, we sat back and said that it's good enough, we have received the benefits, and now to get any further, we were at acceptance and usage by the user community. It's not worth the effort to get all involved...we've used the method we can efficiently in our modifications - large training courses attended by a significant number of people, etc. We were then offering individual training for those people, who are, obviously, using the system.

Q. I presume a lot of the people you trained were administrators?

Yes, departmental administrators plus departmental managers.

Q. The interface they need to use is web-based or the standard GENESYS interface?

The interface for the administrators is the non-web GENESYS one. But, the approval process (approval for timesheets and so on) is web-based. The next phase was the roll out the employee kiosk, which is web-based. We went through a very similar process. However, we did not communicate to the entire stakeholder group, which includes 7000 employees. The strategy for implementation was that there was another way of doing this. So, we were still going to accept paper forms and the normal process for updating information, but if they (users) wanted to it electronically, they could do so. We then rolled it out without having to go much into as much expectation management or requirements specification of how people wanted it to behave. This was because we were not intending to force them into using the kiosk. But, we did establish user groups to work through the work through the functionality of what they wanted to do, what they though was reasonable, what sort of functionality does it have, how does it default to things, how should information get through the system, how should it appear, where should the cursor go when they move from one field to another, what should the drop down lists look like - we did not go through these things with the group to get some information. We did that in right or wrongly ... we found out that the second group of people we asked these questions, identically reflected the group of people within HR that we had also used in the combined approach. So, let's use HR users who understand the data and the system, and let's use some external people and see if they come up with the same thing, which they did. Thus, it became a lot easier then to use our central HR staff as a pilot group. But, whilst we had already determined that they were a fair representation of the university community. So that group of people were then our "guinea pigs" and worked through the various automated processes - we did a similar thing again, we pilot tested the
system...we set up a pilot program and ran it exclusively with two sets of ...which we then brought onboard later for a two-month period, and then communicated that out to the university. That was a lot easier due to the fact that it was an optional thing. We showed that this was an additional way to undertake the work processes. We received a lot of positive feedback. People embraced it...they wanted it. Those people who did not want it, they did not have to involve themselves with it. So, they did not put up any resistance to it. There was some resistance to the authentication technique the university used to identify oneself, because it required the use of a limited set of data that...

**Q. You mean digital signatures?**

No, not digital signatures. We used digital signatures for approval, but not for generation of transactions, such as leave requests, change of address or banking information...that sort of information. The way we authenticated people in an effort to try and roll out the functionality across the board without having to administer and deliver user names and passwords to all those sorts of people and our internal auditors required us to not use the same passwords (usernames may be the same) as our mail network, which we used as a second authentication device. When you forward a transaction in the system, you get an email in your inbox stating that you performed a transaction in the system...this is for security reasons. This is something that people wanted to know. They considered it important for matters such as banking information - you can redirect your salary to a new bank account. The concern was “what is someone diverts someone else's salary to his/her bank account...how do I know about it?” So, we incorporated a feature whereby an email is sent to the person whose salary is being diverted. While it’s not a full-proof feature, it assures people of the little likelihood of that happening. So, not only does an unauthorized user need to hack into the system under your user name and password into the employee kiosk and perform a transaction, he or she also needs to intercept your email. Because of some concerns stakeholders had during the information sessions in the rollout, we instigated some quality control type of features that will actually look for anomalous situations such as if you change a person’s banking information to an account under a different name, it highlights that and we chase it up, and we contact the person whose account is being accessed. So, if I have a bank account under the name of Brown, and I change it to Smith, we make sure that it is a legitimate change. However, if I change it to a joint account between Brown and Smith, we would not worry about it. So, we built in some controls to alleviate user concerns about security. This instilled their confidence in the system.

**Q. So, in order to ensure security, you set up two different sets of access – the access details for employee account is different from those of Internet account?**

Yes, to start with, the university does not have any Internet account as such. Rather, it is the email account you are referring to. Yes, the passwords for the employee kiosk are different from that of the email account though the usernames are the same. So, each user has the same username across all the systems (university keeps a unified username space). But, password does not have to be different but it can be different. This is recommended (different passwords), but the technical impediment we’ve had is that we can’t force them to be different without doing massive amounts of work. Password management becomes an issue. There are two schools of thought in the university, one that passwords should not expire...because if they do expire, then you can create very secure ones. But, if you force them to expire every two months or so, it forces users to write them down which is
less secure. So, there's the school of thought, which says that we are not going to force these passwords to be different as ... there are already some precedents without the usernames and passwords.

_Q. When I was at dept X, we would fill in online timesheets every two weeks (pay cycle) and submit it to the departmental administrators, who, in turn, would manually key in the data into the university web-based HR system._

That was phase two of our project -- the “repeat” function. What the administrations would now do is that they would replicate the pay data from the previous pay cycle to this period. What he or she will need to do is change the data that is different for this period. For those receiving regular payments from one period to another, the administrator's task will be easier. This is part of the user requirements to save them from having to manually key in routine data, and what they did is ... we split it into two ... what we said is that we deliver this basic functionality faster than the more complex one ... so we delivered the basic one ... got some benefits out of that because there were lots of areas out there that had not need for that sort of repeat activity. But, a lot of the big departments, who had built their own system to support this process, information system being one of them, waited till phase 2 came in with the “repeat” function was more closely aligned to the way they did things ... it was less of an impediment to them. They still had some resistance ... by some people who had developed very complex systems and very few people in the organization actually ... in fact, one person of the 190 users we’ve got of the system (same number of approvers), one person stated during this whole process -- “who’s better off out of this?” To this, we responded by saying -- “you are not much worse off to the way you do things now, HR is a lot better off as they don’t have to double-enter the data”. As a whole, the university is better off. Then, the person said “well, it sounds like a good thing then”. So, he agreed to go along with the project on that basis. The main thing we had to battle was when the stakeholders asked “what’s in it for me or for my department?” If there was not much to be gained by them, they showed resistance to the system.

_Q. It's quite natural for people to think like that ("what's in it for me?")). So, these were some of the concerns you uncovered during the 3 phases?_

Yes.

_Q. Were the parallel processes (web-based workflow and the old way of doing the same things) carried out after the prototyping stage?_

Yes, we prototyped the system, demonstrated it to our clients or stakeholders, and they came returned with a number of changes. Some of these changes we incorporated quite easily at that point ... some we took on board and implemented in phase 2 of that particular part, of which one was the “repeat” function. Once we got into the prototype and had a chance to look at how the system was going to actually perform and behave, they then said that -- “would it not be nice if it could this and that? Of course, at that moment, that was going to be an impost to us”. So, we told them that we could develop the system to do what they expected or wanted. That's fine. What we'll do then is roll out ... I mean, the system was aimed at benefiting the at least half of the university ... so, there was no point
in holding it off as only half the organization were the beneficiaries ... so we rolled out the basic form of the system ... we then instigated the dual process with some of the simpler departments which were less complex in their requirements, but they were not necessarily the smallest departments ... in fact, one of them (one of our pilot groups) employed the largest number of casual staff ... nearly 10% of their staff were casual, but they had no automated system. Therefore, the system was a big benefit to them. So, there was an advantage in getting them out. By getting this dept on board, we automatically reduced 10% of the data entry in HR ... so, there was a big goal to be kicked immediately. Within the next 9 months, I think it took us to develop phase 2, which brought in the additional requirements that had been borne out through the pilot program and the dual processes and those other bits and pieces. Obviously, we fixed errors with the system immediately, but the more development work took a bit longer to roll out.

Q. Some of the enhancements were added gradually?

Some were added gradually ... we probably added very few enhancements. Naturally in evolving systems you gave some things that don’t perform quite the way you’d like them to. I mean, these were bugs, to all extent and purposes, but these were only bugs in their functionality, in terms of instances of circumstances if you did an unusual sequence of data entry, things will not work the way they should and you’ll have to start again. So, fixing up those sorts of bugs ... the enhancements to functionality we rolled into phase 2. So, we got it embedded down and then changed functionality later on with another process. This did not really change much of the functionality from the original, but added additional functionality ... so you could do the same thing in a different way to meet different stakeholder requirements. We added another way of doing the same thing because different people have different ways of doing things. While some of the features changed, some remained the same, and we decided that it was worthwhile putting the effort into the improvements, as it was actually an improved way of doing things. It has the end result of being able to eliminate another process we do now, which is probably not one of the best processes ... this is something we’ll have to undertake at some later stage ... will require some amount of work, because it is tied up in agreements. We built ourselves an opportunity to eliminate that process at a later stage.

Q. As you have the ESS along with its constituent Employee Kiosk, and you also have the approval, which are done on the web. Did you provide training for using the web interfaces?

We certainly did. That has been the prior reason behind the slow adoption of the system. The university again with its risk averse nature, was convinced that digital certificate or signature technology was required to maintain its appliance levels. Therefore, for all our signatories, we were required to distribute and install digital certificates on their machines for approval purposes (for security purposes). I am not sure how familiar you are with digital certificate technology, but, don’t get me wrong, it’s far more secure than usernames and passwords. In such aspects, people argue ... they always were ... I believe it is more secure. However, the administrative burden around maintaining digital certificate technology, at the level of technology that was around at that time, far exceeded any benefits from the increased level of security, and this burden fell on the HR department. We were not resourced to take care of this ... we were therefore really only resourced to implement for the areas that wanted to embrace it, because if you are trying to convince
someone to do what they are unwilling to do, and you tell them that it going to take half an hour of their time for someone to come over and play with their computer to install digital certificates onto them, and then teach them how to use it, they will not be keen to get involved. So, that was much of impediment to do this. Moreover, that was not a particularly attractive feature in design and development that (good you are not going to name our organization in this) activity was railroaded by the IT division. That was not a business requirement of HR...it was not a requirement by financial operations for their parts of the process for which they utilize digital certificates as well. Since, the IT division (developers) knew how to use the technology (in line with their culture of going for cutting-edge stuff)...everyone else should use this...this was their justification. This impeded our progress in the rollover and further evolution of the web system. We would have been a lot more advanced than we are had we not had to bother with the digital certificates...complicated things these are. So, making sure that the business side drives the agenda of the development, take advice and leads from the IT area. While the IT area can provide the data that drives the agenda because...when it comes to creating a very big rift between central admin areas...we were not resourced to support the process...we already had our resource levels cut because we were supposed to have this functionality...we had a deadline set for the end of the year to deliver it...so for the next year, we had our staffing levels cut as we supposed to have this functionality included...we had done this but we rolled out to 10% of the organization. So, instead of losing an eighth of a person, theoretically we should have lost a tenth of a person. But, we never lost a full person. In the end, we had the benefits out of them, as we could not support the process. We definitely received negative feedback from our stakeholder base regarding the digital signature process because the process was a lot more complicated than they thought.

Q. Why? Did approval using digital certificates appear to be cumbersome for the supervisors?

Well, the issue became, regarding the management of the process, in the contingencies of the people on leave. For instance, if I am to approve a transaction on honour of you, and that transaction needs to be approved today, you can’t readily transfer the digital certificate mechanism to someone else if that person has not been set up for. It takes half an hour, and they need to be present coz they need to key in the password, they need to approve themselves, because the process was forced to jump through these hoops. So, they complained that the feature was of no advantage to them as it was so difficult to administer. We ended up putting a person on a full-time basis for a period of time to actually try and break the back of the technical impediment that we were faced with. Nevertheless, we still suffer from it now, and the university has, in fact, decided not to continue with the digital certificates...the IT div has learnt its lesson, hopefully, that this was not the way to go. But, it’s a case of us developing the business requirements, which were altered not because of the business itself, but due to the other external influencing factors, and we paid the price for it for allowing it to happen, but we had no control about it...we thought it was a not a good thing to actually go down this path. We could not justify the reason why because at that particular point in time, industry was heading down the same track. Banks were doing it, namely the Commonwealth Bank, and the ATI. So, the technology was adopted by the university, but by the time they pulled the plug on it, we were not quick enough...we had just gotten there. Thus, that’s an important thing to note when it comes to business processes, business people should be the ones who should be consulted for specifications on the design of the processes. We found from our
experience that our IT area with our IT support that, not trying to criticize or blame anyone in particular, but invariably there's an interpretation made by the system developers (programmers and analysts) on the way they think we intended something to do. If they don't seek the clarification on it, more than half the time it goes the wrong way.

Q. Who needs to ensure the clarification?

Given the way our structure where we design the business rules, and we have senior analysts who do the technical specifications, we have a very close relationship with my technical counterpart. Moreover, my technical counterpart has a very good understanding of the business rules... so we don't have much of an issue. But, when the decision has been made below the senior analyst level, there could be some ambiguous decisions made... this does not happen all the time, but more than half the time such a decision has been made, it tend to be made in the wrong direction because it is made strictly from a technical system perspective rather than a business perspective. Thus, it is important to make sure that the clarification is sought back from the business so as to ascertain what should be done there.

Q. This is an issue in a lot of projects. There's always that gap between the technical perspectives and those of the business stakeholders. That's where my PhD looks at to address this gap.

Our senior analyst has been in the business long enough to know what we do on a daily basis. She knows what we try and support on a day-to-day basis, and thus, his interpretations are likely to be more accurate. We tend to find, from our experience, that our programmers, who have not been involved with business issues at the same level, don't make the same sort of decisions. We tried for little while to engage them in the business but the response has been largely against us. As part of the induction program for new IT staff, we bring them into the business for little while so that they can see what we do, and understand the way we do things. Unfortunately, we suffer from that fact that we don't have the type of people who start at the university and are expected to hit the ground running (understand business rules and SOPs sooner). We are yet to convince the management structure that the long-term benefits of getting someone who understands the business, far and away from the fact in the first three weeks of their starting work with us, they're not doing any programming, they could, instead, be directed toward familiarity with the business rules and SOPs. So, we have tried to do that, which is conduct induction program for the first 3 weeks of their starting work with us, with a few people when time permitted us to do it. It's hard to tell whether this has made a difference or not.

Q. You need top management for this. Basically you training these techies in business processes and there's the learning curve and time frame involved. There's also the risk that not all of them will get familiar with the business.

Yes. There are self-service functions... employee kiosk functions ... this is a good supporting case for us... did not suffer the same fate because the people working on the code and scripts were employees themselves and thus, were familiar with the needs and expectations of a typical employee using the system. They were able to study things and say, "hey, I don't think this does not work very well". They were able to make sensible
suggestions as to the different way(s) of doing it or alternate ways of doing of because they were able to see things from the perspective of the employee user. Whereas, with the same group of people dealing with the core HR business functionality, they don’t sit down and get involved with HR tasks and activities such as recruitment or performance appraisal or payroll. They don’t get involved in these...so, they can’t put themselves in the shoes of HR staff. But, for the employee self-service activities, they were able to do it, and they had a more efficient period of programming. They were able to understand how things with such a system worked. They were able to understand what the business catch was, why we were doing it, for whom were we doing it.

Q. The Employee Kiosk...does it include payroll workflows?

No, it does not include things like timesheets. It was originally intended to do so, but the only reason it has not done so for the university thus far has been resources. The intent was certainly there...we have had, within our development group of which I was part...the manager of our group left...I assumed the role of manager...the next most experienced person to me left, and we went down from cumulatively of 14 years of experience to 6 years, and basically lost a lot of that organization knowledge, and the value-added developments, such as the delivering pay slips or timesheets through self-service took a back seat to core business operations and I had to step up to a managerial role rather than a system design specification role and the people who stepped into my role, probably did not have the experience and the background and the time to do these. So, it’s certainly not from a lack of not wanting to do these or looking at the value of it...the university sees the value of it. Rather, it’s a question of having the resources to do it. Now the university, and that’s been declared in the last 2 years...1 year ago the university launched its program with the ERP project, and they decided to put a halt to in-house development work on our core systems, as we’ll be replacing our system with the ERP solution. So, given that most of the development resources are now going to the ERP project, there’s not going to be anyone doing it anyways, therefore we put it on hold. So, the business specifications are done for delivering the payslips, but we don’t have anyone to do it...they are not completed. If they were completed, we could have asked the development team to work on it. So, they’re not fully completed...they are partially done. Payslip delivery was the next thing we were going to do.

Q. Can they see log in and view their current pay slips, pay history, etc.

Yes, they can. That was directly, again, based on a financial decision. University spends close to $29000 a year on pay slips, which includes stationery and postage. Therefore, if we can eliminate that, it will be cost-effective.

Q. Is there any legislation about online payslips?

There was some legislation about requirements for payslips...we had this sussed. The legislation at the time, and this is couple of years ago now, did not actually commit to the online delivery of pay slips.

Q. I was wondering about that?

However, the legislative body at the time, basically said (that was only because the legislation was so out of date, not because we really wanted it to stay that way) “ if you
progress along the path of delivering online payslips, we will not comply with legal requirements, but you probably may in a couple of years time when they get around to update it. This is because technology has progressed so much that they (legislative body) have been unable to keep pace with their legislation. There are several organizations that are doing it now. So, the legislative body knows it is happening, they are not concerned, as they want it to happen. But, they just have not gotten around to it, owing to bureaucratic bottlenecks. The university decided to go ahead with it, despite the fact that it was non-compliant with legal requirements for a payslip... they wanted to give it a try. One of the other things that they looked into in view of the legal compliance issue is the offering of option: payslip can be obtained either online or mailed as hard copy. You can select to receive it electronically or via postal mail as a hard copy. We cannot, however, make electronic payslips mandatory. But, we are aware of the fact that a lot of universities in Australia are providing payslips online.

Q. Basically, it's fine to have an online payslip because all you need is a record of the payment. But, it becomes a problem when you furnish a printed copy to apply for a loan or anything legal.

Yes, you should definitely be able to print them.

Q. Well, in most cases, these payslips can be downloaded in an acrobat reader format.

Sure. One of the reasons for putting the payslips online was cost, a primary reason, the other was it enables us to deliver more information. You're fairly limited to what you can feed onto a hard copy payslip. With online payslips, we can provide a whole lot of information including forms, drill-downs, and links, and so on. We went part of the way and revised our current pay slip, which if you do some tutoring at the uni, you'll notice that we have complied with some of the requirements that the users have been asking for. We've included things like banking information, superannuation, and so on. Some of these we could do relatively easily, but others were a bit more needing development. This is because all the development that is done within the HR system is approved through senior management of the organization. So, it's not just at the level of HR. We deliver a business case requesting for funds to develop the application(s)... we put through a development plan 18 months in advance... so we say that we are actually submitting now (mid-2002) what we are going to develop in 2004. We reckon that the approval process takes a bit too long as technology move so fast in 18 months... you asked to do one thing, but something else (tech development) suddenly comes up and makes things easier to do.

Q. I guess this applies to online timesheets as well. If you make it mandatory for the users to fill in timesheets, they'll probably object to it. It can probably be done in depts where the users are technically proficient, but it may be difficult to mandate this elsewhere.

It's very much a cultural thing at the university. More than the technological impediments, we have the cultural impediments. People not willing to do things differently to the way they have been doing it in the past. As you said, there are varying degrees of technical expertise and competence within the organization. I mean we've got
heads of depts and deans who have no computers at their offices. So, when you ask them to approve things electronically, they voice their strong objections. Keep in mind that some of these people are high up in the organization and hold great influence. So, this is the biggest impediment in our organization – cultural change, being able to do things differently than the way they’ve always done it. There’s also a bit of a role and responsibility issue here… many academics being forced to divert their time to administrative matters (owing to govt. budget cuts translating into fewer admin staff)… they are being asked to sign off and check pay sheets, which is not their core business of teaching and research. They are not administrators. So, there are sometimes political issues that prevail due to this.
## Appendix A3: Sample Coded Transcript

The following text represents a sample coded transcript of an interview with co-researchers in the ESS elicitation session.

### List of Codes Used

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List of Codes Used

- dev: incremental  dev-incr
- dev: prototype    dev-proto

Other UI Features
- OthUI: Links          OthUI-links
- OthUI: Associated     OthUI-Aserv
  services             OthUI-Use

Interview with Project Initiator (O1): Coded

*ad-IniMot* “The underlying intent was pretty simple and straightforward – it was an attempt to save money for the university by reducing duplicate data entry and streamlining processes. Some studies we have done involved talking to clients or staff members and also HR managers “...Business Need.”

“So, it was identified that if we shifted the actual keying in of the information out to the departments who were actually entering this anyway (but, into their own heterogenous systems), then we would actually be able to reduce transactions at the data entry level within HR. That was the underlying intent.”

*Ad-IniMot.* Also a requirement solution to the business needs to reduce cost and streamline processing (see above).

“Secondary to that was by putting in a system form rather than a paper form, you can provide a greater deal of validation with the information... you can place more reliance on the accuracy of the information. Also, the information can be processed more timely.”

*Ad-IniMot.* Reflects the business needs.

“One of the other reasons, which was, more of a spin-off and a justification as part of the business case development, that universities in general, but this university in particular, have an issue with the tightness of advice from the departments, and in practical terms, what that means is generally, if you’re going to leave the organization, and you have two weeks left to go, you often take some annual or recreational leave in the last few days. In this case, we would be very diligent in paying out our employees benefits when they leave entitlements and then, on the day they leave (it is a requirement for their getting their pay on the day they leave)... then 4-5 days later, through the mail postage, we would receive their leave application stating that they were actually on leave on the last 3 days of their tenure with us yet we had paid for their working with us for those days. So, we end up chasing them as they have taken the pay as well as the leave.”

*Ad-IniMot* (strengthens the business need for a computerized system). Also reflects a problem with the business process of pay or leave approval, thus *wkObs*.
"Thus, one of the benefits of designing the system was to enable HR staff responsible for making payments to essentially see into the electronic in-trays of managers in the university, and check if there are any outstanding leave requests."

*Ad-IniMot.* Also, a solution to the problem in the previous anecdote, thus *wkObs* and *wkSt.* Source of info to the Electronic In-tray pattern.

"So, previously we had no idea that an application for leave was sitting on someone's desk waiting to be decided upon, but now, we do because it is sitting on the electronic in-tray and accessible by us (HR) as well as by the supervisor who can approve it straight away."

*Ad-IniMot.* *WkSt.* Also, a solution to the problem of ‘double payment’ prevalent in the pre-web HR workflow. It also meets the business needs of cost reduction and streamlining processes, as evident below:

"So, that was certainly a benefit in terms of the cost and the amount of effort spent in recovering over-payments significantly. So, the cost factor was behind our going for the system. Efficiency was another one...we could actually get information quicker to HR as it eliminated all the information flow blockages."

"The 3rd was with regard to approving the process in terms of supervisors of these transactions that we put through the system...being able to rely on information that is entered into the system or put on hold. If you apply for 10 days leave but actually have 5 days remaining, the supervisors have to go and look into the matter, whereas if the application is coming through the system (electronic workflow and presented on web interfaces), they can rely on it because you actually got those specified number of days leave. This is because if you applied for leave duration that's greater than the number of days entitled, the system will reject your data. So, the system can enforce rules that its paper-based counterpart was unable to do. Therefore, the supervisors can rely on the information coming through the web workflow system, and this enables them to make their decisions faster. So, they save the time spent on looking through employee records to ascertain whether they could approve a leave application presented on a paper form."

*Ad-IniMot.* *Ad-UsMot.* Certainly meets the business needs as well as motivates supervisors to adopt the system. *ValidWeb & ValidDBMS* (makes sure that employees are not allowed to apply for leave days greater than what they're entitled to) Solution to the validation problem of whether the number of leaves applied for is as per entitlement.

"...the primary aspect was cost savings within HR and there has, in fact, been a budget cut for HR to compensate for the fact that we have now disseminated that data entry to the individual departments."
Cost saving is the big one, and thus, no more money to be spent on data entry operators!!!

So, in that respect, you have achieved your business needs?

Yes and no. What ended up happening...through doing this and talking with others...colleagues in other universities and organizations...it is actually very difficult to get that change...to actually get that ROI because you get a shift of work. Yes, we have been able to reduce resource levels that were required for data entry, but we've had an increase in resources for technical support training area to educate people how to do this. Ad-IniMot. DatEnSupp. adm To some extent, that's a cost-integral change but there are development opportunities for HR staff...it's more value-added work for them. Ad-IniMot Rather than sitting in front of a PC entering a data form a form, they are out there interacting with employees and staff and training them how to use the system. This gives HR more of a personal front than just sitting in front of a computer keying in data from a paper form. Ad-IniMot. We found that there has actually been more of a shift of work from one to the other rather than essentially saving workload. But from HR perspective, that was a good outcome anyways. We did actually plan to have a reduction in workload, but that did not actually take place as expected. Ad-IniProb. adm.

So, the reduction in the work owing to the shift of data entry to users themselves was not as much as you expected?

No, there was a reduction in work in that respect (keying in data), but there was additional support required for the automation of the processes (as we changed the business processes). We probably did not anticipate enough what the impact of the change in business processes was going to have on our other bits of the business. We looked at the end results and said that this particular item will be eliminated or reduced but all these other little bits along the way were harder to quantify (have they changed?) Maybe we did not quantify them as well as we should have, and say that these particular transactions and activities have become more complex and require some additional support. We now have to maintain peoples' user names, passwords, and assistance to users to teach them how to do it, answer phone calls when people don't know what to do, maintain a list of approval hierarchy, rather than just relying on a filled-in paper form and giving it to the right person. Ad-IniFor. DatEnSupp. adm.

When you started building this system with these aims, did you conduct any form of requirements elicitation?

We had 3 phases, I suppose of the requirements elicitation process. The 1st was putting out an electronic approval process into the university, and putting transactions online through departmental administrators...so they'll be entering transactions online as they were being approved. This did not impact on all staff...it directly impacted people particularly with regards to casual payroll, which is a large transactional volume task at the uni. The 2nd phase dealt with delivering the employee kiosk, which is the individual employee's transactional generation tool for maintaining his or her own information and applications for leave, and that had 2 phases to it in terms of its level of functionality.
With regard to the first phase in terms of seeking out requirements from the user community, we invited all stakeholders to our sessions where we discussed the future direction that we were trying to take, and make sure that they accepted and understood what the development would mean to them without being able to give them a great deal of detail because we had not designed the system...it was conceptual...we were putting forward this concept that we were going to reduce your data entry, or your data entry may not necessarily be reduced because you are putting in data to a centralised HR database now, instead of into a Microsoft access database. But, the university will be better off with this project, and here are the other benefits for you in terms of the ways you can manage the information and get reports out and that sort of thing. So, we asked them to endorse that and they were more than happy with us to go ahead with the development...they understood the benefits, they understood what the costs were as well as the weaknesses, and had some understanding of the scope of the project...how long it was going to take, the phases it was to go through, the time frames and so on. So, there were no illusions or misconceptions that there were going to get a system that was going to cut their workload in half. So, we did a pretty good job of managing their expectations. That was a pretty important part of the project. We then asked each group of users to nominate amongst themselves 10-12 users as representatives and they formed the pilot groups. We ran through the business requirements with these pilot groups...they helped us find how they want the system to work and how it should behave. dev-incr and dev-incr

So, did you administer a prototype with these pilot groups?

Not yet. These groups were there to establish the requirements of the system, and to assist us in developing the specifications.

Were these stakeholders the departmental administrators?

Yes, departmental administrators and departmental managers. So, the processes impacted on these people responsible for collecting the information, and those people responsible for approving the information. So, we invited them both along and said that this (the system) is going to change the way things work. I must admit that the reaction was different from both groups. The administrators were more than happy for it. The approvers were not happy about it until they saw precisely how easy it was to undertake the process by logging into the website. ad-UsMot

Were the approvers academics?

Yes, they were academics. We did not have 100 % turnout in our stakeholder group, when you consider that our stakeholder invitations were extended to 150 people. I think it was in 1997 that we started doing this. We had 40-50 people who were representative of that group (approvers), which was still a good turnout nevertheless...a significant sample of that group. They nominated 12 people who helped us with the more detailed specifications, and as that progressed along...by the time we got to ...we invited those 12 people and expanded to some other people...so we had about 18 odd people, who were representatives of various departments and faculties, who attended our prototype session, where we demonstrated the prototype as it had been specified by the 12 people. They gave us some more feedback, which we enabled us to make adjustments to the prototype. dev-incr. dev-proto. From that, we gave approval from the organization and senior
management to actually rollout a pilot program, which had 6 out of those 12 people actually using the system in duplicate, because there was some nervousness in the organization about the accuracy of this process and how it will work. *ad-UspProb*. For an almost 6 month period, the 6 people did their normal paper approval process, and the electronic process in parallel. *ad-Ussoln* We did not pay twice (of course) because the electronic process was live but before any of those payments were made, we would cross-reference with the paper work to make sure that payment was not made twice. Very heavy task but that was the university being risk-averse. They were concerned because the money that was being paid was leaving the organization. Previous phase of the electronic approval, the first phase of anything the university incorporated transferring money between the departments of the organization. So, if something went wrong, they figured they could get it back, whereas, with us, if something went wrong, if the employee had left the organization, it’s hard to get the money back. So, from a risk-averse perspective, they made us do this dual process of which we have had 100% compliance from our group, and also at the transactional level, which had no problem with the process. So, it worked pretty well and we were able to convince them otherwise. Then, we rolled it out to the rest of the university. What then happened was that the people, when we had started to roll out, who are proactively involved...the power groups...the stakeholder groups who did not bother attending started to hit back at the organization and say “you are just giving us more work. Who approved this (project)? Why are we doing this, cause we don’t want to do it.” *ad-UspProb bringing about ad-IniProb* We were actually able to go back and say, “Well, this is the consultative process we’ve used over the last 18 months. You were invited to attend, (and we were able refer back), and you chose not to attend. We can’t reach out to every single person in the organization personally, and get their opinions. So, it becomes a very valuable tool in convincing the opposers and eliminating the resistance after we had actually gone live with the system, and we grew reasonably rapidly to having 60-70% of the transactions performed electronically. So, that’s where we are sitting about now. *ad-Ussoln and ad-IniSoln* They are picking up the remaining 30% is justified. We’ve got most of the large areas given that our intent was to reduce data entry and cost efficiencies. *Business need being met.* We had been able to achieve this in the larger departments (where it’s important to gain large efficiencies), but if you go to the smaller departments where they process a transaction very couple of weeks, you probably spend more time out there training and re-training them (after they’ve forgotten the instructions you’ve given them in 3 weeks time) how to use the system. *problem that may require online demos*. Then, you are actually doing processing on one part of the form every 3 weeks. So, there’s a balancing area we hit that 80% of people that can be affected by 20% of the work. The other 20% require 80% of the effort. So, we sat back and said that it’s good enough, we have received the benefits, and now to get any further, we were at acceptance and usage by the user community. It’s not worth the effort to get all involved...we’ve used the method we can efficiently in our modifications – large training courses attended by a significant number of people, etc. We were then offering individual training for those people, who are, obviously, using the system. *datEnSupp*

I presume a lot of the people you trained were administrators?

Yes, departmental administrators plus departmental managers.

*The interface they need to use is web-based or the standard GENESYS interface?*
The interface for the administrators is the non-web GENESYS one. But, the approval process (approval for timesheets and so on) is web-based. The next phase was the roll out the employee kiosk, which is web-based. We went through a very similar process. However, we did not communicate to the entire stakeholder group, which includes 7000 employees. The strategy for implementation was that there was another way of doing this. So, we were still going to accept paper forms and the normal process for updating information, but if they (users) wanted to do it electronically, they could do so. We then rolled it out without having to go much into as much expectation management or requirements specification of how people wanted it to behave. This was because we were not intending to force them into using the kiosk. But, we did establish user groups to work through the work through the functionality of what they wanted to do, what they thought was reasonable, what sort of functionality does it have, how does it default to things, how should information get through the system, how should it appear, where should the cursor go when they move from one field to another, what should the drop down lists look like – we did not go through these things with the group to get some information. We did that in rightly or wrongly …we found out that the second group of people we asked these questions, identically reflected the second group of people within HR that we had also used in the combined approach. So, let’s use HR users who understand the data and the system, and let’s use some external people and see if they come up with the same thing, which they did. The reason for this was that it became a lot easier then to use our central HR staff as a pilot group. But, whilst we had already determined that they were a fair representation of the university community. So that group of people were then our “guinea pigs” and worked through the various automated processes – we did a similar thing again, we pilot tested the system…we set up a pilot program and ran it exclusively with two sets of…which we then brought onboard later for a two-month period, and then communicated that out to the university. That was a lot easier due to the fact that it was an optional thing. We showed that this was an additional way to undertake the work processes. We received a lot of positive feedback. People embraced it…they wanted it. Those people who did not want it, they did not have to involve themselves with it. So, they did not put up any resistance to it. There was some resistance to the authentication technique the university used to identify oneself, because it required the use of a limited set of data that…

You mean digital signatures?

No, not digital signatures. We used digital signatures for approval, but not for generation of transactions, such as leave requests, change of address or banking information…that sort of information. The way we authenticated people in an effort to try and rollout the functionality across the board without having to administer and deliver user names and passwords to all those sorts of people and our internal auditors required us to not use the same passwords (usernames may be the same) as our mail network, which we used as a second authentication device. When you forward a transaction in the system, you get an email in your inbox stating that you performed a transaction in the system…this is for security reasons. This is something that people wanted to know. They considered it important for matters such as banking information – you can redirect your salary to a new bank account. The concern was ‘what is someone diverts someone else’s salary to his/her bank account…how do I know about it?’ So, we incorporated a feature whereby an email is sent to the person whose salary is being diverted. While it’s not a full-proof feature, it assures people of the little likelihood of that happening. Sec. So, not only does
an unauthorized user need to hack into the system under your user name and password into the employee kiosk and perform a transaction, he or she also needs to intercept your email. Because of some concerns stakeholders had during the information sessions in the rollout, we instigated some quality control type of features that will actually look for anomalous situations such as if you change a person’s banking information to an account under a different name, it highlights that and we chase it up, and we contact the person whose account is being accessed. So, if I have a bank account under the name of Brown, and I change it to Smith, we make sure that it is a legitimate change. However, if I change it to a joint account between Brown and Smith, we would not worry about it. So, we built in some controls to alleviate user concerns about security. This instilled their confidence in the system. secs. ad-USSoln

So, in order to ensure security, you set up two different sets of access – the access details for employee account is different from those of Internet account?

Yes, to start with, the university does not have any Internet account as such. Rather, it is the email account you are referring to. Yes, the passwords for the employee kiosk are different from that of the email account though the usernames are the same. So, each user has the same username across all the systems (university keeps a unified username space). But, password does not have to be different but it can be different. sens. This is recommended (different passwords), but the technical impediment we’ve had is that we can’t force them to be different without doing massive amounts of work. Password management becomes an issue. adm (admin of passwords adds to web admin work). There are two schools of thought in the university, one that passwords should not expire...because if they do expire, then you can create very secure ones. But, if you force them to expire every two months or so, it forces users to write them down which is less secure. So, there’s the school of thought, which says that we are not going to force these passwords to be different as...there are already some precedents without the usernames and passwords. (attempt to reduce additional work due to passwords mgt)

When I was at dept X, we would fill in online timesheets every two weeks (pay cycle) and submit it to the departmental administrators, who, in turn, would manually key in the data into the university web-based HR system.

That was phase two of our project – the “repeat” function. What the administrations would now do is that they would replicate the pay data from the previous pay cycle to this period. What he or she will need to do is change the data that is different for this pay period. For those receiving regular payments from one period to another, the administrator’s task will be easier. This is part of the user requirements to save them from having to manually key in routine data, and what they did is...we split it into two...what we said is that we deliver this basic functionality faster than the more complex one...so we delivered the basic one...got some benefits out of that because there were lots of areas out there that had not need for that sort of repeat activity. But, a lot of the big departments, who had built their own system to support this process, information system being one of them, waited till phase 2 came in with the “repeat” function was more closely aligned to the way they did things...it was less of an impediment to them. DatEnSupp. They still had some resistance...by some people who had developed very complex systems and very few people in the organization actually...in fact, one person of
the 190 users we’ve got of the system (same number of approvers), one person stated
during this whole process - “who’s better off out of this?” To this, we responded by
saying – “you are not much worse off to the way you do things now, HR is a lot better off
as they don’t have to double-enter the data”. As a whole, the university is better off. Then,
the person said “well, it sounds like a good thing then”. So, he agreed to go along with the
project on that basis. The main thing we had to battle was when the stakeholders asked
“what’s in it for me or for my department?” If there was not much to be gained by them,
they showed resistance to the system. ad-UsProb

It’s quite natural for people to think like that (“what’s in it for me?”). So, these were
some of the concerns you uncovered during the 3 phases?

Yes.

Were the parallel processes (web-based workflow and the old way of doing the same
things) carried out after the prototyping stage?

Yes, we prototyped the system, demonstrated it to our clients or stakeholders, and they
came returned with a number of changes. Some of these changes we incorporated quite
easily at that point...some we took on board and implemented in phase 2 of that particular
part, of which one was the “repeat” function. Once we got into the prototype and had a
chance to look at how the system was going to actually perform and behave, they then
said that – “would it not be nice if it could this and that? Of course, at that moment, that
was going to be an imposition to us”. So, we told them that we could develop the system
to do what they expected or wanted. That’s fine. dev-incre. dev-proto. What we’ll do
then is roll out...I mean, the system was aimed at benefiting at least half of the
university...so, there was no point in holding it off as only half the organization were the
beneficiaries...so we rolled out the basic form of the system...we then instigated the dual
process with some of the simpler departments which were less complex in their
requirements, but they were not necessarily the smallest departments...in fact, one of
them (one of our pilot groups) employed the largest number of casual staff...nearly 10 %
of their staff were casual, but they had no automated system. Therefore, the system was a
big benefit to them. So, there was an advantage in getting them out. ad-UsMot. By
getting this dept on board, we automatically reduced 10% of the data entry in HR... so;
there was a big goal to be kicked immediately. ad-IniMot. Within the next 9 months, I
think it took us to develop phase 2, which brought in the additional requirements that had
been borne out through the pilot program and the dual processes and those other bits and
pieces. Obviously, we fixed errors with the system immediately, but the more
development work took a bit longer to roll out.

Some of the enhancements were added gradually?

Some were added gradually...we probably added very few enhancements. Naturally in
evolving systems you gave some things that don’t perform quite the way you’d like them
to. I mean, these were bugs, to all extent and purposes, but these were only bugs in their
functionality, in terms of instances of circumstances if you did an unusual sequence of
data entry, things will not work the way they should and you’ll have to start again. So,
fixing up those sorts of bugs... the enhancements to functionality we rolled into phase 2.
So, we got it embedded down and then changed functionality later on with another process. This did not really change much of the functionality from the original, but added additional functionality...so you could do the same thing in a different way to meet different stakeholder requirements. We added another way of doing the same thing because different people have different ways of doing things. While some of the features changed, some remained the same, and we decided that it was worthwhile putting the effort into the improvements, as it was actually an improved way of doing things. It has the end result of being able to eliminate another process we do now, which is probably not one of the best processes...this is something we'll have to undertake at some later stage...will require some amount of work, because it is tied up in agreements. We built ourselves an opportunity to eliminate that process at a later stage.

As you have the Genesys and the Employee Kiosk, and you also have the approval, which are done on the web. Did you provide training for using the web interfaces?

We certainly did. That has been the prior reason behind the slow adoption of the system. The university again with its risk averse nature, was convinced that digital certificate or signature technology was required to maintain its appliance levels. \textit{ad·UsProb.} Therefore, for all our signatories, we were required to distribute and install digital certificates on their machines for approval purposes (for security purposes). I am not sure how familiar you are with digital certificate technology, but, don't get me wrong, it's far more secure than just usernames and passwords (\textit{consequence of applying digital signatures}). In such aspects, people argue that...they always were...I believe it is more secure. However, the administrative burden around maintaining digital certificate technology, at the level of technology that was around at that time, far exceeded any benefits from the increased level of security, and this burden fell on the HR department. \textit{(big admin burden)} We were not resourced to take care of this...we were therefore really only resourced to implement for the areas that wanted to embrace it, because if you are trying to convince someone to do what they are unwilling to do, and you tell them that it going to take half an hour of their time for someone to come over and play with their computer to install digital certificates onto them, and then teach them how to use it, they will not be keen to get involved \textit{(a prominent force against the usage of digital cert.)}. So, that was much of impediment to do this. Moreover, this was not a particularly attractive feature in design and development that (good you are not going to name our organization in this) activity was railroaded by the IT division. That was not a business requirement of HR...it was not a requirement by financial operations for their part of the process for which they utilize digital certificates as well. Since, the IT division (developers) knew how to use the technology (in line with their culture of going for cutting-edge stuff)...everyone else should use this...this was their justification. This impeded our progress in the rollover and further evolution of the web system \textit{(force against the usage of digital cert.)}. We would have been a lot more advanced than we have had we not had to bother with the digital certificates...complicated things these are. \textit{(reflects cultural conflict between HR and the developers)}. So, making sure that the business side drives the agenda of the development, take advice and leads from the IT area. While the IT area can provide the data that drives the agenda because...when it comes to creating a very big rift between central admin areas...we were not resourced to support the process...we already had our resource levels cut because we were supposed to have this functionality...we had a deadline set for the end.
of the year to deliver it...so for the next year, we had our staffing levels cut as we supposed to have this functionality included...we had done this but we rolled out to 10% of the organization. So, instead of losing an eighth of a person, theoretically we should have lost a tenth of a person. But, we never lost a full person. In the end, we had the benefits out of them, as we could not support the process. We definitely received negative feedback from our stakeholder base regarding the digital signature process because the process was a lot more complicated than they thought. (massive concern voiced by approvers).

Why? Did approval using digital certificates appear to be cumbersome for the supervisors?

Well, the issue became, regarding the management of the process, in the contingencies of the people on leave. For instance, if I am to approve a transaction on your behalf, and that transaction needs to be approved today, you can’t readily transfer the digital certificate mechanism to someone else if that person has not been set up for (force against the usage of digital cert.). It takes half an hour, and they need to be present coz they need to key in the password, they need to approve themselves, because the process was forced to jump through these hoops. So, they complained that the feature was of no advantage to them as it was so difficult to administer. We ended up putting a person on a full-time basis for a period of time to actually try and break the back of the technical impediment that we were faced with (added adm burden). Nevertheless, we still suffer from it now, and the university has, in fact, decided not to continue with the digital certificates...the IT div has learnt its lesson, hopefully, that this was not the way to go. But, it’s a case of us developing the business requirements, which were altered not because of the business itself, but due to the other external influencing factors, and we paid the price for it for allowing it to happen, but we had no control about it...we thought it was a good thing to actually not go down this path (definitely an issue of conflict between HR, IT, and the top mgt of the institution, with the top mgt siding with IT on this issue). We could not justify the reason why because at that particular point in time, industry was heading down the same track. Banks were doing it, namely the Commonwealth Bank, and the ATI. So, the technology was adopted by the university, but by the time they pulled the plug on it, we were not quick enough...we had just gotten there. Thus, that’s an important thing to note when it comes to business processes; business people should be the ones who should be consulted for specifications on the design of the processes. We found from our experience that our IT area with our IT support that, not trying to criticize or blame anyone in particular, but invariably there’s an interpretation made by the system developers (programmers and analysts) on the way they think we intended something to do. If they don’t seek the clarification on it, more than half the time it goes the wrong way (cultural conflict antecedent between HR and developers).

Who needs to ensure the clarification?

Given the way our structure where we design the business rules, and we have senior analysts who do the technical specifications, we have a very close relationship with my technical counterpart. Moreover, my technical counterpart has a very good understanding of the business rules...so we don’t have much of an issue. (very important for IT to
have a good understandings of business processes). But, when the decision has been made below the senior analyst level, there could be some ambiguous decisions made...this does not happen all the time, but more than half the time such a decision has been made, it tend to be made in the wrong direction because it is made strictly from a technical system perspective rather than a business perspective. Thus, it is important to make sure that the clarification is sought back from the business so as to ascertain what should be done there (prime concern of HR with regards to how IT views the development and implementation of the application...adm).

This is an issue in a lot of projects. There’s always that gap between the technical perspectives and those of the business stakeholders. That’s where my PhD looks at to address this gap.

Our senior analyst has been in the business long enough to know what we do on a daily basis. She knows what we try and support on a day-to-day basis, and thus, her interpretations are likely to be more accurate. We tend to find, from our experience, that our programmers, who have not been involved with business issues at the same level, don’t make the same sort of decisions. We tried for little while to engage them in the business but the response has been largely against us. As part of the induction program for new IT staff, we bring them into the business for little while so that they can see what we do, and understand the way we do things. Unfortunately, we suffer from that fact that we don’t have the type of people who start at the university and are expected to hit the ground running (understand business rules and SOPs sooner). We are yet to convince the management structure that the long-term benefits of getting someone who understands the business, far and away from the fact in the first three weeks of their starting work with us, they’re not doing any programming, they could, instead, be directed toward familiarity with the business rules and SOPs. So, we have tried to do that, which is conduct induction program for the first 3 weeks of their starting work with us, with a few people when time permitted us to do it (web adm...urging IT personnel to learn and understand business processes). It’s hard to tell whether this has made a difference or not.

You need top management for this. Basically you train these techies in business processes and there’s the learning curve and time frame involved. There’s also the risk that not all of them will get familiar with the business.

Yes. There are self-service functions...employee kiosk functions ...this is a good supporting case for us...did not suffer the same fate because the people working on the code and scripts were employees themselves and thus, were familiar with the needs and expectations of a typical employe using the system (less problematic when IT personnel are users themselves...thus they hold the employee or supervisor viewpoints). They were able to study things and say, “hey, I don’t think this does works very well”. They were able to make sensible suggestions as to the different way(s) of doing it or alternate ways of doing of because they were able to see things from the perspective of the employee user (IT able to take employee viewpoint). Whereas, with the same group of people dealing with the core HR business functionality, they don’t sit down and get involved with HR tasks and activities such as recruitment or performance appraisal or payroll. They don’t get involved in these...so,
they can't put themselves in the shoes of HR staff. But, for the employee self-service activities, they were able to do it, and they had a more efficient period of programming. They were able to understand how things with such a system worked. They were able to understand what the business catch was, why we were doing it, for whom we were doing it.

The Employee Kiosk...does it include payroll workflows?

No, it does not include things like timesheets. It was originally intended to do so, but the only reason it has not done so for the university thus far has been resources. The intent was certainly there...we have had, within our development group of which I was part...the manager of our group left...I assumed the role of manager...the next most experienced person to me left, and we went down from cumulatively of 14 years of experience to 6 years, and basically lost a lot of that organization knowledge, and the value-added developments, such as the delivering pay slips or timesheets through self-service took a back seat to core business operations and I had to step up to a managerial role rather than a system design specification role and the people who stepped into my role, probably did not have the experience and the background and the time to do these. So, it's certainly not from a lack of not wanting to do these or looking at the value of it...the university sees the value of it. Rather, it's a question of having the resources to do it. Now the university, and that's been declared in the last 2 years...1 year ago the university launched its program with the ERP project, and they decided to put a halt to in-house development work on our core systems, as we'll be replacing our system with the ERP solution. So, given that most of the development resources are now going to the ERP project, there's not going to be anyone doing it anyways, therefore we put it on hold. So, the business specifications are done for delivering the payslips, but we don't have anyone to do it...they are not completed. If they were completed, we could have asked the development team to work on it. So, they're not fully completed...they are partially done. Payslip delivery was the next thing we were going to do.

Can they see log in and view their current pay slips, pay history, etc.

Yes, they can. That was directly, again, based on a financial decision. University spends close to $29000 a year on pay slips, which includes stationery and postage. Therefore, if we can eliminate that, it will be cost-effective (business need of cost saving being met...repPer).

Is there any legislation about online payslips?

There was some legislation about requirements for payslips...we had this sussed. The legislation at the time, and this is couple of years ago now, did not actually commit to the online delivery of pay slips.

I was wondering about that?

However, the legislative body at the time, basically said (that was only because the legislation was so out of date, not because we really wanted it to stay that way) “if you progress along the path of delivering online payslips, you will not comply with legal requirements, but you probably may in a couple of years time when they get around to
update it.” This is because technology has progressed so much that they (legislative body) have been unable to keep pace with their legislation. There are several organizations that are doing it now. So, the legislative body knows it is happening, they are not concerned, as they want it to happen. But, they just have not gotten around to it, owing to bureaucratic bottlenecks. The university decided to go ahead with it, despite the fact that it was non-compliant with legal requirements for a payslip… they wanted to give it a try. One of the other things that they looked into in view of the legal compliance issue is the offering of option: payslip can be obtained either online or mailed as hard copy (in case of employee concern about the legitimacy of online payslips). You can select to receive it electronically or via postal mail as a hard copy. We cannot, however, make electronic payslips mandatory. But, we are aware of the fact that a lot of universities in Australia are providing payslips online. repPer

Basically, it’s fine to have an online payslip because all you need is a record of the payment. But, it becomes a problem when you furnish a printed copy to apply for a loan or anything legal.

Yes, you should definitely be able to print them.

Well, in most cases, these payslips can be downloaded in an acrobat reader format.

Sure. One of the reasons for putting the payslips online was cost, a primary reason, the other was it enables us to deliver more information You’re fairly limited to what you can feed onto a hard copy payslip. With online payslips, we can provide a whole lot of information including forms, drill-downs, and links, and so on. We went part of the way and revised our current pay slip, which if you do some tutoring at the uni, you’ll notice that we have complied with some of the requirements that the users have been asking for. We’ve included things like banking information, superannuation, and so on. Some of these we could do relatively easily, but others were a bit more needing development. This is because all the development that is done within the HR system is approved through senior management of the organization. So, it’s not just at the level of HR. We deliver a business case requesting for funds to develop the application(s)…we put through a development plan 18 months in advance…so we say that we are actually submitting now (mid-2002) what we are going to develop in 2004. We reckon that the approval process takes a bit too long as technology moves so fast in 18 months…you asked to do one thing, but something else (tech development) suddenly comes up and makes things easier to do.

I guess this applies to online timesheets as well. If you make it mandatory for the users to fill in timesheets, they’ll probably object to it. It can probably be done in depts where the users are technically proficient, but it may be difficult to mandate this elsewhere.

It’s very much a cultural thing at the university. More than the technological impediments, we have the cultural impediments. People not willing to do things differently to the way they have been doing it in the past. As you said, there are varying degrees of technical expertise and competence within the organization. I mean we’ve got heads of depts and deans who have no computers at their offices. So, when you ask them to approve things electronically, they voice their strong objections. Keep in mid that some
of these people are high up in the organization in hold great influence. So, this is the biggest impediment in our organization – cultural change, being able to do things differently than the way they’ve always done it. There’s also a bit of a role and responsibility issue here…. many academic being forced to divert their time to administrative matters (owing to govt. budget cuts translating into fewer admin staff)... they are being asked to sign off and check pay sheets, which is not their core business of teaching and research. They are not administrators. So, there are sometimes political issues that prevail due to this.
Appendix A4: Narratives

For the completeness sake, the narratives of all participating organisations have been included here.

**Textural-Structural Description: O1**
The textural-structural description of O1 can be found in chapter 5.

**Textural-Structural Description: O2**

O2 is another prominent Melbourne-based tertiary educational institution that adopted a web-based front end in 1999 to deliver services to its employees. The web system was acquired from the university vendor as part of the SAP package that included internal HR, finance, and student administration workflows. Enterprise application integration was one of the motivators behind the purchasing of the ERP system that also consisted of the ESS, as stated by the O2 project manager:

"Well, basically we were looking at new HR/payroll systems for our organizational use, and came across this particular SAP system that included payroll, finance, and HR in an all integrated form. In the past, we had separate system for these functions. Along with the integration the SAP system was offering us, it also included the ESS module."

Moreover, the fact that ESS was being increasingly adopted by large enterprises and outsourced payroll companies also served as a motivator.

"At that time, we thought that was the trend everyone was going with...everyone was conducting transactions electronically, that is."

However, the main driving forces behind the ESS adoption were the O2 strategic goals. Like O1, O2’s business needs associated with the adoption of web-based employee services consisted of cost-savings and productivity-enhancing measures, and the general improvement in the quality of services to the various user-stakeholders. These business needs can summarized in a nutshell from a quotation by the interview participant, the HR project manager:

"...focusing on the core functions rather than on the processing (routine paper-based)...also contributes to this reduction of the workload...not only reducing the
copies of paper-based documents coming in, but the time taken to physically enter the data into the system, as all that gets done through ESS (the web system). The employee will log into ESS, apply and submit the leave...the document then goes to the supervisor (part of the workflow) for approval. Once this is approved, the document is automatically entered into the SAP system...it’s all done as part of the workflow. This frees up our time to eventually go and meet our clients (improve the services to our staff), rather than spend time sitting in front of a computer and keying in data”.

The project team consisted of HR personnel with a technical background. O2 first automated the leave application workflow, and began to gradually post all pay slips online. It also encouraged its employees to enter their own personal data into the system. Employees were also able to update and modify their personal data, apply for leave, check their leave balances, and salary history online. Query engines were inserted into the web system to allow look-ups and processing of online report as per specified criteria. Also, leave approvals were to done over the web, even though HR decided not to impose the web system upon supervisors, and concentrated in training departmental administrators, instead. Web-based timesheets for casual employees, though part of the project plan, had not been implemented at the time of the case study. Thus, the stakeholders in the user community comprised of supervisors, departmental administrators, and employees. The system was customized, deployed, and maintained by the IT group within HR, also the initiator in this case.

**O2 project manager’s experience with requirements elicitation**

As with O1, the in-depth interview with the O2 project manager (refer to O2: Coded Transcript in appendix B) also revealed that concern identification and analysis took place through the feedback mechanism during the pilot testing stage. Requirements gathering was performed by means of focus groups made of representatives from the various faculties and departments. In the words of the O2 project manager:

"So, basically, before we went on to ESS (the web-based services), we actually sent information to faculties about our proposed adoption of the system. During the process, we even had a little committee set up to go out and visit people in the various faculties in order to collect information. We would give them information about ESS (what it is all about) and we also put together a little brochure about the system. We did not roll out the system all over at once, but on a faculty-by-faculty basis. We would physically go out, visit them and show them how ESS works. We would send all of them a brochure with their initial passwords."
Thus, pilot testing of the web system, using an evolutionary methodology, was conducted on a faculty-by-faculty basis, during the process of which the HR project team would elicit the viewpoints, in the form of feedback, of the users. Some of the feedback was viewed as concerns by the project team as these needed to be addressed. On the basis of these concerns, the system would be fine-tuned and rolled over to the particular faculty, as indicated by the interviewee:

“Basically, faculty-by-faculty, we would start rolling out by asking - are your staff happy with ESS? Are they having problems logging into ESS?”

Moreover, the diffusion of the system across the university took place in phases as explained by the HR-IT manager:

“So, basically, if one faculty was happy with the system being offered, we told them their staff can log in and check their pay slips. We then added that after a certain date we would stop printing their hard copy pay slips. From then on, every member of staff should be able to log in and access their pay slips. So, we did not just stop sending them hard copy pay slips from day 1. We rolled out gradually by targeting one area and then moving on to the next.”

O2 project manager’s experience with Data Entry & Validation, View and Update concerns

It was important for the project team to consider the concerns, as doing so was a means to effect the further diffusion of the system throughout the institution. This is indicated in one of the anecdotes. Thus, it was important to identify issues of concerns voiced by users, which implied or hinted at their inclination to use the ESS. One such core concern was potential user resistance to involvement with the ESS. In the words of the O2 project manager:

“A lot of academics live in their own world with not much contact from the IT area.”

However, the user community consisted of academics primarily, and actions had to be taken to alleviate this concern, thereby paving the way for promoting the system. The action, in the form of new or resultant requirements (requirements 5 & 6 from the Initiator voice table in appendix B) for user training, online Help, and other forms of IT support, in order to alleviate this concern. This is confirmed by the statement from the manager:
"Thus, this is one issue - the change (to a web-based electronic system), where we had to re-educate the users to become more familiar with the ESS."

However, training the huge number of staff members would have been infeasible, owing to its greatly diminishing any productivity gains from the ESS. So, the project team took action to alleviate the concern.

O2 project manager:

"So, we did not actually conduct any one-to-one training or even a big group...basically, we sent out someone to train the managers...it was then their turn (departmental members already trained) to train their own employees. Otherwise, it would have been impossible to train each and every one of the 3000 (and above) staff that we have over here."

Furthermore, the project team identified the non-academic staff in the departments, namely the administrators (such as personal assistants) as the primary users of the systems, and thus, directed training programs at them. On the other hand, academic staff, assigned with administrative responsibilities, such as heads of departments and course coordinators, were not perceived as part of the primary user group owing to their adherence to the “old way” of using paper-based documents.

O2 project manager:

"Mainly the administrative staff we trained. We did not actually train any HODs (heads of departments), though they are physically approving the leave applications. This is because they still maintain manual paper work in their own scope of work. In fact, they usually delegate all electronic transactions to their PAs. The PAs log in to ESS and approve the leave applications on behalf of the HODs. Of course, this takes place after the HOD has approved the hard copy of the leave application."

Since, administrative staff were more willing to adopt ESS than their academic counterparts, the solution was perceived to be effective and had no comebacks. Moreover, training programs are conducted on a recurring basis to train new administrative users and re-train existing users.
O2 project manager:

"They (IT services) run (training) programs for managers every two months. They've got refresher courses for those managers and administrators who are back into using the system (who were once trained but did not have to interact directly with the system owing to job rotation). So, these training programs are conducted quite regularly. If any manager requires training, ITS is contacted and training is organized and provided."

Individual employees were also identified as ESS users, though their involvement with web-enabled workflows was not meant to be at the same level as that of administration staff and those with approval authority. Thus, there were issues with this class of users that were looked upon as concerns by the HR-established project team. According to the project manager, one such concern was:

"...they (employees and supervisors) prefer to see a paper document signed rather than passed through an electronic workflow system."

To minimize the effects of these concerns, the benefits associated with convenience and accuracy of data were emphasized to motivate employees to use the system. Thus, requirements associated with the publishing of pay slips and salary history on the web, the modification and updating of personal details by the employees themselves, and the availability of online queries and look-ups, were implemented in the ESS (see requirements 2 and 13 in the Initiator voice table in appendix B).

O2 project manager:

"...with the person checking his/her own data, we can be assured that the data is accurate. If not, they will come back to us to request changes (as was the case in the non-web environment). So, we thought the deployment of the web environment would be good for our staff."

In addition, the initiators highlighted the fact that the system would free HR personnel from mundane data entry tasks and thus, enable them to focus more on the provision of services to employees. At the time of the interview, the project team was planning to introduce web-based timesheets for casual employees, and using "convenience" as the promoting keyword.
O2 project manager:

"What we have in the works in to actually get the casual employee to enter the timesheets themselves – so, it’s a step down the line from the admin person (who have been entering timesheets into the SAP system so far). Thus, instead of filling in hard copies, they(casual staff) just key in the pay hours directly into the web system, and once submitted, it is sent to whoever is the approver for the employees concerned. This will definitely be web-based."

Researcher: If the timesheets are web-based, the casual staff could fill them in at home, as they may not even have an office?

O2 project manager:

"That’s right."

O2 project manager’s experience with Workflow concerns

Communication issues in the ESS workflows predominated what the project team held as concerns, not only from user sources, but from themselves as well. Knowing fully that the migration of relevant workflows to a web medium could potentially cause communication problems among the employees, supervisors, and HR, the project team placed considerable emphasis on overcoming these.

O2 project manager:

"With the ESS, basically...a lot of communication needs to be done..."

Timesheets and leave applications, once submitted via the web, arrived at the designated approver's electronic in-box for authorization, and an email was dispatched to the appropriate manager informing her/him of the fact that there documents pending her/his approval.

O2 project manager:

"...(documents) will be sitting on their electronic in-tray. But, basically, not everyone logs into the system on a daily basis like us admin workers. So, what we have done is actually link his or her email to the workflow process, such that as
soon as someone applies for leave, an email will drop into the supervisor’s email inbox. Basically, the email will state that there is something to process, so the supervisor will know then to actually log in and approve the leave."

Also, once a decision was made on a document, an email was automatically sent to the respective employee informing her/him of the outcome of the supervisor’s decision. In most cases, the applications were approved as employees and supervisors would sort out and agree upon the relevant details, and terms and conditions, prior using the ESS to formalize the process. Therefore, most of the online leave applications, having been approved, made it through to HR for processing.

O2 project manager:

“...in most cases, your supervisor already knows that you are taking leave around that time, before you send the application, and a lot of the times, you know that the leave will get approved rather than rejected. So, there will hardly be any rejections.”

In fact, intra-departmental communication was strongly encouraged by the project team, as they believed that it was a prerequisite to the effectiveness of the web-based workflows. To maintain this informal environment of communication, the project team allowed flexibility for the supervisory role in the ESS. In other words, business rules restricting the supervisor’s decision-making were not enforced. This even extended to situations where the supervisor was allowed to approve a leave application, in which the duration was greater than the balance.

O2 project manager:

“At the moment, it is up to the individual departments to approve or reject any additional leave. I think, pretty sure, though I am not the one who approves these, the supervisor will get to see the leave balances at the bottom of his/her inbox (profile) in the workflow. This way, the supervisor can see that the employee has applied for (say) 2 days above allocation. However, if he/she wants to approve it, it can be done without any problems. Like I said, this involves communication between the employees and supervisors within the departments. Usually, the employee would have spoken to the manager about this leave involving the 2 extra days. So, these applications are already verbally approved even before they make it to ESS. So, we have not actually hard-coded this into ESS, as this would take away the flexibility.”
However, one of the communication issues perceived by the O2 project manager as a major concern was related to the establishment of approval authority into the ESS. There were times when HR was not notified of the appointment by departments of an acting supervisor to carry out the duties of an approver, who had either gone on leave or was absent for some reasons. In these situations, leave applications were piling up into the electronic in-tray of the absent supervisor, leaving the appointee with “higher duties” with no ESS work to do. This was a major concern for both the employees and HR.

O2 project manager:

“...for the workflows to function properly, the approver’s position has to be set correctly. So, it’s actually to maintain the data. For example, if my supervisor goes on leave, there will be no one to approve the leave application, which will be sitting on his inbox for the whole period he will be away. So, we need to ensure that when people are going on leave, they appoint a substitute approver. This substitute approver needs to be set up correctly in the system; otherwise it will perpetuate the problem of applications sitting in the inbox unattended.”

The problem was the fact that the departments failed to communicate to HR about the staff member who was assuming higher duties, due to which she/he could not be established in the ESS as an approver. Some departments informed HR about the acting supervisor for the purpose of additional remuneration for the higher duties, but they did not mention what the position the person was acting on behalf.

O2 project manager:

“...why it is critical for us to be informed of who the acting head is, and in what position. Often, the departments put through requests for special pay for those assuming “higher duties” (whatever rate) but they fail to inform us of what position of “higher” duties these people are acting in. They (the department) need to tell us not only who this person is, but what position this person will be acting on behalf in the duration of “higher” duties.”

Of course, within some departments, employees got their leave applications approved by the acting supervisor through the usual informal or conventional process. But, the problem lay with the formalization of the process, i.e. despite the intra-departmental approval, the document still needed to be processed via the web, and had repercussions for employees. The employee would go on leave, after having her/his application
approved on a paper-based document, while the web version of the document was still lying in the absent approver’s in-tray awaiting formal approval. Thus, HR had no idea of this leave approval and as a result, the employee was not “officially” on leave. In due course, the problem was sorted out between HR and the department through non-web modes of communication. Nevertheless, it had caused hassles for the employee and unnecessary work for the HR in having to clear the matter with the respective department, thereby increasing the administrative burden.

O2 project manager:

“Often, they (employees) will just go on leave thinking that their leave has already been approved, but in reality, it is still sitting in the approver’s in-tray waiting to be approved (despite the fact that the supervisor may have verbally approved it). The employee may be thinking that he or she’s got 10 days of leave remaining, but in fact the person has only 5 days left. So, that’s misleading, even though they should know how many days they got right now...”

The process of evolution

As previously mentioned, the overall strategic plans of O2 influenced its business needs for the adoption of the ESS, also shown by the arrow from the Strategy to the Business Needs in Figure 6. These business needs were also influenced by HR concerns surrounding issues of productivity, cost reduction, and improvement of the quality of its services.

To meet these business needs, the HR project team drafted requirements for the web system. These are explained in O2 voice tables in appendix B. Moreover, some of these business needs gave rise to requirements, the consequences of which raised concerns. One of these consequences was the unease and resistance of the user community toward the shift to an electronic workflow system (consequence 3 in the Initiator voice table in appendix B). This consequence, in turn, created an issue of concern for the initiators.

Thus, the consequence was perceived negatively by the initiators as it caused a concern for them. To alleviate this, the project team inculcated the requirements (5 & 6) for user training, online Help, and other forms of IT support, in order to alleviate this concern.
However, one of the consequence of implementing the requirement (5) for training staff had to be re-evaluated as a large number of staff members were employed by O2, thereby diminishing any productivity gains from the implementation of web services, if they were all to be trained (consequence 11). This concerned HR (concern 8), and had to be thought through, as clearly stated by the project manager:

*Business needs also caused concerns. One such business need (Business need 2 in the Initiator-HR voice table in appendix B) was the streamlining of all relevant workflows. This raised concerns with HR (concerns 6 and 7), and led to their establishment of requirements for electronic in-trays for the purposes of monitoring the flow of documents through the system and business rules that necessitated the setting up of co-approvers and acting heads (requirements 8 and 9). Basically, it meant that web enabling the workflows could bring about a loss of control, unless certain features and business rules are embedded.*

As Figure 6 illustrates, the initiator requirements were validated by users with each cycle of the evolutionary process. The consequences of the initiator requirements essentially imply user validation, as shown by the callout in Figure 6. During validation, users voiced their perspectives on the initiator requirements, reflected in the ESS. Some of these perspectives were viewed as concerns by the project team as actions were necessitated, thus bringing about the resultant requirements. The consequences of some of the resultant requirements also caused concerns for the initiators. Hence, a new or modified set of requirements had to be established to counter the concerns. In this way, another evolutionary cycle of the ESS was triggered.

**Criticality of concerns and the existence of conflict antecedents**

*Not all the concerns were perceived as highly critical. Less critical concerns required relatively simple solutions. However, the issues perceived as highly critical were complex in nature and large in magnitude, owing to which they demanded serious consideration by the project team.*

The main point of contention was the fact that individual departments failed to inform HR each time the former had appointed someone to assume higher duties on behalf of an
absent supervisor or departmental head or simply to step into a supervisory role as the former holder of that position had resigned, discussed in detail in a preceding section.

Figure 6. O2 model of the evolution process.

O2 project manager:

"It will take us a long time to chase that data whereas if they know what’s happening, and let us know about it, it will reduce our time and effort spent in fixing errors. s... right now, we are spending a lot of time fixing errors generated because so and so has gone on leave and something needs to be signed, and no one’s been assigned as a substitute approver. So, the workflow problems keep repeating...sort of going on in a loop."

This predicament was perceived as a threat to the fabric of O2’s ESS project.

O2 project manager:

"Otherwise (if the problem is not addressed and rectified), ESS will fall apart."

The project manager experienced how important it was to properly set up the structure of approval authority in each department. Thus, the details of the co-approver along with the position she/he is acting upon needed to be set up. This way, leave applications from employees could be automatically directed to the co-approver’s in-tray during the absence of the original supervisor.
To minimize the effects of this antecedent, the HR project team, also delegated the responsibility of ESS administration, spent considerable time to oblige the departments to notify HR new appointments to supervisory positions (i.e. who the new supervisor is, and what role she/he is assuming), and enforce certain business rules into the system, such as the provision of co-approvers and the monitoring of web documents sent by employees through the workflows. This was definitely a concern associated with a lack of communication between the departments and HR.

**Researcher:** So, the solution at this point is that the departments should inform HR of what position the person will be acting on behalf of?

**O2 project manager:**

"HR is currently reviewing all the forms that we have been using, so that we could prompt the departments to provide specific position (of the person assuming higher duties). In previous forms, which are quite out-of-date (but we are still using them) there is nothing mentioned about who the approver is or whether this person will be assuming “higher” duties on behalf of a supervisor. This is why our new forms will enable us to gather this information. This, we are actually looking at updating all our forms and incorporating all these in there."

Another critical concern was the security issue. ESS contains employment profiles of staff members. Hence, privacy and confidentiality issues were paramount.

**O2 project manager:**

"Security issues were of concern because we were anxious about unauthorized access into user profiles, like getting hold of other peoples’ passwords, and so on. So, this was one area of concern, and we were actually warning every one not to share passwords. Since, all personal pay details are on the web (to reduce paper work), we were concerned that an unauthorized person could get into another person’s account and view all their sensitive details."

The project team was determined on ensuring the prevention of security breaches and unauthorized access, as these will discourage the users from further involvement with the ESS. Thus, separate sets of access codes were provided to users for entering the system, while supervisors and departmental administrators were another set of codes to login as approvers. Unfortunately, this raised another concern from the user community.
O2 project manager:

"The other area of concern was the change itself in the work processes owing to the introduction of ESS. A lot of academics live in “their own world” with not much contact from the IT area. They get frustrated easily when they face hurdles, such as “why can’t a payslip be sent to me after I have logged in”. Some of them have problems remembering the 3 sets of passwords (for security reasons), one for the network, one for email, and one for ESS. Often, they will mix up the passwords, and enter the wrong password into the ESS, and as a result become unable to view their payslips. Thus, this is one issue, the change, where we had to re-educate the users to become more familiar with ESS."

In view of this concern, training programs, online Help, and helpdesk facilities were initiated as requirements for the ESS endeavour. But, it certainly exposed the difficulty associated with implementing such a system to academics in O2.

Another issue that was viewed as a critical concern by the project team was the “locking” and “unlocking” of online documents. In the early phases of ESS implementation, employees were able to make corrections to their leave applications even after submission. On the other hand, the approver, despite finding the documents sitting on her/his web-based in-tray, was unable to access them owing to being “locked out” by the respective employees. This caused annoyance with the approvers, which prompted the ESS team to look into the matter. They enforced a business rule, whereby a leave submission is no accessible to the employee once it has been electronically submitted.

O2 project manager:

"Once the documents are submitted, the changes can be made only after the approver has seen them. The communication should come from the approver who will inform the employee of the wrong leave data entered, after which, a new one is submitted. I mean, there’s no easy way around this... if the approvers can’t find that leave, they’ll ring us again, which creates problems for us as well. But, this usually takes place once a day... queries like that. But, if we allow employees to change all the time, then approvers are going to ring us frequently to complain about applications not being accessible from their in-trays anymore.

These critical concerns illustrate the fact that the ESS project was implemented amid clouds of tension of a socio-political nature, shown in Figure 6. Tensions prevailed over
issues of concerns to HR as well as in the validation process of users. As is evident, the issues were not technological in nature as most of the primary users, administrative staff in the departments, were IT proficient and bore no aversion to the use of a web system. On the contrary, the political environment was such that the project initiators had to exercise caution and reflect upon how aggressively they promoted the ESS adoption and usage throughout the organization. This is why academics were not forced to embrace changes in their standard operating procedures owing to the introduction of the ESS, i.e. they were allowed to carry on with the informal non-web procedures of approving leave and timesheets. Moreover, these informal channels of communication existing in the departments were essentially a manifestation of social structures, and attempting to change these structures radically would invariably lead to rising tensions between the ESS management and the academic staff. This also explains why the project team took up the opposite approach, i.e. they actively encouraged informal communication between employees and supervisors within the departments.

Perceived outcome of the project

The project manager was of the opinion that the implementation of the ESS brought about the expected benefits to the HR department. The objective of reducing workload, such data-entry, was definitely eliminated, as a result of shifting data entry to the recipients of services rendered by HR. Hence, HR staff were able to direct their attention to core administrative tasks.

O2 project manager:

"...we are able to focus on the core functions rather than on the processing of paper work. The leave application feature is also a big part of this...(ESS) also contributes to this reduction of the workload...not only reducing the copies of paper-based documents coming in, but also reduces the time taken to physically process, i.e. entering the data into the system, as all that gets done through ESS...frees up our time to eventually go and meet our clients (improve the services to our staff)...
"

Since, deliverables of the ESS, such as pay slips, salary history, and leave approvals, were published online, HR no longer needed to send hard copies of these documents to
employees. Therefore, the project was instrumental in saving stationary, printing, and postage costs. Moreover, at the time of the case study, the online publishing of group certificates (tax return statements issued by employers) was being planned to bring about further cost-savings. Also, ESS features that allowed users to conduct online queries and look-ups reduced the number of routine calls HR staff had to attend to.

However, there were outcomes, which were not entirely positive in the ESS team's perception. For example, the full rollover web services into intra-departmental work processes were not possible owing to inability to totally eliminate paper work.

O2 project manager:

So, unfortunately, we still can't get rid of all papers, but at least, at our end, we don't see any hard copies. But, other departments are still using hard copy documents.

It should also be taken into account that the total elimination of paper work within the departments was not possible, owing to the social and political factors at play. The project team had to tread very carefully in its path to motivate the managerial staff to adopt the WBIS. Therefore, they had to make sure that sweeping changes to the way departments did things internally were not proposed.

**Textural-Structural Description: O3**

O3 is another university in Melbourne that adopted ESS in 2002, a project that was driven by its HR strategies. In the words of the respondent, the project manager of O3:

"It came as part of the discussions with the vendor. Earlier on we had a demonstration with the product director. The reason for looking at such a system was driven by our HR strategy. It came out after implementation of system AAA, our project that required the university to automate all core systems. This was intended to enable our users to access information from a more central repository. The other reason was productivity gains."

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The ESS was purchased, as part of a web-based HR package, from a vendor, and a special project team was established within the HR department to oversee its configuration, implementation, and rollover. Service implementation took place in two phases. The first phase consisted of implementing features that enabled employees to enter, update or modify their own personal data into the system, as well as view their pay slips and salary history online. Queries and look-up facilities were also implemented as part of this phase. The second phase constituted the web enabling of the leave application workflow, and the gradual evolution into a full-fledged ESS. Timesheets for casual employees, however, were still being dispatched as Microsoft Excel spreadsheets with emails. Supervisors, departmental administrators, and employees, made up the primary user groups. The initiator was the HR division, and represented by the project team, which comprised of members with a thorough knowledge of the business processes, and possessed IT and web skills.

O3 project manager’s experience with requirements elicitation

The O3 project team did not conduct any form of formalized requirements elicitation for the ESS. It merely transferred some of the features from a previous inter-departmental information system, for which requirements had been gathered from users.

O3 project manager:

"We basically transferred some requirements from the previous project we were working on. In that project, we had consulted managers to elicit their views on what sort of reports they’d like to see online and so forth."

Even though no formal requirements gathering had taken place, the project team was involved in observing the pilot testing of the system in other institutions.

"...we started exploring a couple of sites (set up by the vendor) that were up and running. These systems we observed live as they were being used by some universities in South Australia and in NSW. Some of these sites were in the beta testing stages."

Thus, the team claimed to have “learnt” from the experiences of their counterparts in other institutions, and felt that formal requirements gathering was unnecessary. However,
the WBIS was subjected to beta testing during each phase (view/update, and workflow), during which feedback from users was gathered. The second stage was tested with a sample of 30 users, as explained by the project manager:

"So we had these people (sample users) applying for annual leave online in order to make sure it was all working. Also waiting for the new upgrade to the system, which had an email prompt. It's a real must before we went live with the system so that managers would know that they had records to be dealt with in the application. So that sort of went on for the last 5-6 months."

During the pilot testing stages, feedback was collected from the users, but they project manager did not perceive them as being significant enough to undertake major customization efforts.

"There was feedback, but not a lot. The users were all quite happy with the system. You got to remember that we were giving them something that they never had before."

However, examination of project notes revealed a whole set of issues perceived as concerns by the project team.

**O3 project manager's experience with View & Update concerns**

The project manager claimed that the target user group did not express any enthusiasm for the ESS. On the contrary, it was claimed that their proposed involvement with the system was perceived as an imposition.

O3 project manager:

"Academics!!! Hardly anyone of them interest in the system at all. They were initially all complaining and telling is that we were forcing them to book leave online and so forth."

So, how did the project team manage to introduce the system? The issue of convenience an ease of use was promoted to motivate the users. Thus, the promotional drive consisted of demonstrations and seminars where the expected benefits of the system, such as the ability to view and update personal details and check salary histories with a press of a button on the web interface, were highlighted. In addition, supervisors were informed of
the benefits of streamlined workflows. The consequences of providing the view & update facility as a means to motivate user involvement was perceived positively as the initial resistance had decreased.

O3 project manager:

"...it was a good way to have the leave balances out on the web for our staff to check. The View and Update facility enabled them to go in (into the system) have a look at their emergency and personal contact details, update them if the data was incorrect, change their address, etc. This eliminates their need to send in a normal paper-based form. They could have a look at what level they were in as far as their salary was concerned...they were expecting something new, so they could check their payslips on-line."

The other positive consequences provided benefits to the HR division in the form of savings in stationery, printing and mailing costs, as all deliverables were published online. Online queries and look-ups brought about positive outcomes in the forms of the ability of employees to check the status of their leave and remuneration over the web by themselves whenever they wanted, which in turn, resulted in time savings for HR staff.

To further support users who had adopted ESS, the project team provided training to supervisors and departmental administrators, and online Help facilities and user manuals to employees. To ensure the data entered by the users was done correctly, input validation rules were enforced into the system. More details of these concerns and resultant solutions and their consequences are provided in appendix C.

O3 project manager’s experience with workflow concerns

Owing to the distributed setting of the university, with its campuses scattered across the state, it was of great importance for the project team to ensure that the ESS facilitated communication through the web medium. These concerns are involved with the workflow component of the ESS and are also presented in appendix C.

One of the main issues of concern to the initiator was that of escalation of approval authority. It dealt with the approval hierarchy for leave and pay applications submitted electronically. Thus, the solution to the concern had to be the enforcement of a structure
in the ESS whereby these applications would be directed to the supervisor of the approver who had failed to attend to these documents after a certain period of time.

O3 project manager:

"The approver had 7 calendar days to look into the leave requests, before these are escalated to the next approval level. The last level in the chain is the ESS administrator (that's me!), who is responsible for investigating the reason behind the escalation."

Approvers were also asked to notify the ESS team prior to taking extended periods of leave, so that the "higher duties" could be delegated to next managerial level or to a designated manager appointed for the purpose by the individual departments. The issue of communication associated with workflow was viewed in a light of importance by all the parties involved. Moreover, informal communication among staff in the individual departments was encouraged. To allow such an environment, no business rules were enforced to prevent employees to cancel their leave applications once submitted. In other words, they regained access to the documents that were actually sitting on their supervisor's web in-tray, a fact that the project team looked upon as a concern. However, instead of going back and enforcing business rules into workflow, they decided impose restrictions on the reversal of the leave application once it had been approved. Thus, if an employee wanted to cancel a leave request after it had been approved, she/he was required to provide a written letter of request for cancellation, authorized by her/his immediate supervisor (with whom this should have been discussed earlier), to the ESS administrators.

O3 project team:

If they (employees) wish to reverse a leave booking after it has been approved, they've got to follow the cancellation procedure by letting us know in writing. Otherwise, it creates problems with proper leave records management"

Obviously, the ESS team had to restrict the possible bottlenecks to the business processes. Once a leave application had been approved, HR staff would act upon to finalize and confirm the transaction. Reversing the application at this stage implies wastage of HR effort already spent on the transaction as well as additional work to effect the
cancellation. Furthermore, it increases the burden on the management of data. Thus, the HR division wanted to get the message through to the members of the organizational staff that they viewed such requests as special situations. On the other hand, if a leave application was rejected, supervisors were strongly encouraged to informally discuss with their employees the reasons behind their decisions.

O3 project manager:

"We did not force them (approvers) to give comments as to why they rejected the leave via the web. Instead, they can sort it out with their staff informally."

Also, electronic reminders and notifiers were incorporated into the system. Therefore, an email was automatically sent to a supervisor each time an employee had submitted a requested for leave to her/him. Employees were sent automatic email confirmations once they had submitted leave applications. This resolved any concerns with supervisors failing to remember to attend to online tasks, or employees feeling anxious about the transparency of the ESS workflows.

**The process of evolution**

The process of ESS evolution in O3 was iterative, but each cycle involved minor modifications. User concerns that could lead to remarkable changes were not considered on grounds that major enhancements to the system would cost the organization a substantial sum of money.

O3 project manager:

"...you go back to your vendor and say – "these are our views about things that need modification" – you can give these to them as part of their product analysis themselves and they determine, in their appraisal of their other users, whether this is a viable proposition. If they consider that it is viable, they incorporate this into the core product. Otherwise, we have to pay a lot of money."

This brings us to the kind of user feedback that was actually inculcated during the configuration of the WBIS. Apparently, most of the feedback proposed minor changes associated with the “look and feel” of the web interfaces.
"With the web system, we just got the product from the vendor and launched as it is...we only customized a few things, such as the pay slips view and so on."

The fact that only minor concerns were incorporated into the iterations of the ESS is implied by the dotted boundaries around the resultant requirements. O3 strategies translated into business needs for a web system that included objectives of streamlining HR operations, improving services to staff, and better management of HR data.

![Diagram](image)

Figure 7. O3 evolution model

Since user validation was confined to minor features, the project team did not expect any critical issues arising. This is represented by the dotted arrow from user validation back to initiator concerns. In fact, the project manager pointed out that the feedback obtained suggested a high level of acceptance.

O3 project manager:

"There was feedback, but not a lot. The users were all quite happy with the system. You got to remember that we were giving them something that they never had before."

**Criticality of concerns**

The prime concern was the confirmation of leave applications in the workflow, which the project manager claimed was a loophole the vendor had overlooked. It applied to staff, who worked during weekends and vacations. Like most tertiary educational institutions,
lectures in O3 were held during weekends and special intensive courses organized over summer holidays. Formal applications for leave did not apply to these periods, which meant that technically the ESS should have been configured to warn users if they had included such periods. However, business rules to enforce this had not been embedded into the application, as a result of which the ESS team was forced to review each leave applications before final confirmation.

O3 project manager:

"It (the leave application) is automatically entered into the database...you can see it online as it sits on the database. But it is not a confirmed transaction...it will not be paid nor will the leave balance be reduced...so you can tell that it is not a confirmed transaction. So we have a quick look at it and go -- 'okay, we confirm it' - and it just becomes part of the normal processing."

This was actually a concern expressed by the project team itself, as it was perceived as an obstacle to the smooth functioning of the web-enabled workflows.

O3 project manager:

"It's just something in there that they (vendor) have not got quite right. There is a fix on the way for that, but until such is in place, I won't authorize it to be a confirmed transaction. This is because there's room for errors here."

Security was undoubtedly another area of serious concern to the ESS management. At the time the interview with the O3 project manager was conducted, the system was accessible only through computers on any of the campus networks. This was enforced to alleviate the initiator security concerns due to the fact that both the ESS and the database were on the same server.

Researcher: It says in your manual that at this time the web system can only accessed on-campus. Is it still the case?

O3 project manager:

"Yes, it is at the moment. That's a security issue because we only have got only one server...so, both the database and web kiosk sit on one server. So, the firewall is around the organization. So, you access it only if the system knows that your machine is part of O3 intranet."
This was not well received by some staff members, as ideally, a web system should be accessible from any location and at any time. The project team later resolved the issue by moving to another platform with two servers, one inside the firewall holding the database, and the web-based employee kiosk sitting on the server outside the firewall. This allowed users to access the system from remote locations, such as the privacy of their homes.

Perceived outcome of the project

According to the project manager, the implementation of ESS enabled the organization to achieve its business needs. The most apparent benefit experienced was the reduction in paper work. The other gains included reduction in leave and timesheet processing costs, and in HR workload owing to routine tasks.

Of course, the ESS team had to be tactful with how the implementation was spread across the organization, so as not to be seen as staff members as imposing the system onto them.

O3 project manager:

"They (the academic departments) were initially not keen on using the web system, because they thought this would change the way they have been working for years. This is why we had to take steps to clarify and explain the benefits of the web system to them, and the fact that this would not necessarily mean a radical change in their work culture or ways of doing things."

Textural-Structural Description: O4

O4 was another prominent Australian university to implement the ESS in order to provide HR services to its staff. The decision behind the adoption of the web system was the O4 strategic goals. The HR division, also the initiator in this case, established the ESS project team, comprising of members with technical and Internet expertise, drawn from within the division.

O4 project manager:

"In implementing the initial phase of the ESS the main strategic benefit we anticipated was introducing staff to the system and its basic functionality."
Operationally, it was anticipated that this would reduce the number of payroll related enquiries (by providing staff with access to their pay slips) and would enable staff to update their own personal data reducing queries to the Personnel Services Teams."

The baseline stakeholders included the HR division (of which the ESS team was a part of), departmental administrators, supervisors, and employees. The interview was conducted with one of the project managers involved with implementation of web-enabled HR services in O4. At the time of the interview, the ESS was providing services such as employee access to their personal and employment details including the shifting of data entry to them, and timesheet and leave approval processes. Employees were still able to submit these documents themselves (i.e. they had to be entered by administrative staff) but supervisors were able to make decisions on them in the web environment. Further services were planned for subsequent cycles in the evolution of the web system.

O4 project manager’s experience with requirements elicitation

The O4 project team did not conduct any form of formal requirements gathering from the target users. Instead, they followed what they termed a “vanilla” approach, i.e. they observed similar projects being implemented in other organizations, and applied some of the requirements and experience into the beta version of their own ESS. This was then presented to the users in order to obtain their validation and feedback. Successive iterations of improvement and enhancement then followed, which allowed the system to evolve. Thus, issues of user concern were gathered from each evolutionary cycle and subjected to consideration.

O4 project manager:

"The intention was to following this with a user assessment for developing for future phases."

O4 project manager’s experience with Data Entry, View & Update, Validation and Support concerns

One of the main user concerns experienced by the project manager was the usability of the web system. Users were concerned about the difficulty and allocation of time associated with their usage and involvement with the system. The concerns were
especially significant because they were mostly busy with their usual workload, owing to which they were hesitant to devote too much time having to receive HR services via the web. Thus, the ESS team configured the system to be simple and easy-to-use in such a way that users with even the minimal level of computer and Internet proficiency were able to access and work with the system. In other words, the functionality was incorporated into the interfaces in such a way that employees were able to use the ESS without any special training. Of course, training was provided to the administrative staff and supervisors, as their involvement with the ESS was directly linked to the workflows, which were relatively more complex or necessitated further understanding of organizational policy and business processes.

O4 project manager:

"The main concerns expressed by users were, firstly, in relation to the usability of the system. At the University we have staff with concurrent jobs. To cater for this in the ESS, we had to make customizations that made navigation easier for staff with one job to navigate."

To guide the employees in the navigating through the various steps in the kiosk, the project team included an online tutorial and other web-based Help facilities.

The other main concern, reported by the project manager, was the fact that the users were unaware of their login and password details. To alleviate this concern, the ESS management set up a Helpdesk unit within itself to administer these details. Information regarding how and where to obtain access codes was conveyed through the various organization-wide channels of communication, such as emails, offline staff message boards, and even through circulars to individual departments. Some of the other standard issues included data integrity and validation concerns expressed by HR.

O1 project manager's experience with Workflow Concerns

Some of the concerns identified were standard workflow issues, such as escalation of approval authority in case of contingencies (i.e. supervisor being absent and not attending to their electronic in-trays), transparency of the web-enabled workflows, confirmation of online document submissions, and electronic reminders and notifications.
Criticality of Concerns

Security and privacy issues were perceived as the most critical concerns. The former was of particular concern to the ESS management, and they decided to enforce a 128-bit encryption to ensure security.

Privacy was a major concern to employees as they were anxious with the fact that their details were online and could be accessed by an unauthorized user. To alleviate the concern, the O4 project team established strict rules about login and password details, and set up measures to monitor and track the user access and data modification.

O4 project manager:

"For most staff, this was satisfactory (security measures) but others objected to having their details "on the web", even though this is not the case. In addition to ensuring the highest level of security we also liaised with our Privacy unit to ensure that we were complying with the relevant Privacy legislation."

Perceived outcome of the project

At the time of the interview, O4 was still in the midst of implementing the ESS. Certain features were being added or planned for incorporation at later stages. These included online leave applications and full migration to online payslips. Despite the initial resistance from the users, the project manager was confident of the successful rollover of the web-based HR services.

O4 project manager:

"The project was successful in terms of what we set out to achieve. However, most of the benefits will be realized in future stages so the key is to keep up the momentum to ensure maximum benefits for both staff and the University."

Textural-Structural Description: O5

O5 is also a well-known provider of outsourced payroll services, and has a client base that extends across Australia. With the advent of the Internet, O5 found a new mode of interaction with its clients, and offered them software that had a dial-up connection. Thus,
the clients were able to send timesheets, by filling in the pay data on the interfaces that came with the software or simply upload spreadsheets containing, to O5 by dialling up. Not only was the company providing payroll service, it was also an Application Service Provider (ASP).

In 2001, it decided to offer web-based payroll services to its bureau clients, which happened to be SMEs. Its larger clients were still using the dial-up connection or had special business-to-business networks in place. Bureau clients had their entire payroll and HR operations managed by O5, as they had no dedicated HR personnel. In-depth interview was conducted with the web project leader, referred to in the thesis as the O5 project manager.

O5 project manager:

“We are now offering services via the web, but many of our larger customers are still using the dial-up connection. We used to receive timesheets from our bureau clients via fax, but now they are able to send pay data through the web-based interfaces. So, rather than faxing us pay details and changes to employee data, they can just key in the data onto the web interfaces.”

At the time of the interview, O5 was offering web-based timesheets and reports. Moreover, clients were able to view and update personnel records, and in some relatively larger enterprises, employee kiosks were put in place for individual employees to key in their pay data or update personal details. The project team was also working on a feature that would enable clients to send the list of newly recruited employees over the web.

**O5 project manager’s experience with requirements elicitation**

Preliminary requirements elicitation took place when a client decided to opt for the web services, and a contract, covering the fundamental aspects, was drawn out. A demonstration of the ESS was carried out with the client, and some customization of features, in accordance with the requirement specifications at this stage, was implemented. Following this, the client began to receive the web-based services as part of a pilot testing stage.
OS project manager:

"Once they start using the web services, they'll be going through the pilot testing stage. We'd set up their accounts and provide them with access, and they'd be able to use the main functionality provided in the interfaces and the workflows, such as the data entry screens, manager in-boxes, timesheets, and approval workflows. Then, we'd ask them if they had any problems or want to suggest improvements to the system. Based on their comments, we would make modifications."

Thus, the fine-tuning of service and system requirements took place on the basis of this feedback received from the clients. As the version of the ESS presented to them at the outset of the pilot testing stage consisted only of the basic features, the feedback was the prime source of enhancements. Furthermore, clients made their concerns known through the feedback mechanism.

OS project manager:

"Their feedback is the main source of requirements, coz the system presented to them during pilot testing is basic, and so, we enhance on the basis of their feedback. So, the enhancements will be the parameters or business rules the clients want to have enforced into the system."

The decision to adopt web technology to extend web services was driven by the strategies of the payroll provider, which led to business needs for increased productivity, competitiveness, and enhancement of client satisfaction. The process of system evolution in the web-based payroll project was cyclical as the initial version presented to the clients at the outset of a web contract was basic, and included the requirements of OS. The process of evolution is illustrated in Figure 8. On the basis of client validation during the demonstration by the project team and the contractual agreements, the web system was modified to inculcate their requirements or features that alleviated their concerns. This was followed by the pilot testing stage where the ESS was further validated by clients through the feedback mechanism, thereby triggering another cycle of system evolution. This was an ongoing process and new features were being added continually.
O5 project manager’s experience with Data Entry & Validation, View & Update concerns

O5 aimed to achieve cost-savings by shifting data entry to the clients. Likewise, it intended to translate these cost savings into more competitive processing fees for web service clients. Being aware of the fact that this meant the clients, many of whom possessed a minimal level of IT and Internet skills, will have to enter the pay data and get involved in the ESS workflows themselves, the project team kept the interfaces simple and user-friendly and confined the number of steps to navigate through the payroll workflow to a minimum. Data integrity and validation rules were embedded into the ESS, so that users are informed immediately and precisely of the field they had entered incorrectly.

O5 project manager:

"So, rather than filing in a paper-based form and faxing it to us, the bureau clients (SMEs) can enter the data directly onto the web interface and send it to us. The system is not batch-processing...it’s real-time...so the data entered by the clients is validated then and there."

To provide further support for the data entry by clients, the O5 project team set up pop-up error messages that not only indicated the fields of erroneous data but also provided hints and suggestions on rectification.
O5 project manager:

“It’s real time validation so the employee get a message on his/her screen stating the fields that have been entered incorrectly, and the pop-up message also has a “help” button that provides suggestions on how to resolve the errors.”

Other forms of support included online demos and the incorporation of a requirement that allowed pay data in a timesheet to be repeated from the previous pay cycle. In addition, training was imparted to clients when they signed to receive payroll services via the web.

O5 project manager:

“...we provide training and demonstrate how to use the system once a new client signs in for web services. We assign a manager to each client, and he/she looks into issues of system usage and arranges training. This manager is the account manager, and it is his/her job to oversee the installation of the solution and the training of users...we train our clients, who, in turn, impart the training to their employees.”

As part of the web services, remuneration reports and payslips are published on the web as well as included in the CDs sent to the clients at the end of every pay cycle and financial year.

**O5 project manager’s experience with Workflow concerns**

When it came to the ESS workflows, clients voiced a number of issues that raised concerns with the O5 project team. The main focus was on the payroll workflow. Thus, it was imperative to keep users informed of status of their timesheets in the web-enabled pipeline. Thus, when a manager approved a timesheet and sent it to O5 for processing, an email notification was automatically dispatched to the employee informing her/him of the fact. Occasionally, a timesheet might get rejected by the manager, in which case an email is sent explaining the reasons behind the rejection. On the other hand, if the document had been sitting in the manager’s electronic in-tray for a number of days, the employee was able to pursue the matter through the ESS.
O5 project manager:

"If it (timesheet) has not been approved for a certain period of time, the employee is able to track down and investigate the reasons why it was not approved."

Thus, the employees of some clients are able to fill in timesheets themselves and then submit for approval, while in some others, the clients themselves entered the timesheets onto the web after approving it on paper. In any case, clients were prompted by the ESS to reconfirm the pay data before the timesheets were finally sent for payroll processing. This gave them an opportunity to review and ensure that the pay data was indeed correct. However, editing the data was not possible once the timesheets had been finalized and sent to O5, as this could potentially increase unnecessary difficulties in payroll processing.

O5 project manager:

"Sometimes after the EFT (money paid to the employees), the client might discover from their reports that they’ve made a mistake in their payments...so they are allowed to open the pay record and rectify the mistake. Of course, they can’t rerun the payroll process once they have finalized the process, coz we have already started processing the timesheets (so it will be big problem to us)."

To alleviate client concern about the status of these timesheets, an email is sent to them automatically after submission to confirm them of the fact that O5 had received the documents and was going to process them shortly. Furthermore, such notifications are also dispatched when deliverables are made available online.

Another issue of concern to clients was associated with the absence of the O5 account manager, who was essentially the point of contact with the payroll provider and took care of their needs. Approved timesheets, once submitted by the clients, were sent to the electronic in-trays of the account managers. If the account manager failed to attend to the documents within a specified period of time, escalation to the next managerial level took place. However, in such situations, the documents were diverted to a substitute manager’s in-tray.
The critical concerns

Security was an issue that was perceived as a critical concern. The standard solution was to provide logins and passwords to each user of the ESS. However, this was subject to an agreement between the client and O5. In other words, if a client wanted to grant access to its own staff, this had to be discussed with the O5 project team and included in an audit report. This facilitated a more effective security management.

The creation of user profiles was also considered as a solution to alleviate the security concerns. The profiles were established according to the status of the user in the client organization hierarchy.

O5 project team:

“A payroll manager in Tasmania is able to see records of employees, at all levels, working in the branch in Tasmania, while his counterpart in Queensland is able to do so with all the records there. The payroll manager in the HQ, on the other hand, can access payroll records in all the branches across the country.”

When it came bureau clients, the client-manager was able to access the timesheet details of all employees, while the latter was only able to view their own personal details, and timesheet. Thus, the web contract also included the access privileges, along with the login and passwords discussed earlier.

O5 project manager:

“So, when a client asks us to set up a web-based HR services solution for them, they need to provide us with information on access privileges of the different types of users and so on, coz we need to set up the system and allocate passwords and stuff.”

Perceived outcome of the project

Overall, the project manager expressed optimism about the project, and regarded the launching of web services as a success. This was inferred on the basis of the projected cost reductions, streamlined payroll process, and general convenience that were expected to be mutually beneficial to both parties, i.e. to the clients as well as O5.
**Researcher:** So, you are quite optimistic about the web services?

O5 project manager:

“Yes, we are. Also, we expect to get a good adoption rate from our bureau client segment. It will result in cost and time savings for the clients.”

**Textural-Structural Description: O6**

The textural-structural description of O6 can be found in chapter 5.
Appendix A5: Sample Voice Tables

Due to the large size of the voice tables (totalling over 40 pages in total), only a sample of voice tables associated with the narratives of organisations discussed in the thesis have been included here. The reader may on occasion notice some discrepancy in the issue numbering sequence in chapter 5 and in the following voice tables. This is to increase the readability of multi-table data, as sourced from the following user voice tables.

**User Voice Tables: O1**

<table>
<thead>
<tr>
<th>STAKEHOLDER TYPE</th>
<th>CHARACTERISTICS</th>
<th>CONCERNS</th>
<th>BUSINESS NEEDS</th>
<th>REQUIREMENTS</th>
<th>CONSEQUENCES</th>
</tr>
</thead>
</table>
| HR (initiator)   | 1. HR department of university  
                   2. Separate from the IT division. | 1. “Reduce transactions at the data entry within HR” | 1. Reduction in costs associated with routine transactions, such as data entry, printing hard copy deliverables, postage and mailing of payslips.  
2. Streamline workflows | 1. Shift data entry to the user-stakeholders (clients)  
2. Timesheets and leave applications to be approved online. | 1. Unceasiness on the part of employees and supervisors with the web system.  
2. More time for value-added work.  
Consequences 1 and 2. |

* Online payslips yet to be implemented.
<table>
<thead>
<tr>
<th>STAKEHOLDER TYPE</th>
<th>CHARACTERISTICS</th>
<th>CONCERNS</th>
<th>BUSINESS NEEDS</th>
<th>REQUIREMENTS</th>
<th>CONSEQUENCES</th>
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<tbody>
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<td></td>
<td></td>
<td>2. Paying exiting employees for the last few days of their work, while, in actuality, they were on leave - the problem of over-payment.</td>
<td>No associated business need</td>
<td>4. Provide electronic in-tray for supervisors and departmental administrators.</td>
<td>4. Electronic in-tray enabling better monitoring of workflows</td>
</tr>
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<td></td>
<td></td>
<td>3. &quot;No idea that an application for leave was sitting on someone's desk waiting to be decided upon.&quot;</td>
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<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>4. Increasing technical support and training to the user community</td>
<td>3. Improve client services</td>
<td>5. Provide training and support. 6. Provide on-line Help.</td>
<td>5. Reduces user resistance. 6. Training and user-support diminishing the time saving from reduced data entry by HR</td>
</tr>
<tr>
<td></td>
<td></td>
<td>5. Increased web administration (&quot;maintain people's usernames and passwords&quot;)</td>
<td>4. Owing to the nature of employee services, the workflows need to be secure and the confidentiality, validity, and accuracy of information flowing through is of great importance.</td>
<td>7. Username and password management (security issue)</td>
<td>Alleviates the concern.</td>
</tr>
<tr>
<td>STAKEHOLDER TYPE</td>
<td>CHARACTERISTICS</td>
<td>CONCERNS</td>
<td>BUSINESS NEEDS</td>
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<td></td>
<td>6. “Answer phone calls when people don’t know what to do”.</td>
<td>Business need 3</td>
<td>8. Web management team made of personnel who understand both technical aspects and importantly, the business processes.</td>
<td>Alleviates the concern.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>7. At the same time, gradually minimize the need of employees to phone HR on routine matters.</td>
<td>Business need 2</td>
<td>Requirement 6</td>
<td>Consequences 6 &amp; 7.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>8. Increased level of resources needed and additional administrative work and user training to implement digital signatures.</td>
<td>Business need 4</td>
<td>9. A separate set of login and passwords for approvers.</td>
<td>Alleviates the concern</td>
</tr>
<tr>
<td></td>
<td></td>
<td>9. Lack of IT understanding of business processes.</td>
<td>No associated business need</td>
<td>10. Familiarize new IT staff about business processes.</td>
<td>8. Not apparent whether the familiarization of IT staff with business staff has had an impact or not. Alleviates the concern,</td>
</tr>
<tr>
<td></td>
<td></td>
<td>11. Data integrity and accuracy of information.</td>
<td>Business need 4</td>
<td>11. Immediate validation of input data.</td>
<td>Alleviates the concern</td>
</tr>
<tr>
<td>STAKEHOLDER TYPE</td>
<td>CHARACTERISTICS</td>
<td>CONCERNS</td>
<td>BUSINESS NEEDS</td>
<td>REQUIREMENTS</td>
<td>CONSEQUENCES</td>
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<td>12. &quot;Biggest impediment to our organization – cultural change&quot;, or the resistance put up by power groups to changing their ways of doing work.</td>
<td>No associated business need</td>
<td>12. Initiate parallel web-enabled and manual workflows.</td>
<td>9. Parallel web-enabled and manual workflows off-setting some of the productivity gains.</td>
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<td></td>
<td>10. Parallel web-enabled and manual workflows reduced resistance from some users.</td>
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<td></td>
<td></td>
<td>11. &quot;We can’t reach out to very single person (client) in the organization and get their opinions personally (regarding the web system)&quot;.</td>
<td>No associated business need</td>
<td>Requirements 5 &amp; 6</td>
<td>Consequences 6 &amp; 7.</td>
</tr>
</tbody>
</table>

Table 36. Initiator (HR) Voice Table
<table>
<thead>
<tr>
<th>STAKEHOLDER TYPE</th>
<th>CHARACTERISTICS</th>
<th>REQUIREMENTS</th>
<th>CONCERNS</th>
<th>RESULTANT REQUIREMENTS</th>
<th>CONSEQUENCES</th>
</tr>
</thead>
</table>
| Supervisor       | 1. Academic administrator  
2. Approves pay and leave applications | 1. Shift data entry to academic administrators (requirement 1 in Initiator voice table) | 1. Need proper training | 1. Provide training sessions for departmental supervisors and administrators. | 1. Ensures stakeholder familiarity and commitment  
2. Training and user-support diminishing the time saving from reduced data entry by HR. |
|                  |                | 2. Not everyone can make it to training sessions.  
3. Not everyone can remember every feature demonstrated in training sessions. | 2. Provide online support, such as online demonstrations of workflows and Help features. | | 3. Necessitates the dedication of resources that diminishes some of the cost savings of implementing the web system.  
4. Alleviates the concerns |
|                  |                | 4. Minimization of data entry. | 3. Routine data (such as regular payments from one period to another) can repeated on to new online documents (timesheets) | | 5. Departmental administrators’ data entry tasks made easier. |
|                  |                | 2. Data entry by employees (requirement 1 in Initiator voice table) | 5. “Being able to rely on the information (such as leave data) that is entered into the system or put on hold” | 4. Embed input validation rules that check with the database to ensure that data entered is correct | 6. Reliable and accurate data.  
7. Further dedication to data management. |
<table>
<thead>
<tr>
<th>STAKEHOLDER TYPE</th>
<th>CHARACTERISTICS</th>
<th>REQUIREMENTS</th>
<th>CONCERNS</th>
<th>RESULTANT REQUIREMENTS</th>
<th>CONSEQUENCES</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>3. Timesheets and leave applications to be approved online (requirement 2 in Initiator voice table).</td>
<td>6. Supervisors resent having to navigate through several interfaces to find all the documents that are awaiting their approval.</td>
<td>5. Provide electronic in-tray for supervisors and departmental administrators.</td>
<td>8. Alleviates the concerns of supervisors related to disruption in their modus operandi and work organization.</td>
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<td></td>
<td></td>
<td></td>
<td>7. Supervisors expect the web system to organize documents awaiting approval in the same way that’s done on their desks.</td>
<td></td>
<td>9. Ineffective for supervisors who seldom check their in-trays.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>8. Supervisors may be late or forget to check their electronic in-trays for documents awaiting their approval.</td>
<td>6. Electronic reminders, such as emails.</td>
<td>Alleviates the problem.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>9. Supervisors prefer a list of applications that have been approved, disapproved, or need attending to.</td>
<td></td>
<td>10. Ineffective for supervisors who have no access to email.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>10. Supervisors will be concerned with the processing of the documents, such as timesheets (after these are approved) carried out by HR/payroll.</td>
<td>7. Indicate status of the applications in the workflow.</td>
<td>Alleviates the concern.</td>
</tr>
<tr>
<td>STAKEHOLDER TYPE</td>
<td>CHARACTERISTICS</td>
<td>REQUIREMENTS</td>
<td>CONCERNS</td>
<td>RESULTANT REQUIREMENTS</td>
<td>CONSEQUENCES</td>
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<td></td>
<td></td>
<td>4. Digital signatures for approvals of timesheets and leave applications</td>
<td>11. Time needs to be devoted to get digital signatures installed on computers. 12. Requires training on the usage of digital signatures 13. Not a portable technology 14. Adds to the resistance of already web-averse supervisors.</td>
<td>8. Provide another level of security to supervisors for approvals by means of special logins and passwords.</td>
<td>11. A separate set of access codes will ensure a simple yet secure level of supervisory workflow. 12. Such a simple level of security may not be adequate for more mainstream financial transactions, such as purchase orders and large fund transfers.</td>
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<td></td>
<td></td>
<td>5. Comments to accompany rejected applications</td>
<td>15. <em>Supervisors may not be willing to spend too much time on administrative tasks.</em> 16. Many supervisors prefer to communicate informally with their employees.</td>
<td>9. Allow supervisors to reject applications without providing explanatory comments</td>
<td>Alleviates the concern</td>
</tr>
</tbody>
</table>

Table 37. Supervisor/Departmental administrator voice table
<table>
<thead>
<tr>
<th>STAKEHOLDER TYPE</th>
<th>CHARACTERISTICS</th>
<th>REQUIREMENTS</th>
<th>CONCERNS</th>
<th>RESULTANT REQUIREMENTS</th>
<th>CONSEQUENCES</th>
</tr>
</thead>
<tbody>
<tr>
<td>Employee</td>
<td>1. Lecturer</td>
<td>1. Shift data entry to academic administrators (requirement 1 in Initiator voice table)</td>
<td>1. Need proper training</td>
<td>1. Provide training sessions for departmental supervisors and administrators.</td>
<td>1. Ensures stakeholder familiarity and commitment</td>
</tr>
<tr>
<td></td>
<td>2. Tutors, both full-time and sessional</td>
<td></td>
<td>2. Not everyone can make it to training sessions.</td>
<td></td>
<td>2. Training and user-support diminishing the time saving from reduced data entry by HR</td>
</tr>
<tr>
<td></td>
<td>3. Administrative officers, both full-time and sessional</td>
<td></td>
<td>3. Not everyone can remember every feature demonstrated in training sessions.</td>
<td></td>
<td>3. Necessitates the dedication of resources that diminishes some of the cost savings of implementing the web system.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>4. Minimization of data entry.</td>
<td></td>
<td>4. Alleviates the concerns</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>3. Routine data (such as regular payments from one period to another) can repeated on to new online documents (timesheets)</td>
<td></td>
<td>4. Departmental administrators' data entry tasks made easier.</td>
</tr>
<tr>
<td>STAKEHOLDER TYPE</td>
<td>CHARACTERISTICS</td>
<td>REQUIREMENTS</td>
<td>CONCERNS</td>
<td>RESULTANT REQUIREMENTS</td>
<td>CONSEQUENCES</td>
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<td></td>
<td></td>
<td>5. Knowing whether the data onto the web-based forms are correct and accurate.</td>
<td>4. Immediate validation of input data.</td>
<td>6. Employees are informed of incorrect entry, e.g. &quot;...if you are asking for leave, and you don't have entitlements, then it will reject your request...&quot;.</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>2. Immediate validation of input data.</td>
<td>6. Rejection of applications without precise error messages with cause frustration.</td>
<td>5. Precise error messages</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>3. Web-enabling all workflows and delivering all deliverables, such as pay slips, online</td>
<td>7. Lack of access of some employees to computer and internet facilities 8. Lack of IT and Internet proficiency of some employees.</td>
<td>6. Initiate parallel web-enabled and manual workflows, and delivery of hard copy payslips (in other words, making the usage of the web-enabled system optional).</td>
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<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>7. Alleviates the concern - &quot;It will inform you of the fields that have been entered incorrectly (onto the web form)&quot;.</td>
<td></td>
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<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>8. Some error messages need to be supported by appropriate Help features as assistance for rectification.</td>
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<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>9. Alleviates the relevant concerns.</td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td>10. Diminishes some of the projected productivity gains of HR with regards to the implementation of the web system.</td>
<td></td>
</tr>
<tr>
<td>STAKEHOLDER TYPE</td>
<td>CHARACTERISTICS</td>
<td>REQUIREMENTS</td>
<td>CONCERNS</td>
<td>RESULTANT REQUIREMENTS</td>
<td>CONSEQUENCES</td>
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</tr>
<tr>
<td></td>
<td></td>
<td>4. Timesheets and leave applications to be approved online.</td>
<td>9. Employees may be late or forget to submit timesheets on time.</td>
<td>7. Electronic reminders, such as emails.</td>
<td>11. Alleviates the concern.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>10. Employees expect transparency of the process in a web environment.</td>
<td>8. Indicate status of the applications in the workflow.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>11. Employees will be concerned with the outcome of the decisions made (approved or rejected) on their timesheets and leave applications.</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>5. Allow supervisors to reject applications without providing explanatory comments</td>
<td>12. Rejection without explanation will cause disappointment and frustration with employees.</td>
<td>9. Supervisors are encouraged to provide explanations behind rejections on the web, though it is not mandatory.</td>
<td>15. Reduced queries and complaints by employees.</td>
</tr>
<tr>
<td>STAKEHOLDER TYPE</td>
<td>CHARACTERISTICS</td>
<td>REQUIREMENTS</td>
<td></td>
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<td></td>
<td></td>
<td>6. Personal data can be updated and modified via the web system.</td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>ISSUES</th>
<th>RESULTANT REQUIREMENTS</th>
</tr>
</thead>
<tbody>
<tr>
<td>17. Not only does an unauthorized user need to hack into the system under your (employee) user name and password and perform a transaction, but also needs to intercept your email (electronic notification).</td>
<td></td>
</tr>
</tbody>
</table>

**Table 38: Employee value table**
<table>
<thead>
<tr>
<th>STAKEHOLDER TYPE</th>
<th>CHARACTERISTICS</th>
<th>REQUIREMENTS</th>
<th>CONCERNS</th>
<th>RESULTANT REQUIREMENTS</th>
<th>CONSEQUENCES</th>
</tr>
</thead>
</table>
| IT Divisions     | 1. System analysts, web designers, and programmers  
2. Five members who have developed a number of systems, including the web-HR workflow system, internal HR system, and web-based Student Information Systems. | 1. Special security features for supervisors to approve applications over the web.  
2. Online deliverables, such as salary history, and pay slips. | 1. Only usernames and passwords may not be adequate.  
2. "...we are using tools of the latest technology." | 1. Digital signatures for approvals of timesheets and leave applications | 1. Refer to the concerns of supervisors/departments with regards to digital signatures.  
2. Increased level of resources needed and additional administrative work and user training to implement digital signatures. |
|                  |                |              |          |                        | None reported. |

Table 39. IT division voice table
<table>
<thead>
<tr>
<th>STAKEHOLDER TYPE</th>
<th>CHARACTERISTICS</th>
<th>REQUIREMENTS</th>
<th>CONCERNS</th>
<th>RESULTANT REQUIREMENTS</th>
<th>CONSEQUENCES</th>
</tr>
</thead>
</table>
| Top management   | Top management in the university, comprised of academics, administrators, and various power groups. | 1. Shift data entry to the user-stakeholders (clients)  
2. Time sheets and leave applications to be approved online.  
3. Deliver pay slips and remuneration reports online.  
4. Special security features for supervisors to approve applications over the web. | 1. "Risk averse" nature of the top management (concerned about things going wrong due to the shift to the web-enabled system from a manual and non-web environment)  
2. "Risk averse" nature of the top management | 1. Initiate parallel web-enabled and manual workflows. | Reduction of some of the cost-savings that could have been realized with the implementation of the web-enabled workflow system.  
Refer to the consequences of the digital signatures in the IT division voice table.
### User Voice Tables: 06

<table>
<thead>
<tr>
<th>STAKEHOLDER TYPE</th>
<th>CHARACTERISTICS</th>
<th>CONCERNS</th>
<th>BUSINESS NEEDS</th>
<th>REQUIREMENTS</th>
<th>CONSEQUENCES</th>
</tr>
</thead>
<tbody>
<tr>
<td>Payroll (initiator)</td>
<td>a. Company providing outsourced payroll services to SMEs</td>
<td>1. &quot;...they (payroll staff) don't need to enter the data themselves as they had to previously.&quot;</td>
<td>1. Reduction in costs associated with routine transactions, such as data entry.</td>
<td>1. Shift data entry to the clients</td>
<td>1. &quot;...all they (payroll staff) have to do is get the timesheet data (comes as a file) though the web, press a button, and the data all goes in straight into the database...&quot;</td>
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<tr>
<td></td>
<td>b. Composed of various functional units, the relevant ones being client services</td>
<td></td>
<td></td>
<td></td>
<td>2. Frees up time for payroll staff to better serve clients.</td>
</tr>
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<td></td>
<td>c. Web development and administration team is included within client services unit.</td>
<td>2. Reduction in payroll workload from routine tasks.</td>
<td></td>
<td></td>
<td>3. &quot;...they (clients) may not be at a stage where they could claim to be PC-ready or Internet-ready.&quot;</td>
</tr>
<tr>
<td></td>
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<td>2. Streamline transactions</td>
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<td></td>
<td></td>
<td>2. Deliver remuneration reports online.</td>
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<td></td>
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<td>4. Reduction of paper work.</td>
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<td></td>
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<td>5. Revenue margin lost due to elimination of mailing and courier costs.</td>
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<tr>
<td>STAKEHOLDER TYPE</td>
<td>CHARACTERISTICS</td>
<td>CONCERNS</td>
<td>BUSINESS NEEDS</td>
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<td></td>
<td>3. Timesheets submitted over the web</td>
<td>7. Faster workflows (productivity gains), as quoted: &quot;...clients are of the view that the web service would be more efficient for them, in terms of the speed of the payroll process&quot;. 8. Consequence 2 &amp; 3.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>3. Improve client services</td>
<td>9. Ability to offer &quot;a personal touch to our clients&quot;.</td>
</tr>
<tr>
<td></td>
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<td></td>
<td></td>
<td>4. Staff should be made available to respond to client queries via phone, fax, or email at any point in time.</td>
<td>10. Dedication of resources. 11. Reduces user resistance to the web system.</td>
</tr>
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<td>5. Provide training and support. 6. Provide on-line technical support.</td>
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<td></td>
<td>7. Provide links to other relevant web sites, such as insurance service, superannuation funds, financial institutions, etc.</td>
<td>Consequence 11</td>
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<td>8. Set up web coordination team</td>
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<td>4. &quot;This need to provide full-fledged IT support will be greater as more and more clients opt for the web services&quot;</td>
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<td>5. &quot;...if clients have had a very bad experience using the web, they'll never ever adopt the services we offer through this medium.&quot;</td>
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<tr>
<td>STAKEHOLDER TYPE</td>
<td>CHARACTERISTICS</td>
<td>CONCERNS</td>
<td>BUSINESS NEEDS</td>
<td>REQUIREMENTS</td>
<td>CONSEQUENCES</td>
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<td></td>
<td></td>
<td>Consequence 3</td>
<td></td>
<td></td>
<td>contacted within 24 hours</td>
</tr>
<tr>
<td></td>
<td></td>
<td>6. Accuracy and integrity data entered by the users.</td>
<td>4. Accuracy and integrity of data flowing through the web system</td>
<td>9. Embed input validation rules that check with the database to ensure that data entered is correct</td>
<td>16. Reliable and accurate data.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>7. Reduction of service charges owing to cost reduction in data entry and processing payroll.</td>
<td>5. Profitability of the web venture</td>
<td>10. Restrict online queries and look-ups (related to requirement 3)</td>
<td>17. Further dedication to data management.</td>
</tr>
<tr>
<td></td>
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<td>8. &quot;So, if the clients opt for the full web service with the expectation of exemption from the Distribution and Handling charge, we lose that margin.&quot;</td>
<td>Business need 5</td>
<td>11. Place web services fee.</td>
<td>18. No reduction in service charges.</td>
</tr>
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<td>19. Pays for increased levels of web management.</td>
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<td>20. Clients expect cost savings from the adoption of web services.</td>
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<td>STAKEHOLDER TYPE</td>
<td>CHARACTERISTICS</td>
<td>REQUIREMENTS</td>
<td>CONCERNS</td>
<td>RESULTANT REQUIREMENTS</td>
<td>CONSEQUENCES</td>
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</tbody>
</table>
| Client           | 1. Small and medium size enterprises (SMEs)  
2. Involved from a range of industries, such as plumbing, electricals, to various services.  
3. Computer and Internet proficiency varies. | 1. Shift data entry to clients                    | 1. Need proper training                            | 1. Provide training sessions                        | 1. Ensures client familiarity and commitment                   |
|                  |                                  |                                                   | 2. Web technology may be new for some clients      | 2. Provide online support, such as manuals, online demonstrations of workflows and Help features. | 2. Necessitates the dedication of resources.                  |
|                  |                                  |                                                   |                                                   |                                                   | 3. Alleviates the concerns                                  |
|                  |                                  |                                                   |                                                   |                                                   | Requirement 7 in Table 40. Initiator-payroll voice table     |
|                  |                                  |                                                   |                                                   |                                                   | Consequences 12-15 in Table 40. Initiator-payroll voice table |
|                  |                                  |                                                   |                                                   |                                                   | 3. Web interfaces should be simple and user-friendly        |
|                  |                                  |                                                   |                                                   |                                                   | 4. Reduces client resistance toward the web system.         |
|                  |                                  |                                                   |                                                   |                                                   | 5. Clients are informed of incorrect entry,                |
|                  |                                  |                                                   |                                                   |                                                   | 6. Rejection of applications without precise error messages with cause frustration. |
|                  |                                  |                                                   |                                                   |                                                   | 7. Alleviates the concern.                                  |
|                  |                                  |                                                   |                                                   |                                                   | 8. Messages need to be supported by appropriate Help features as assistance for rectification. |
|                  |                                  |                                                   |                                                   |                                                   | 9. Alleviates the concern.                                  |
|                  |                                  |                                                   |                                                   |                                                   | 10. May not effective for those clients who don't check their emails regularly. |
|                  |                                  | 2. Immediate validation of input data (same as resultant requirement 3).  
3. Timesheets to be submitted to payroll over the web prior to the specified due date. | 4. Rejection of applications without precise error messages with cause frustration (related to consequence 5). | 5. Precise error messages |
<table>
<thead>
<tr>
<th>STAKEHOLDER TYPE</th>
<th>CHARACTERISTICS</th>
<th>REQUIREMENTS</th>
<th>CONCERNS</th>
<th>RESULTANT REQUIREMENTS</th>
<th>CONSEQUENCES</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>4. Timesheets are submitted to effect payroll transactions for the current pay period.</td>
<td>6. Some employees may need to be paid in advance</td>
<td>7. Allow clients to submit timesheets beyond the current pay cycle.</td>
<td>11. Alleviates the concern.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>5. Fee placed on ad-hoc and additional reports.</td>
<td>9. &quot;Since our clients are mostly SMEs, they are very price conscious.&quot;</td>
<td>9. Provide customisable reports on the web.</td>
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<td>13. Accords clients the flexibility to choose the format for a report.</td>
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<td>14. &quot;...the information that they are actually interested in might be included in a few reports. But with our proposed Christmas (customisable) report, clients will able to choose the data fields that they would like to be published in a single report.&quot;</td>
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<td></td>
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<td></td>
<td></td>
<td>15. Dedication of payroll resources to develop and maintain this feature.</td>
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</tbody>
</table>

Table 41. Client voice table
Appendix B1: MAGMA Case Study

This case study has been used in the evaluation studies of the ESS experience patterns.

Background

MAGMA Publishing is in the printed media business. It owns several magazines and a major business newspaper, and employs over 200 full time staff, and over 150 adjunct staff nation wide. These employees consist of reporters, copy editors, layout artists, and senior editors (who assume a supervisory position). Most of the full-time reporter work on-location, while a large number of the copy-editors are part-time employees working on an hourly basis.

Adoption of a web-based Human Resource information system (HRIS)

With the growth in size and scale of operations of MAGMA, the HR division has been facing certain difficulties, which had significantly increased overhead. These included the unnecessary work associated with processing leave and overtime pay applications from reporters who were on-location, as well as timesheets from the large number of part-time copy-editors. The situation was made critical by the fact that some supervisors (senior editors) were themselves on-location or on leave themselves. HR staff were burdened unnecessary processing work as a result of late receipt of leave applications and timesheets. On top of all these, they had to face up to disgruntled employees who lodged complaints about late notification of leave approval or late receipt of remuneration. The urgent need to reduce overhead and streamline operations led the HR managers to consider the adoption of a web-enabled application, which could be used as an interface to engage all employees in the workflows.

The plan to adopt a web-based system was welcomed by all, as it was aimed at eliminating the grievances of all parties, namely, employees, senior editors, and HR. Consequently, the HR division teamed up with MAGMA IT services. Together they worked on an assessment of the strategic and operational benefits that a web-based medium could yield. Accordingly, a plan was laid out and the original vendor (the provider of the non-web HRIS) was contacted to upgrade the system and provide the web front-end. With regards to the plan that the HR director stated:

"Increasing employee satisfaction and motivating employee productivity is something we (HR) are definitely responsible for. Thus, we believe that the implementation of a web-enabled workflow system that will facilitate our interactions with our clients (employees and supervisors) will enable us to carry out our strategic goals of fostering employee satisfaction, performance, and achievement, and at the same time reduce unnecessary processing work on our part and save some trees (reduce paper-based documents)"

Owing to the inherent difficulties in conducting formal requirements gathering sessions with MAGMA staff, the team decided to get the vendor to install a prototype and a beta testing stage was begun. Training sessions, directed at different parties respectively, were organized and conducted at different times in order
include as many members of the staff as possible. The beta stage was carried out for a period of four months. Communication channels were kept open, and trainers from the vendor as well MAGMA IT staff were assigned to assist and take note of comments from the different groups of users.

**Problems encountered in the deployment of the web-based HRIS**

The optimism of the HR division was short lived. The beta testing phase uncovered a whole set of concerns that were unanticipated. After a few weeks of launching the prototype, a number of part-time copy editors complained that the hours they had entered for attending meetings (which are contractually paid for) in the web timesheets, were not actually considered for remuneration. When HR approached the respective supervisors about these, they found out that the latter had actually approved the timesheets. This left the HR staff baffled as to why the hours for meetings failed to show up on their interfaces. According to one HR manager:

"We had no idea that they (the copy editors) were supposed to receive payment for the meetings. I mean these hours did not show on our screens. We only saw the hours for work, and paid them accordingly."

Another problem arose when a reputed journalist, working on location, expressed her dissatisfaction with the web system by stating:

"I was very busy chasing up a story in Madagascar, but I realised that I needed to urgently apply for that annual leave I had accumulated. So, I spared myself some time to fill in the leave application on the web and then sent it. However, upon my arrival, I found out that the application had not yet been approved because Terence (the senior editor), himself, has had been overseas covering a story. So, now I can’t even take my leave on the date I applied for. Before this web system was implemented, I used to just send him an email, and receive a reply promptly."

Her concern has been shared by several other journalists who are usually busy working on stories in different locations. According to another journalist:

"During the training sessions, we were shown how easy it was to lodge leave applications. We were told that the web system would take the burden of chasing senior editors off our shoulders, and that the outcome of their decisions will be posted in our web inboxes. But, this is not the reality. My editor rarely checks his own inbox owing to his rather tight schedule. He probably would have checked it if he knew that there were documents sitting there waiting for his approval. Meanwhile, I am still following the old system of using paper-based forms and leaving them with his administrative assistant."

Senior editors complained that, being journalists themselves, they need to work on-site, and thus, they are unable to attend to administrative matters while they are away.

"I simply can’t look into leave applications or timesheets sitting on my inbox while I away working on a story. This is why I delegated my approving authority temporarily to my no. 2, and the actual checking of the data to my secretary. Therefore, when one of my staff sends a document for approval via the web workflow system, it should not be directed to my inbox, but to that of my no. 2 instead."

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On the other hand, several members of staff had reiterated that once they submitted the documents online, they were left pretty much in the dark. They had no clue as to whether these had been already viewed by their supervisors or not.

Another incident that caused uproar with the part-time staff members was when they were trying to submit their timesheets. Despite their entry of data correctly, and following the steps of the workflow as per the online Help facility, the system refused to accept their submissions, and kept on issuing error statements instead. One such user, who was particularly vocal about her dissatisfaction with the pay submission workflow put forward:

"It simply kept on showing these error messages that made no sense at all. I was absolutely sure that I had entered the hours correctly in the right fields. After a few attempts, I rang up Help desk. To my disappointment, the Helpdesk staff was not able to help and instead insisted that I had filled in the timesheet incorrectly. However, I was adamant, and then he tried to enter the data onto the timesheet on my behalf, but it still did not work."

In fact there had been repeated complaints about the lack of competence of the Help desk staff. Upon investigation into the problem, MAGMA IT discovered that a bug had mysteriously crept into the timesheet workflow module, as a result of which the ambiguous error messages were being generated. This delayed the subsequent steps of the workflow, such as approval and processing. To the utter disappointment of HR, they had to revert back to the pre-web days when they had key in payroll data into the system themselves, though this was only for one pay cycle.

**The Task**

The case study is to be done in a group, where discussions are strongly encouraged. After carefully reading the case, write system requirements that best address the business needs while alleviating the concerns of stakeholders involved using the patterns provided.
Appendix B2: MAGMA Assessment by Domain Expert

The following problems and their solutions have been identified in the MAGMA case study by an independent ESS domain expert.

**Observed Problems**

1. **Inconsistent use of email**
   - Some people act on emails advising of leave applications.
   - Others check email less often and miss the reported “leave dates”.

2. **Inconsistent processes**
   - Some business processes are linked to individuals rather than their positions or tasks performed.

3. **Length of beta testing**
   - It is not clear that problems found in a one month of beta testing have been resolved.

4. **Help desk processes**
   - Problem escalation and prioritising not defined explicitly.
   - Lack of training for help desk operators.
   - So implementers could not identify the reported issue as a bug!

5. **Requirements gathering**
   - No requirements were collected.
   - No analysis of the current system.
   - Obvious that people involved (from original Dev) had no idea about the underlying business rules (definition of changeable hours).
   - Current processes of delegating authority not supported.
   - Thus the implemented workflow is not based on needs.

**Things to Do**

- Workshop with reps from Journalist Editors, Assistants and HR to discuss expectations, needs and difficulties related to working on locations.
- Analyse back-end system input needs to define the data requirements and to define rules on late submissions, early (estimate) submissions.
- Workshop on current workflow and define optimal new / flexible workflow.
- Requirements should be listed, prioritised by stakeholders.
- Prototype should not go into beta-testing. Use prototype to review functionality (agreed on requirements and on-going changes to reqs). Beta-test a frozen release. Do it in parallel with old system as a pilot to gather feedback.
- Plan environment, i.e. Help Desk and support processes.
- Plan training to show how exceptions are to be dealt with and what escalation mechanisms are built in (e.g. if action is not taken, an alternative 2nd level person is to be alerted, or 3rd so to minimise if not eliminate the lack of response time).
- Timesheet authorising as a process needs to be carefully reviewed and discussed because if no checking takes place the whole authorisation is a redundant activity that does not add value. Better value (perhaps) would be some authorising process by HR at head office to do checking to detect abnormal claims.
Appendix B3: Direct Observation Exercise with ESS-A

The following transcript describes the discussion captured in the session aimed at evaluating the ESS experience patterns by means of direct observation of an ESS team.

Sample transcript

- P1: We're going to take them one at a time.
- P3: We'll work through the problems as we see them.
- P1: Yes, work through them; find the common problems and work through the possible scenarios from the patterns.
- P2: No stakeholder input. It was just HR versus IT and in terms of the HR they developed and implemented the operations of the system (to address the strategic objectives) without consulting the stakeholders.
- P1: No problems on page 1.
- P2: We've identified a problem in the second paragraph on page 2. They haven't done enough marketing of the project / concept. Did no research on other HR web offerings.
- P1: Let's move to page 2.
- P3: I have identified a communication problem.
- P5: Before the communication problem there's another one....was the fact that the HR division had not conducted any form requirements gathering, so they do not understand what their users expect or are looking for from the system.
- P4: No formal requirements.
- P3: Any patterns?
- P1: I don't think there are any specific patterns as such, but we could probably use the patterns en-masse – they do provide a starting point.
- P4: Anything else in paragraph 2?
- P5: It ties in with the specifications. It also relates to the fact that there was no proper data validation. At that point. The business rules were not properly embedded, as to what was acceptable and what wasn't.
- P3: The Automated Input Validator pattern is useful here.
- P2: They should have identified the clients and the different types of clients, as well as the issues around the different types of clients.
- P1: Last paragraph (p2)
- P3: Lack of confidence in the system.
- P1: Looks like it may be the training pattern.
- P4: The manager doesn't check his inbox because he's overburdened. It looks like poor time-management.
- P1: It's not just that, but it's also the lack of communication.
- P2: Doesn't understand the importance of checking his inbox.
- P1: Is it also the fact that they're not flagging for it?
- P2: Further training should be provided to supervisors.
- P4: The problem is that the editor is not checking his inbox.
- P1: What's causing the problem? Let go through each of the patterns to see what can be applied here'
• P1 – P5 (all in agreement): Status Indicator, Electronic In-tray, Aide Memoire, The Authorizer, and The Usage Trainer patterns are relevant here

• P5: My point was that the person who was going to approve the leave was on leave himself, so obviously there was no contingency, like we’re going to have built in, after that escalation period has elapsed. After that, it goes up to the next person and after that a default person. So they had no contingency set up in case the main supervisor was absent.

• P2: Therefore the problem is no approval contingency as far as escalation is concerned.

• P4: We could use the workflow status. No?

• P3: Aide Memoire, Application Rejection…

• P1 & P4: The Status Indicator, and The Authorizer

• P2: This is so relevant to what we’re grappling with.

• P1: Any others on page 2?

• P4: No.

• P3: They haven’t put a halt to the old system to force people to use this system.

• P4: What does that highlight? Again, no contingency.

• P2: Planning wasn’t that great.

• P5: No contingencies in place.

• P1: So what patterns?

• P3: I say The Usage Trainer pattern

• [Everyone agrees]

• P4: There is a Single factor as well….

• P1: This is not for the camera… (jokes!)

• P2: Simple but secure

• P1: Wait; let’s identify the problem here first.

• P3: Delegating or approving authority?

• P4: The Authoriser and Simple but Secure patterns.

• P3: Possibly Electronic in-tray

• P5: Seems like there was a problem with the system – wasn’t telling people what the states were… a black hole…

• P1: So the problem is the error messages – no explanation offered as to why the error is occurring.

• P5: We could use the Automated input Validator there as well. That would solve the errors before they even got to the help desk.

• P3: Effective Help Features would be useful.

• P5: On that one also, the problem was intended initially so there must have been some lack of testing or… Some programme that wasn’t properly followed…

• P1: Given that they didn’t collect any requirements, bit hard to test isn’t it?

• P5: I imagine they would have identified the problems earlier on in the piece rather than… and there were two issues they were completely unaware of… one was the user and the other the help desk. Someone is going to the Help Desk and they had no idea how it works, so obviously you’ve got an application that you haven’t put through its paces. You would have picked it up initially.

• P3: You would have thought you’d have seen it if you’d done the requirements before. It’s a part-time person trying to put in hours and it’s not accepting it.

• P1: Also, there’s no documentation explaining what those errors are about.

• P4: Precise Errors, and The Web Coordinator to be used.
• P1 and P3: Also, The Automated Input Validator, and Effective Help Features
• P3: The on-line demo should also be used because there seems to be confusion throughout.
• P5: What about application rejection?
• P4: That wasn’t part of the problem.
• P2: It’s part of the delegation of authorisation issue. Lack of support structure and competency. The Usage Trainer pattern is relevant here.
• P1, P3 – P5: Yup.
• P1: What about security issues?
• P4: Oh, it’s like the other structure we use.
• P1: The patterns are quite useful.
• P5: You could have directed these to our application. It would have solved some of the problems, but not all (laughs...)
• P1: In that regard your patterns are very useful. We have seen these in our work. So what is lacking in the patterns?
• P2 – P5: There should be more about project set-up, like planning and initiation, stakeholders and formal requirements. No patterns for project framework, such as project initiation, risk assessment, and success criteria.
• P5: That would solve a lot of the problems over here as well.
• P3: There was no patterns specific to communication problems, were there?
• P1: There were some like Effective Help Features and Comments.
• P5: Is there a pattern that... because they didn’t do any requirements and just bought an application from the shelf...that if you do that they should still be able to measure against certain business rules and policies.
• P3: Maybe we need a pattern called ‘how to buy a product off the shelf’ pattern (joke!)
• P4: Yeah!!!
• P5: Even if it’s an off the shelf pattern they should still be able to evaluate how useful the system will be. (generally, discuss off-the-topic re. Acquiring products off-the-shelf)
• P2: Sort of like that triangle.
• P1: The only one of the listed ones that could be expanded is the Web-coordinator. I thought it explained the problem well, but didn’t suggest a concrete solution. It discusses the issue but does not explain how you could synchronise support areas and so forth. The Web Coordinator pattern lacked in terms of providing an appropriate solution
• P1: What do you think about the format of the patterns - the way they are described here?
• P5: Very logical sequence and structure.
• P2 and P3: The patterns were well structured and easy to follow for a non-technical person. These are also excellent for planning
• P1: Any other ones you think need improvement? Do some of these patterns reflect our experiences?
• P3 and P4: Every one of them!
• P4: How do these fit in our own....what we’re looking at? Do we have to use any of them?
• P5: So what have we got here? Usage Trainer, Automated input Validator – are for our system catered as we speak.
• P2: What about The Demo?
• P1: Not quite to that same degree.
• P3: The demo we have is more like a power point presentation.
• P1: We definitely have lack of Precise Errors.
• P3: Aid memoire we do have.
• P4: Comments Please?
• P5: The comments are basically free text. That is accepted, rejected, submitted, but it’s not enforced.
• P2: Status Indicator?
• P5: We have that. Once that application is sent you can see what status it is in, whether it’s been rejected, accepted or pending.
• P2: Simple But Secure – yes we use it.
• P3: Electronic in-tray, yep.
• P1: Administrative Monitoring doesn’t really exist in the form that is presented in the pattern.
• P3: The default approver almost becomes the administrator-monitor.
• P1: It’s not quite the way it’s described in the solution.
• P5: That’s an interesting one we’ve got with the administrator because we don’t really have anything in place to let us know if the whole process has fallen down until someone lets us know. We know we have 1000 escalations. How do we know who is the default approver because there has been a breakdown somewhere in the system?
• P4: We need to put in place a mechanism.
• P5: We’re aware of that. If we’ve got a majority of transactions that are just pending we needed to investigate why that is so. Thus, we can use the Administrator Monitoring stuff.
## Appendix C1: Experience Patterns

The following is a list and details of the collected ESS patterns, which constitute a domain knowledge base.

### Pattern List

<table>
<thead>
<tr>
<th>Pattern</th>
<th>Problem solved by a pattern</th>
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</thead>
<tbody>
<tr>
<td>The Usage Trainer</td>
<td>How to familiarize client users with the various facets of the particular web application?</td>
</tr>
<tr>
<td>The Automated Input Validator</td>
<td>How to enforce the integrity of data entered by clients through the web-based interfaces?</td>
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<tr>
<td>The Demo</td>
<td>How to re-experience the training program?</td>
</tr>
<tr>
<td>Precise Errors</td>
<td>How to effectively inform client users of erroneous data entry?</td>
</tr>
<tr>
<td>Effective Help Features</td>
<td>How to provide online assistance to the client user in the rectification of data entry errors?</td>
</tr>
<tr>
<td>The Aide Memoire</td>
<td>What happens if employees and supervisors forget to submit timesheets or approve leave applications to HR/payroll on the due date?</td>
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<tr>
<td>Application Confirmation</td>
<td>How can users be provided assurance of the successful submission of the online documents?</td>
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<tr>
<td>Application Rejection</td>
<td>What should happen if the supervisor disapproves the leave application or timesheet for a particular employee?</td>
</tr>
<tr>
<td>No Comments Please</td>
<td>What happens if supervisors are concerned about spending too much time and effort while approving employee applications online?</td>
</tr>
<tr>
<td>Comments Needed</td>
<td>How to ensure that supervisors state reasons behind the rejection of timesheets or leave applications?</td>
</tr>
<tr>
<td>The Status Indicator</td>
<td>What is the status of the application process?</td>
</tr>
<tr>
<td>Simple but Secure</td>
<td>What happens if supervisors and/or initiators are concerned with the use of digital signatures as a security feature?</td>
</tr>
<tr>
<td>The Electronic In-Tray</td>
<td>How do supervisors find the documents submitted to them by employees?</td>
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<tr>
<td>The Authorizer</td>
<td>How would employees or HR know who the current authorizer of applications is?</td>
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<tr>
<td>Approval Escalator</td>
<td>What can be done to disruption in the workflows when approvers are unavailable to attend online administrative tasks?</td>
</tr>
<tr>
<td>The Web Coordinator</td>
<td>What can be done to ensure that the web-based information system is functioning optimally at all times, especially during the due dates for timesheets and remuneration reports?</td>
</tr>
<tr>
<td>Pattern Name</td>
<td>The Usage Trainer</td>
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<tr>
<td>Problem</td>
<td>How to familiarize client users with the various facets of the particular web application?</td>
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<tr>
<td>Context</td>
<td>With web interfaces, the task of entering personnel records, leave and pay data into the database is shifted to the clients. The interface is presented as a data entry form, which requires the clients to fill out the appropriate fields. However, this means that clients need to be directed in such a way that the rules of data integrity are taken into account while entering data. Thus, data integrity rules need to be imparted directly to clients or embedded into the application. Although clients may be familiar with the usage of computerized systems and even web-based applications, the particular HR/payroll application might be completely new to them. In view of this, they need to be made familiar with the intricacies of the application and especially, the prevalent business and data integrity rules.</td>
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</tbody>
</table>
| Forces       | 1. Clients may not be familiar with the data integrity rules of the application.  
2. An application that flashes data-entry errors “a few times too many” each time clients, who are largely unfamiliar with the application, enter records may cause frustration, and consequent abandonment of the web-based solution.  
3. Redundant or inaccurate data entered by clients may result in poor data management.  
4. The imposition of data integrity rules as constraints without training might be viewed as “complex” restrictions on their usage of the application. This aversion could discourage from using the application |
| Solution     | *The system shall necessitate the provision of training in the usage of the system.*  
The adoption of the web application by the clients could be facilitated by training client contacts (or other authorized members). The importance of ensuring the integrity of data and the steps taken to ensure this should be incorporated into the training. An example of this is a situation where HR/payroll trainers, during a demonstration of the application at the client site, depict different scenarios of faulty data-entry and its consequences, and then show how data should be entered properly. |
| Consequences | 1. Training and effective demonstration of the solution will ensure that clients gain an understanding of data integrity rules and its enforcement during data-entry.  
2. Training clients involves the dedication of HR/payroll managers in designing relevant materials and conducting training sessions. Thus, this undoubtedly involves the commitment of the resources. |
<table>
<thead>
<tr>
<th>Pattern Name</th>
<th>The Usage Trainer</th>
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<tbody>
<tr>
<td><strong>Known Uses</strong></td>
<td>The adoption of new applications in work settings is often accompanied by the provision of training to users. In the domain of web-based HR/payroll services, this is an essential obligation on part of the service provider, and is included in the contractual agreements with clients. Training is offered on most of the features of the application, but the issue of data entry and validation is crucial, and applies to all information systems, whether web or non-web, intra-organizational or inter-organizational. Even though the application of this pattern may be implicit in the adoption of new applications, most IT departments and trainers will state reasons behind the provision of this feature and its outcome, as described in the context and forces, and consequences, respectively.</td>
</tr>
<tr>
<td>Pattern Name</td>
<td>The Automated Input Validator</td>
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</tr>
<tr>
<td><strong>Problem</strong></td>
<td>How to enforce the integrity of data entered by clients through the web-based interfaces?</td>
</tr>
<tr>
<td><strong>Context</strong></td>
<td>Even though training provided by the payroll outsourcer or the HR department will familiarize client users with the various features of the web application, it may not, on its own, be able to ensure data integrity sufficiently, due to various reasons, which are described in the forces. Furthermore, many of the forces related to the previous pattern, The Input Validation Trainer, are also relevant in this context.</td>
</tr>
</tbody>
</table>
| **Forces**        | 1. Clients may not be familiar with the data integrity rules of the application.  
2. Service providers may not be present while clients are entering data. In such situations, complex data-entry procedures may force clients to consult the on-line Help of the application, which they may be averse to.  
3. Clients may receive training in proper data-entry, but still enter records in violation of data integrity rules. Moreover, clients may attend training sessions, but the actual data-entry task might be assigned to someone employed as a casual/temporary staff. Thus, training may not guarantee that clients follow the rules.  
4. The data entered by clients through the web application is directed to the database held by the payroll legacy system. In view of this, redundant or inaccurate data entered by clients may result in poor data management. |
| **Solution**      | The system shall embed data integrity and business rules into the application. Data integrity rules could be enforced as non-functional requirements or constraints into the applications. There should be a mechanism that prevents the submission of the data entered incorrectly into the system. The constraints should prevent the record being committed to the database until the error is corrected. A related pattern is Unambiguous Format. |
| **Consequences**  | 1. Embedding data integrity rules into the application will further enforce integrity by preventing data inaccuracy and redundancy.  
2. The embedding of data integrity rules into the application requires significant development hours spent by the company's IT staff. |
<p>| <strong>Known Uses</strong>    | Most data processing systems, both web and non-web, have business and data integrity rules embedded into them. Examples of such patterns at work can be found in many of the internet banking and web-based flight reservation applications, where incorrect entry into certain fields, such as those for bank account number, credit card information, city and postcode, and dates, prevent the submission of an online form into the system. Integrity rules pertaining to the fields mentioned are usually embedded either into the interface or reside at the web server. For example, these rules will not allow the incorrect number of digits for the bank account number or a mismatch between city and postcode from being sent into the database. Similar types of measures are also undertaken in non-web applications. |</p>
<table>
<thead>
<tr>
<th>Pattern Name</th>
<th>The Demo</th>
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<tbody>
<tr>
<td>Problem</td>
<td>How to re-experience the training program?</td>
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<tr>
<td>Context</td>
<td>Clients may not remember the various features of the web application that were introduced in the training program. Besides, the actual task of keying in data might be delegated to members of client organization, who may not have received the training.</td>
</tr>
</tbody>
</table>
| Forces      | 3. Organizing another training session will require commitment of resources of both the client and the payroll company.  
4. It is may not be possible, nor desirable, to provide training to the client each time new personnel are delegated data entry tasks. |
| Solution    | The system shall include an online demonstration  
The introduction of web-based services could be accompanied by a multimedia demonstration program, offered as a feature in the application, which will take the client through a step-by-step tour of the application, with particular emphasis on data integrity and proper data-entry. Thus, clients could refer to this program when they are confronted with errors and are unable to contact payroll managers at the time. |
| Consequences| 1. A demo program can facilitate the clients' usage of the application. This is especially relevant in a scenario where the task of data-entry, within the client firm, has been delegated to someone who has not received training, e.g. a temporary or newly recruited administration staff.  
2. From the viewpoint of the payroll company, however, this may also involve development costs, especially when the demo needs to be upgraded with every new version, of the application. |
| Known Uses  | 1. Demo programs provided with Internet set-up kits, and pre-paid Internet Services, take the user through the installation of necessary tools and dial-up connections in a step-wise manner.  
2. Microsoft Office wizards, where the steps in building spreadsheets, presentation, and database tables, forms, and reports, are demonstrated to users. Microsoft products are sold to the general public, who may not be IT professionals. Thus, this pattern is relevant here.  
3. Online demonstrations of internet banking procedures, where simulations instruct and guide the customers in the usage of web-based banking facilities. Banks provide internet services to both retail (B2C) and institutional customers (B2B), who are widely dispersed (due to which training is impossible) may not be entirely IT proficient. |
<table>
<thead>
<tr>
<th><strong>Pattern Name</strong></th>
<th><strong>Precise Errors</strong></th>
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<tbody>
<tr>
<td><strong>Problem</strong></td>
<td>How to effectively inform client users of erroneous data entry?</td>
</tr>
<tr>
<td><strong>Context</strong></td>
<td>This is a follow-up to the Automated Validator pattern, whereby the embedded data integrity rules reject incorrect data entry.</td>
</tr>
</tbody>
</table>
| **Forces**       | 1. Clients need to be informed of the errors.  
2. Web applications should minimize the need for clients to consult the payroll company or HR with regards to the workflow via conventional modes of communication.  
3. Vague error messages or error statements that are not specific enough could cause confusion and subsequent frustration with the usage of the application. |
| **Solution**     | The system shall display precise error messages  
Error messages should clearly indicate which fields on a web form were entered incorrectly. |
| **Consequences** | 1. Precise error messages inform users not only of the incorrectness of the data entered, but also which fields were entered incorrectly.  
2. Even though the client user is informed of the fields entered incorrectly, no (online) suggestions, to rectify the errors, are provided. This forms the basis of the next pattern, Effective Help Features. |
<p>| <strong>Known Uses</strong>   | Warning messages generated by well-designed applications, both web and non-web. In web-based business-to-consumer electronic applications, the incorrect entry of credit card information is “greeted” with an error message specifically pointing out the fact. Another example is the error message stating that “end date must be later than start date” when a customer checks his/her transaction history while using Internet banking services. |</p>
<table>
<thead>
<tr>
<th>Pattern Name</th>
<th>Effective Help Features</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Problem</strong></td>
<td>How to provide online assistance to the client user in the rectification of data entry errors?</td>
</tr>
<tr>
<td><strong>Context</strong></td>
<td>We are now looking at a situation, which could be considered as the resulting context after the patterns, discussed above, are applied. Clients have received training on the importance of maintaining data integrity and the relevant steps involved. Furthermore, data integrity rules have been embedded in the web applications through which clients enter and process data. It is beyond doubt that data entry is an on-going task. The records of new employees have to be entered, resignations accounted for, salary and pay rates updated, timesheets and leave applications entered etc. Thus, the web interface is a workspace to be frequently used by clients, which cannot always be supervised on-site by HR/payroll managers. Data entered incorrectly will be rejected by the embedded rules, designed as error pop-up messages. At the same time, clients, especially those with non-IT (Information Technology) backgrounds, may not remember what they learnt in the training, and thus, commit the mistakes. This is why certain features to guide them, need to be inserted into the application in order to minimize the frustration that might prevail.</td>
</tr>
</tbody>
</table>
| **Forces**   | 1. Assistance for error rectification by means of phone calls or emails defeats the aims of adopting web-based information systems.  
2. Clients who are not involved in IT nor have in-house IT staff, may not be entirely comfortable with an application's Help feature which provides very general hints, or calls for time-consuming navigation through the Help index. |
| **Solution** | *The system shall provide effective application Help features*  
Each time an error message appears to indicate that certain fields were filled incorrectly, clients will consult the Help facility of the application. The error message should provide a direct link to the relevant part of the Help file where it is explained exactly why the data was incorrect as well as examples of the proper format. |
| **Consequences** | 1. An excellent Help facility will undoubtedly support clients. A feature, which explicitly states why the format of the data entered was incorrect, along with examples of the correct format, will definitely be of great tool assistance to clients.  
2. On the other hand, the development of such a feature is not a one-off task. The extent of the user-friendliness of the Help facility needs to be ascertained, and is thus, incremental in nature.  
3. However, it may not be all that feasible to tailor the Help facility as per the requirements of each client. |
<p>| <strong>Known Uses</strong> | Help systems (Windows Media Player, Visio 2000), where an error message provides a link to corresponding Help and trouble shooting information. |</p>
<table>
<thead>
<tr>
<th>Pattern Name</th>
<th>The Aide Memoire</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Problem</strong></td>
<td>What happens if employees and supervisors forget to submit timesheets or approve leave applications to HR/payroll on the due date?</td>
</tr>
<tr>
<td><strong>Context</strong></td>
<td>Timesheets should be sent to payroll for processing prior to the due date of the pay cycle. Likewise, leave applications should be approved and recorded electronically before the employee goes on leave. Otherwise, late submissions, if it becomes routine practice, undoubtedly increases the workload on HR/payroll, and diminishes any productivity gains from a web-based application.</td>
</tr>
</tbody>
</table>
| **Forces**       | 4. Employees and supervisors may forget or be late in submitting timesheets or leave applications (especially at the earlier phases of implementation of the web-based system).  
5. Informing individual employees and supervisors of late submissions creates unnecessary payroll work.  
6. Limit communication via conventional modes |
| **Solution**     | **The system shall dispatch automated timesheet reminders**  
To alleviate all relevant stakeholder concerns, an electronic reminder should be dispatched to all the employees and supervisors a few days prior to the actual due date. This is related to The Electronic In-tray and Status Indicator patterns. |
| **Consequences** | 3. Electronic reminders will ensure that employees and supervisors have been notified of timesheet and other online documents (such as leave applications) submissions on the due date.  
4. Electronic reminders may not be effective if employees and supervisors work with computers very rarely. |
<p>| <strong>Known Uses</strong>   | Most electronic workflow and groupware systems (such as Lotus Notes) are equipped with the electronic messaging feature. |</p>
<table>
<thead>
<tr>
<th>Pattern Name</th>
<th>Application Confirmation</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Problem</strong></td>
<td>How can users be provided assurance of the successful submission of the online documents?</td>
</tr>
<tr>
<td><strong>Context</strong></td>
<td>Users are required to fill in their pay and leave data onto standardized web-based timesheet and leave application forms, the fields of which may or may resemble those on conventional paper-based forms. In view of this, users may be anxious about the accuracy of the data captured into the appropriate field on the web forms.</td>
</tr>
</tbody>
</table>
| **Forces**   | 1. Employees and supervisors expect transparency of the process in a web environment  
               2. Anxiety over the submissions of documents via the web may increase the number of queries from users via conventional models of communication  
               3. The purpose of a web system is to reduce status queries by more conventional modes of communication. |
| **Solution** | **The system shall confirm the details of online submissions.**  
The application should display an interface containing the details entered onto the web forms by the users. |
| **Consequences** | 1. Online confirmation of submission will allow users to verify the data entered and make rectifications (if necessary)  
               2. Reduced queries and complaints from users. |
<p>| <strong>Known Uses</strong> | Most applications delivering web-enabled services, such as Internet Banking, online flight reservations, are equipped with this feature. |</p>
<table>
<thead>
<tr>
<th>Pattern Name</th>
<th>Application Rejection</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Problem</strong></td>
<td>What should happen if the supervisor disapproves the leave application or timesheet for a particular employee?</td>
</tr>
<tr>
<td><strong>Context</strong></td>
<td>There are times when the supervisor may not agree with timesheet data or leave hours, and intends to reject the application?</td>
</tr>
<tr>
<td><strong>Forces</strong></td>
<td>If the employee is not informed of the rejection, he/she will not have a chance to rectify the incorrect data, as a result of which processing may be halted (an employee concern). Timesheet rejections should be recorded by the application for future reference. Rejected timesheets should not be sent to payroll for processing, as these will create unnecessary processing work (a payroll concern).</td>
</tr>
<tr>
<td><strong>Solution</strong></td>
<td>The system shall allow the supervisor to reject the application and return to the employee electronically The application should contain an interface for the supervisor to review the documents. If the supervisor, while reviewing the timesheet or leave application for a particular employee, does not approve of the data entered, he/she should be able to pursue rejection, in which case the document can be automatically returned to the employee for changes through the electronic medium</td>
</tr>
<tr>
<td><strong>Consequences</strong></td>
<td>1. Unnecessary processing and overhead can be minimized or even avoided. 2. Simply rejecting timesheets may cause confusion and dissatisfaction with clients. 3. No online explanation for employees with regards to the rejection of their application may cause anxiety.</td>
</tr>
<tr>
<td><strong>Known Uses</strong></td>
<td>Most web-based employee self-service systems are equipped with this feature.</td>
</tr>
<tr>
<td>Pattern Name</td>
<td>No Comments Please</td>
</tr>
<tr>
<td>--------------</td>
<td>---------------------</td>
</tr>
<tr>
<td><strong>Problem</strong></td>
<td>What happens if supervisors are concerned about spending too much time and effort while approving employee applications online?</td>
</tr>
<tr>
<td><strong>Context</strong></td>
<td>The main workflows of a web-enabled HR system include the submission and approval of timesheets and leave applications by employees and supervisors, respectively. Ideally, web developers would embed business rules into the workflows to ensure that, in the event of a timesheet or leave application rejection, supervisors explain the reasons behind their decision, i.e. include comments. This is aimed at reducing hiccups in HR work processes due to grievances by anxious employees.</td>
</tr>
</tbody>
</table>
| **Forces**   | 1. Supervisors may not be willing to spend too much time carrying out online administrative tasks, especially if they are not entirely computer or Internet proficient.  
2. In many cases, employees and supervisors prefer to communicate informally within their work units with regards to matters of pay and leave.  
3. Unhappy supervisors will express aversion to online administrative tasks. |
| **Solution** | The system shall allow supervisors to make decision to online employee application without including comments |
| **Consequences** | 1. This requirements specification will ensure that supervisors use the web system  
2. It also alleviates supervisor concerns about the disruption of their divisional work practices.  
3. Complaints can be lodged by anxious employees whose applications have been turned down without proper comments. |
<p>| <strong>Known Uses</strong> | Many websites allow registration or online booking without the inclusion of comments |</p>
<table>
<thead>
<tr>
<th>Pattern Name</th>
<th>Comments Needed</th>
</tr>
</thead>
<tbody>
<tr>
<td>Problem</td>
<td>How to ensure that supervisors state reasons behind the rejection of timesheets or leave applications?</td>
</tr>
<tr>
<td>Context</td>
<td>As described in the preceding patterns, <em>No Comments Please</em> and <em>Application Rejection</em>, one of the requirements for a web-based HR system should be the ability of the supervisor to reject documents submitted electronically by employees. However, the rejection of documents are viewed by employees are being rather “unpleasant”, and they will demand explanation from their supervisors, or even from HR. This is even more of a significant employee concern in virtual work teams, where there’s a physical distance between the employees and the supervisors.</td>
</tr>
</tbody>
</table>
| Forces       | 1. Supervisors will want to avoid being overwhelmed with queries from employees and having to attend to them via other modes, such as face-to-face meetings, phone, or e-mail. Besides, this defeats the purpose of having a web-based system.  
2. At the other end, payroll will be concerned with its getting involved in the process of sorting disputed timesheets.  
3. Receiving a rejected timesheet without any explanation whatsoever may cause immense disappointment to employees.  
4. Supervisors may simply forget to include reasons while rejecting a timesheet. |
| Solution     | **The system shall enforce the inclusion of comments in the event of employee document rejection**  
In order to address this problem and the concerns of employees, supervisors, and HR, some business rules need to be embedded into the application whereby each rejection of a timesheet or leave application should be accompanied with comments explaining the reasons behind the rejection. |
| Consequences | 1. Reduced queries and complaints by employees.  
2. Eliminates HR from having to verify hours entered by employees.  
3. More work for supervisors. |
<p>| Known Uses   | User Interface validation rules which refuse to process web forms unless certain fields are filled. |</p>
<table>
<thead>
<tr>
<th>Pattern Name</th>
<th>The Status Indicator</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Problem</strong></td>
<td>What is the status of the application process?</td>
</tr>
<tr>
<td><strong>Context</strong></td>
<td>Once timesheets and leave applications are filled in and submitted, employees and other pay recipients have not much to do except wait for the actual pay check or leave acceptance. However, there is the period of time involved with the processing of the timesheet, during which the timesheet may be approved, rejected, or withheld by the supervisor or payroll.</td>
</tr>
</tbody>
</table>
| **Forces**   | 1. *Employees and supervisors expect transparency of the process in a web environment.*  
2. *Employees will be concerned with the outcome of the decisions made (approved or rejected) on their timesheets.*  
3. *Likewise, supervisors will be concerned with the processing of the documents, such as timesheets (after these are approved) carried out by HR/payroll.*  
4. *Supervisors prefer a list of applications that have been approved, disapproved, or need attending to.*  
5. *The purpose of a web system is to reduce status queries by more conventional modes of communication.* |
| **Solution** | **The system shall indicate the workflow status**  
It is important to inform both employees and supervisors of the status of the work processes. There should be about four states that indicate status, namely Approved (by supervisor and sent to HR/payroll), Rejected, Waiting (supervisor is yet to review the timesheet or leave application), and On Hold (supervisor has viewed the document but has deferred its approval or rejection). This is a subject for the next pattern, the “In-tray”. |
| **Consequences** | 1. *Indicating the status of the timesheet processing will alleviate the concerns of the employees and supervisors.*  
2. *Timesheet rejections (as shown on the web interface) could cause anxiety. Refer to Obstacle, which comprises of patterns that address this issue.* |
<p>| <strong>Known Uses</strong> | Courier services provide a tracking feature on their web system, whereby a customer could log in and check the status of the parcel in the itinerary. |</p>
<table>
<thead>
<tr>
<th>Pattern Name</th>
<th>Simple but Secure</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Problem</strong></td>
<td>What happens if supervisors and/or initiators are concerned with the use of digital signatures as a security feature?</td>
</tr>
<tr>
<td><strong>Context</strong></td>
<td>Digital signatures are used to enforce security on open systems, such as applications on the web. These technological artefacts ensure, in the context of web-based HR solutions, that the approval of timesheets and leave applications are done by authorized personnel only.</td>
</tr>
</tbody>
</table>
| **Forces**   | 1. *The maintenance of digital certificates necessitates the allocation of vast resources.*  
2. *The nature of administrative workflow tasks related to pay and leave approvals are very moderately sensitive.*  
3. *The installation and usage of digital signatures requires considerable time and training on the part of supervisors.*  
4. *Unhappy supervisors will express aversion to online administrative tasks.* |
| **Solution** | *The system shall designate a separate set of access codes for supervisors.* |
| **Consequences** | 1. *A separate set of access codes will ensure a simple yet secure level of supervisory workflow.*  
2. *It relieves the burden of the initiator's dedication of vast resources in maintenance.*  
3. *Such a simple level of security may not be adequate for more mainstream financial transactions, such as purchase orders and large fund transfers.* |
<p>| <strong>Known Uses</strong> | Internet banking sites grant access to personal customers on the basis of account numbers and passwords |</p>
<table>
<thead>
<tr>
<th>Pattern Name</th>
<th>The Electronic In-Tray</th>
</tr>
</thead>
<tbody>
<tr>
<td>Problem</td>
<td>How do supervisors find the documents submitted to them by employees via the web?</td>
</tr>
<tr>
<td>Context</td>
<td>The context of this pattern is related to that of the Status Indicator, except the prime stakeholder here is the supervisor. It is assumed that a supervisor will have a number of subordinate employees who are expected to submit timesheets and leave applications for approval. Furthermore, the web system may not be confined to the sole purpose of HR-related processes. Rather, it may incorporate other administrative tasks undertaken by the supervisors, such as the purchasing, and project management. In a paper-based office, a supervisor will typically have a number of trays dedicated to the various tasks and contain relevant documents. Most managers are comfortable with such an arrangement, and will expect the web-based system to be an online implementation of this.</td>
</tr>
</tbody>
</table>
| Forces       | 1. *There is some resistance from supervisors towards the shift from the paper-based work processes to a web-based electronic workflow system, as they hold the view that the latter may disrupt the way their work is organized.*  
2. *HR needs to keep track of documents awaiting supervisory approval in the workflow.*  
3. *Supervisors resent having to navigate through several interfaces to find all the documents that are awaiting their approval.* |
| Solution     | **The system shall provide a web-based in-tray for each supervisor.**  
This requirement will ensure that all documents sent to a supervisor via the web are available and easily accessible in the electronic simulation of a physical in-tray that sits on office desks. Once a supervisor logs into the system, he/she should be presented with the in-tray that contains all the transactions (e.g. leave applications, timesheets, purchase orders) that are awaiting approval. |
| Consequences | 1. *Alleviates the concerns of supervisors related to disruption in their modus operandi and work organization.*  
2. *HR is able to access all documents awaiting approval from a particular supervisor, in case of emergencies (see The Authorizer for such a situation).*  
3. *Requires greater web management (see The Authorizer and The Web Coordinator)*  
4. *Ineffective for supervisors who don’t log into the system regularly (see the Aide Memoire).* |
<p>| Known Uses   | Email packages (MS Outlook, Eudora, yahoo, hotmail, etc.) and electronic task planners and calendars are equipped with similar features to indicate a categorized list of new messages or tasks awaiting attention. |</p>
<table>
<thead>
<tr>
<th>Pattern Name</th>
<th>The Authorizer</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Problem</strong></td>
<td>How would employees or HR know who the current authorizer of applications is?</td>
</tr>
<tr>
<td><strong>Context</strong></td>
<td>Unlike the non-web process where employees submitted timesheets or leave applications to their supervisors in person, the web-enabled HR services system provides online leave forms and timesheets that can be filled in and submitted automatically to the supervisor, or the authorizer. However, supervisors may be on-leave, resign from the organization, or simply be unavailable to attend to documents submitted via the web medium. Perhaps, another person has been appointed to assume the supervisory role or acting on behalf of the absent supervisor, but this has not been updated in the system. Consequently, there is a disruption in the workflow, as applications keep piling up in the absent supervisor’s in-tray.</td>
</tr>
</tbody>
</table>
| **Forces** | 4. Employees and HR may not be aware of changes in supervisory roles within individual organizational units.  
5. In the case of contract work, it is important for project workers to know who actually approves the timesheets.  
6. HR will need to attend to complaints by employees that their applications have not been attended to.  
7. Unnecessarily increases the workload of web administration, as effort is needed to redirect or divert all applications piling up in the absent approver’s in-tray. |
| **Solution** | The system shall require departmental administrators to monitor workflows.  
Departmental administrators or secretaries to supervisors are often delegated with administrative tasks. They also play a vital role in the web-enabled HR workflows, and are often granted administrative access. Thus, they should be required to monitor the flow of documents sent electronically by employees, especially in situations as described in the context. |
| **Consequences** | 1. Workflows are not disrupted despite changes in supervisory roles.  
2. Active involvement of departmental administrators increases the level of adoption of the web-based services among the user community.  
3. Departmental administrators may need to devote more time to the running of the workflows. |
<p>| <strong>Known Uses</strong> | Most organizational units have administrative staff that are responsible for computerized business processes within the unit. |</p>
<table>
<thead>
<tr>
<th>Pattern Name</th>
<th>The Approval Escalator</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Problem</strong></td>
<td>How to maintain the role of the approver when a supervisor is not attending to documents in the electronic in-tray?</td>
</tr>
<tr>
<td><strong>Context</strong></td>
<td>Supervisors may be on-leave, resign from the organization, or simply be unavailable to attend to documents submitted via the web medium. This situation can cause disruption in the workflow, as documents sent via the web keep piling up in the absent supervisor's in-tray.</td>
</tr>
</tbody>
</table>
| **Forces** | 1. Delays in the approval documents owing to supervisor absences can cause anxiety for employees and disrupt administrative processes.  
2. HR will need to attend to complaints by employees that their applications have not been attended to.  
3. Unnecessarily increases the workload of the ESS team, as effort is needed to redirect or divert all applications piling up in the absent approver's in-tray. |
| **Solution** | *The system shall automatically divert the documents pending approval to the next supervisory level or to a designated supervisor.*  
This requirement necessitates the configuration of each organizational unit's supervisory structure into the web system. Once the approval hierarchy has been established, documents are automatically escalated to the electronic in-tray of the supervisor of the absent approver or to that of a manager who has assumed the role of the substitute approve, after a pre-specified period of time has elapsed. Another prerequisite to this requirement is the uninterrupted flow of communication between the departmental administrators and the ESS team. |
<p>| <strong>Consequences</strong> | Workflows are not disrupted despite changes in supervisory roles. |</p>
<table>
<thead>
<tr>
<th>Pattern Name</th>
<th>The Web Coordinator</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Problem</strong></td>
<td>What can be done to ensure that the web-based information system is functioning optimally at all times, especially during the due dates for timesheets and remuneration reports?</td>
</tr>
<tr>
<td><strong>Context</strong></td>
<td>With the adoption of web-enabled HR services, all relevant business processes are to be undertaken electronically. As can be deduced from the previous patterns, such undertaking via the web will require a higher level of management and support from the IT division.</td>
</tr>
</tbody>
</table>
| **Forces** | 1. A web-based reporting system will call for the participation of not only HR staff but also that of IT personnel.  
2. At the center of the web-based information system is the web server, which could be down due to sudden malfunctions.  
3. IT personnel are primarily responsible for the management of the system, and may not possess an understanding of the HR business processes. |
| **Solution** | The system shall engage the role of a web coordinator. To effectively manage the web-based information system, a team of web coordinators needs to be established. The members of the team could be drawn from various areas within the organization, but definitely include HR staff, and departmental administrators, in addition to IT personnel. Furthermore, the team should comprise of members with different sets of skills and knowledge regarding the various business processes including HR, IT management, website administration, and importantly, organizational culture and power structures. |
| **Consequences** | 1. Optimal running and maintenance of the system.  
2. Requires more resources to be directed to web coordination. |
| **Known Uses** | Similar application in both Business-to-Consumer (B2C) and Business-to-Business (B2B) electronic commerce systems. Basically, this pattern can be found in all web-based workflow applications. |
Appendix D1: References


Coplien, J.O. (2001): "Organizational Patterns".


Appendix D2: Relevant Publications by the Author


