Staff Perceptions of an Enterprise Resource Planning System Implementation: A Case Study of three Australian Universities

Marilyn Dale Fisher
BA Syd, Dip Ed Syd, PG Dip Couns Nepean, MA Macq.

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Faculty of Arts, Humanities and Education
Central Queensland University

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Abstract

This study examines staff perceptions of the implementation of an Enterprise Resource Planning system (ERPs) in three Australian universities. It considers the growing body of literature on the issues impacting on effective and efficacious Enterprise Resource Planning (ERP) implementations in organisations including the most recent literature on ERPs in the higher education sector. This literature identifies a number of issues that it is argued, translates from the corporate sector to the higher education sector including a number that require additional focus in this sector. It is proposed in this dissertation that effective and efficacious implementations in Australian universities require particular consideration of organisational influences related to their context and the perceptions of the users of the systems.

Case study methodology was used to examine the staff perceptions of the management of ERP implementations in universities. This involved undertaking case studies in three Australian universities in the process of implementing ERP systems. The first phase of the study obtained data through a series of focus groups at one university to explore staff perceptions of the efficacy of the ERP implementation at their university. This data and the relevant literature served as a framework for the development of the research process in the second phase of the study. This phase involved conducting a series of interviews with staff that enabled the researcher to undertake a more detailed exploration of the staff perceptions of influences affecting ERP system implementations at three Australian universities.

The research study identifies the influences impacting on the outcomes of these implementations of ERPs in the three Australian universities and forms the basis for the development of guidelines for the effective and efficacious management of ERP implementations in Australian universities. This set of guidelines for the management of implementations of ERPs in Australian universities is an outcome that can have applicability for the higher education sector generally.
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List of Abbreviations

Admin  Administration  
AUD    Australian Dollar  
AVCC   Australian Vice-Chancellors’ Committee  
BPR    Business Process Re-engineering  
CA     California (USA)  
CASMAC Core Australian Specification for Management and Administrative Computing  
CAE    College of Advanced Education  
CHA    CHA Computer Solutions Pty Ltd  
CIO    Chief Information Officer  
CQU    Central Queensland University  
CSF    Critical Success Factors  
DVC    Deputy Vice Chancellor  
ERP    Enterprise Resource Planning  
ERPs   Enterprise Resource Planning systems  
ERPII  Enterprise Resource Planning II  
G08    Group of Eight universities  
GST    Goods and Services Tax  
HEIMS  Higher Education Information Management System  
HR     Human Resource  
IEEE   Institute of Electrical and Electronics Engineers  
IT     Information Technology  
MRP    Material Requirements Planning  
MRPII  Manufacturing Resource Planning  
No.    Number  
PC     Personal Computer  
RFP    Request For Proposal  
RMIT   Royal Melbourne Institute of Technology  
SAP    Systeme, Anwendungen und Produkte (Systems, Applications and Products)  
TAM    Technology Adoption Model  
TQM    Total Quality Management  
UK     United Kingdom  
UGC    University Grants Committee in the UK  
UK MAC U K Management and Administrative Computing (MAC) initiative  
UNSW   University of New South Wales  
US     United States  
USA    United States of America  
VC     Vice Chancellor  
Y2K    Year 2000
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Declaration

I declare that the work presented in this dissertation is to the best of my knowledge and belief, original, except as acknowledged in the text, and that the material has not been submitted either in whole or part for a degree at this or any other university.

The submission of this dissertation is in partial fulfilment of the requirements of the Doctor of Education at Central Queensland University.

______________________________

Marilyn Dale Fisher
Rockhampton, Queensland Australia
May 2006
Chapter 1

INTRODUCTION

1.1 Introduction

Enterprise Resource Planning systems (ERPs) are commercial software packages designed to assist organisations to integrate existing administrative systems in the areas of finance, human resources, supply chain information and customer information (von Hellens, Nielsen & Beekhuyzen, 2005). Since the late 1990s there has been an increasing use of ERPs in most large businesses and organisations and, more recently, in the higher education sector. The widespread use of ERPs is a response to the needs of businesses and organisations to replace older administrative software systems and achieve integration of different organisational functions and system.

The trend of ERP adoption has continued in higher education institutions globally. In a growing body of literature providing guidance for organisations implementing ERPs, there are a number of issues that can be identified to translate from the corporate sector to the university sector. This research explores the issues that influence the implementation of an Enterprise Resource Planning (ERP) system in the university sector. The unique focus of this research is on staff perceptions in three Australian universities which were in the process of implementing ERPs. These universities have implemented ERPs as a means of replacing their existing administrative information systems. More specifically, this study explores the staff perceptions of human and organisational issues influencing implementations at these three Australian universities. It identifies the issues which university staff perceive contribute to an effective and efficacious implementation of an ERP system in a university setting. From these identified issues, a set of guidelines for the management of implementations of ERPs in Australian universities has been developed.
This chapter outlines the details of the study and the boundaries of the research. It provides the background to the research and an overview of research undertaken previously. The justification of the research, its significance and its limitations are also discussed. The research questions are stated and an overview of the content of the chapters within this dissertation is outlined.

1.2 Background

Internationally in recent years, declining levels of government funding, with an accompanying growth in student numbers in the higher education sector, has resulted in increasing government pressure on universities worldwide to operate as businesses. These factors, combined with interventionist strategies from governments to adopt corporate ways of doing business, have driven the need for universities to improve the administrative efficiency of their operations (Allen, 2001). In response to these pressures from governments to create administrative efficiencies, a strategy for many universities, similar to businesses, is to implement ERPs (Allen, 2001). ERPs have been introduced into universities with the aim of improving and integrating their administrative systems and efficiency while at the same time providing a focus on improved customer service by offering e-commerce strategies (Frantz, 2001).

The software companies retailing ERPs developed the systems for global manufacturing organisations and, in the mid 1990s, redesigned them initially for US universities and colleges and later for the global education market (Frantz, 2001). The major ERP vendors, PeopleSoft, Oracle, SAP and JD Edwards, historically focused on the corporate market, but have made the transition into higher education by offering a campus management/student administration module to complement their range of products (Nielsen, Beekhuyzen & Goodwin, 2005). Recently, there has been a consolidation of these ERP vendors and PeopleSoft Enterprise is now the major ERP product in the higher education sector. Consequently, universities and colleges in the US have been implementing ERPs since 1996 and Australian universities since 1998.
It will be shown in this dissertation that the adoption of ERP systems by universities has been problematic and provided limited benefit mainly because of a lack of expertise, financial and IT resources (Esteves & Pastor, 2005). For instance in Australia, the CASMAC (Core Australian Specification for Management and Administrative Computing) system, a project designed to integrate administrative and management systems for the higher education sector, was abandoned because of the rising costs of continuing to develop a product with an apparent inability to deliver outcomes for the sector (von Hellens et al., 2005). As the implications of the CASMAC failure became clearer to the higher education sector, as Year 2000 (Y2K) issues loomed with the potential crash of existing systems at the end of the year 2000, this contributed to an unpredictable future for the existing administrative information systems. Against this backdrop of uncertainty for Australian administrative information systems, a new solution appeared for the Australian higher education sector in the form of ERPs which were starting to be adopted by American universities and colleges.

As reported above, Australian universities have been implementing ERP systems since 1998 when the University of New South Wales (UNSW) undertook such a project, closely followed by Central Queensland University (CQU). Since then, most Australian universities have initiated some form of ERP system implementation with the aim of improving and integrating the management and administrative processes in student registration, human resource (HR) systems and financial processing (Frantz, 2001). Research undertaken in 2001 by Beekhuyzen et al. (2002) suggests that 86% of Australian universities were implementing or intended to implement at least one module of ERP software and, in 2002, 36 out of a possible 42 universities were adopting ERPs. In 2005, Nielsen reported that 38% of Australian universities had adopted ERP solutions from a single vendor and 48% had adopted a ‘best of breed approach’ and adopted a range of modules from a number of vendors, while 14% had not implemented any type of ERP system. PeopleSoft continues to be the leading vendor in the higher education sector (Nielsen, 2002; Philipson, 2006).
trend for ERP implementation has continued in the higher education industry globally (von Hellens et al., 2005).

As noted above, ERP systems have been introduced into universities with the aim of improving the efficiency of administrative systems while focusing on improved customer services for students (Frantz, 2001). There are many citations in the literature of the high cost of ERP implementations, commonly running both over time and over budget, and with little or no business benefit achieved (Nielsen, 2002). Furthermore, the implementation of ERPs in the higher education sector has raised new organisational issues for universities because these systems were primarily designed for corporate non-university organisations with little effort made to fit them to universities (Beekhuizen, 2001; von Hellens et al., 2005). It will be argued that universities are different to businesses in that they rely on broad representation and consensus rather than managerial prerogative, which can provide challenges in implementing an ERP system (Gates, 2005). The packaged nature of the ERP software is also problematic for university users because of the need to adjust the organisation’s business processes to fit the package or to modify the package considerably to fit the organisation (von Hellens et al., 2005). The difficulty for universities is fitting the software to business processes that are regarded as best practice for industries. Universities have increasingly adopted business processes from the corporate sector; however, the advent of an ERP has created further pressure to change their business processes within a limited time frame. It is this further pressure to change their processes in a specified time that can create this additional impact on the process of the implementation of an ERP in a university and inevitably to change the organisation itself. Pollock and Cornford (2004, p.32) argue that ERP systems are accompanied by “tensions in which ever setting they are implemented”; however, ERP systems are actually “refashioning the identity of universities”.

Some Australian universities have reported major problems associated with their implementations of ERP systems and these will be discussed further in Chapter 2.
(Nielsen, 2002; Von Hellens et al., 2005). The majority of ERP implementations in the higher education sector have been considered unsuccessful and ineffective (Davenport, 1998; Holland & Light, 1999; Markus, Axline, Petrie & Tanis, 2000; Beekhuizen, 2001). From this perspective, this research is particularly important because there is generally little research evidence about how to successfully implement business systems in non-business settings such as universities (Beekhuizen, 2001) and specifically from a staff perspective. Examining an ERP implementation in Australian universities from the perspective of staff in a range of roles, as far as is known to date, has not been undertaken prior to this investigation.

In examining the issues affecting ERP implementations in universities, there is a body of literature on the critical success factors for successful implementation of ERP systems in the corporate sector and this is discussed in detail in Chapter 2 of this dissertation (Holland & Light, 1999; Nah, Lau & Kuang 2001; Somers & Nelson, 2001; Parr & Shanks. 2003; Shehab, 2004). This body of research into ERP implementations in the corporate sector can be applied to the higher education sector to determine whether the issues affecting implementations of ERPs in universities are similar or different to the corporate factors (Nielsen, 2002 & 2005) and is considered in the next chapter. Amoako-Gyampah and Salam show in their research that staff perceptions of the changes associated with ERP system implementations influence how they view the success or otherwise of an implementation (2004). User satisfaction is often a factor affecting whether an implementation is viewed as successful and many success factor studies to date have been based on the perceptions of managerial level employees only (Frantz, 2001; Amoako-Gyampah, 2004). Investigating an ERP system implementation through staff perceptions has been a perspective chosen by few researchers. It will be shown in Chapter 2 that there is a gap in the literature of research available that examines the staff perceptions of issues affecting ERP implementations particularly from the perspective of a range of staff roles in a number of Australian universities. The synthesis of the relevant literature has been used to guide the research questions and objectives for this study as presented in the
following sections. This has enabled this study to explore the perceptions of staff about an implementation of an ERP in their university.

1.3 Scope and Aim of the Study

Situated in the context of a globally changing higher education sector, this research explores the perceptions of the effective and efficacious implementation of ERPs in three Australian universities from the staff perspective and the role of the institutional context. Such an exploration was undertaken with the aim of identifying issues to consider when implementing ERPs in Australian universities.

Specifically, this research aims to:

1. Examine the literature on ERP implementations in the corporate context with a view to informing ERP implementations in universities.
2. Explore the impact of the higher education context on the implementation of an ERP system.
3. Establish the perceptions of staff about Enterprise Resource Planning system implementation processes at each of the three universities.
4. Develop a set of guidelines for the management of implementations of ERPs in Australian universities.

1.4 Research Questions

The foregoing research aims are addressed by the following two research questions:

Research Question 1: How do the context, process and other issues, as perceived by staff, affect ERP system implementation processes in the Australian higher education sector?

Research Question 2: What do these staff perceptions of ERP implementations reveal about guidelines for efficient and efficacious ERP system implementations in universities?
Underpinning these two research questions is the consideration that staff perceptions of ERP implementations and surrounding issues directly impact on the success or failure of said implementations. Research Question 1 allows the researcher to link to the first phase of the study, which involves a series of focus groups, to the second phase of the study. In this way, therefore, the dissertation is testing out the extent to which staff perceptions of the context, process and other issues, impact on ERP implementations. Research Question 2 takes these perceptions further by helping the researcher to develop guidelines for an efficacious ERP system implementation. Both research questions allow the researcher to thoroughly investigate the ERP field in terms of what is perceived to impact on ERP implementations within a university context.

When an ERP system is implemented there are a number of characteristics which determine a positive and successful outcome of the undertaking. However, despite these characteristics, the term successful is too broad and imprecise for this study. The desirable characteristics of a successful implementation tend to be seen as completion within the planned timeframe and the allocated budget (Al-Mashari, Al-Mudimigh & Zairi, 2003). An implementation which does not engender unnecessary use of resources and which optimises the use of available resources is an efficient ERP implementation. It is also important that the system, when implemented, is fully functional and operates as it was envisaged. There should be minimal difficulties with the system and available support after go-live. This is an efficacious implementation. The characteristics of an ERP implementation considered in this study are those that make it an efficient and efficacious implementation.

1.5 Research Objectives

The following objectives were undertaken to address the above research questions.
1.5.1 Research Question 1

- Undertake a literature review to identify:
  a. the usage and meaning of key terms and concepts with regard to managing the implementation of ERPs in organisations and to establish the possible range of organisational and human issues associated with ERP implementations
  b. the contemporary research associated with effective and efficacious management processes in both the corporate and higher education literature in relation to ERP system implementations and to explore the range of contextual, process and other issues examined in this research with particular reference to the higher education sector.

- Use a case study approach to examine university staff perceptions of ERP implementation processes within the Australian university context.

- Document the issues that influence the management of ERP implementations in relation to contextual, process and other issues.

- Synthesise the ERP literature and the findings from the staff perceptions in the three universities in order to identify and situate within a body of knowledge the emerging themes with regard to effective and efficacious university ERP implementations, highlighting similarities and differences.

1.5.2 Research Question 2

Use the results obtained from Research Question 1 to develop a set of guidelines for facilitating efficient and efficacious ERP implementations in universities.

1.6 Significance

There is little research evidence about how to implement ERPs in universities generally, in the Australian higher education sector specifically, and particularly in relation to organisations and the users of the systems: the staff (Allen & Kern, 2001; Beekhuyzen, Goodwin & Nielsen, 2002; von Hellens et al., 2005). Research using the primary focus of the perceptions of the staff in universities has not been undertaken previously. Research investigating the in-depth staff perceptions of an ERP
implementation with staff at a number of levels and occupational groups in an organisation has not been published previously. Furthermore, research investigating staff perceptions of an ERP implementation in the specific context of a university, and an Australian university in particular, has not been undertaken. Therefore, the results from this study provide an additional insight into the issues impacting on an ERP system implementation in a university. The results from this study will be used in developing a practical set of guidelines that may improve the management of ERPs in universities.

1.7 Justification of the Research and Contribution to Knowledge
As alluded to above, considerable ERP literature exists on issues relating to the choice and adoption of the system and on technical issues, such as hardware and software requirements. However, there is a lack of literature identifying the human and organisational issues affecting implementations of ERPs in the Australian environment (Nielsen, 2005) and particularly those issues identified through staff perceptions. This has highlighted the need for research exploring the particular issues affecting ERP implementations in the higher education sector (Nielsen, 2005). Further, it has identified that gaps exist in current research and practice relating to the ERP implementation issues in the higher education field generally and in the Australian university environment in particular.

Continuous improvements in technology and the increasing complexity of administrative and support systems in tertiary education require universities to regularly upgrade their information technology systems. Versions of ERP systems have a limited lifespan of a couple of years and retaining support from the software vendors is essential to maximise an institution’s effective use of the software system. At the time of preparation of this dissertation, Australian universities were developing the Higher Education Information System (HEIMS) in response to government policy associated with the Nelson reforms to the higher education sector (Nelson, 2003). Developing another information system that will be accessed by both government departments and the institution adds another information system
complexity to the higher education sector. It is therefore necessary to have a knowledge base and guidelines to ensure that higher education institutions can carefully implement and manage the institutional impacts which accompany these future changes of large scale information systems.

This research focuses on examining ERP implementation issues from the perceptions of a range of staff in a range of roles in three different universities. Future implementations and upgrades of ERP systems will need to carefully manage both the prevailing contextual issues and the staff perceptions associated with these implementations. Thus, the contribution to knowledge of this research will be to provide guidance to the higher education sector on future ERP implementations and upgrades to these systems.

1.8 Limitations

Four limitations apply to this research. The first limitation of this investigation is that the scope of the study focuses on the human and organisational issues associated with an ERP system implementation. The choice and adoption of the system, the costs of hardware and software, contractual arrangements and technical risk factors are outside the scope of this study and have not been considered as part of this investigation. As this study investigates the issue of ERP system implementations through staff perceptions and experience, it is the issues affecting people and the organisations in which they work that are the core issues of this research.

The second limitation of the study is the size of the sample of universities used for the research. It would have been beneficial to examine all of the Australian universities implementing ERP systems at that time; however, a delimitation of the study was that it was necessary to use a sample that was achievable for the researcher to manage in the time available and for the chosen methodology. Accessing a cross-sectional sample of staff to be interviewed in the chosen universities was part of the research process that required careful planning by the
researcher. The universities involved in this research are two rural, regional, multi-campus universities with College of Advanced Education backgrounds and one sandstone or Group of Eight (GO8) university. The universities involved in this investigation, for purposes of this dissertation, will be called by their pseudonyms, University X, University Y and University Z (this will be discussed in more detail in Chapter 3). The universities implemented ERP systems at different times to each other. As a consequence of the above sample limitation the research will not be universally generalisable. However, the research outcomes add to the knowledge about the nature of the particular research context and situation from which it is generated and have applicability to the wider social world of ERP implementation research and change in the higher education sector (Allen & Kern, 2001; Beekhuzen, 2001).

The third limitation is that the researcher is a member of staff at one of the universities and has been involved in the ERP implementation and was a member of the steering committee responsible for the implementation and is thus a participant researcher. Whilst it is appropriate that the researcher’s own position is subjective, there is a risk of researcher bias. As the researcher’s role could have prejudiced participants and unduly influenced the results, this needed to be managed through a number of strategies including the use of an external facilitator for the focus groups. Having access to the data analysis of another independent researcher negated most of these concerns. Conducting interviews at two other universities where the researcher’s position in the university was not a factor relevant to the participants was a major strategy to alleviate possible bias from the researcher’s role in the project. Additionally, the informed consent process and a statement that was provided prior to the start of both the focus groups and interviews, stating who would have access to the interviews and requesting that staff be as honest and open as possible, should alleviate possible bias. This was managed throughout by this ethical process and critical reflection as well as through the supervision process.

The fourth limitation of the study is that it relies primarily on focus groups and interviews to obtain data. Because the study depended on the participants to
respond openly, developing rapport with participants and a careful explanation of the purpose of the research and the techniques employed to aggregate the data were important. There is a further delimiter in terms of being able to interview staff at universities that were unwilling to give permission to be part of the research project. The universities which participated were limited to those where senior management were comfortable with the success of their implementation. This may have created a bias in the universities which participated in the research project and is taken into account in the generalisability and conclusions of the study.

1.9 Definitions and Terminology
This section presents the definitions and terminologies most commonly used in this research as definitions of terms used in this area are not uniform. It is therefore appropriate to define commonly used terms in this dissertation to avoid ambiguity.

**Business process re-engineering (BPR)** is defined by Hammer & Champy (1993) as the fundamental rethinking and redesign of business processes to achieve improvements in measures of performance, such as cost, quality, service and speed.

A **case study** can be described as an in-depth investigation of an organisation, or of an individual or individuals in a field setting (Schatszman & Straus, 1973). The case study method may use a variety of techniques to gain a picture of the aspects of the organisation under investigation (Robson, 2002).

**Critical Success Factors (CSF)** is a term devised by Holland and Light (1999, p.31) and can be described as “factors needed to ensure a successful ERP project”.

**Enterprise Resource Planning (ERP)** is the practice of consolidating an enterprise’s planning, manufacturing, sales and marketing efforts into one management system. Enterprise Resource Planning attempts to provide a solution to the problem of the existence of a number of different information systems within an organisation that do not allow a free-flow of information to occur easily (Davenport, 1998).
Enterprise Resource Planning systems (ERPs) are designed to be a “single comprehensive and integrated data-base which collects data from and feeds data into modular applications supporting virtually all of a company’s business activities – across functions, across business units, across the world” (Davenport, 1998, p.123). ERPs propose to deliver “seamless integration of all the information flowing through a company – financial and accounting information, human resource information, supply chain information, and customer information” (Davenport, 1998, p.123). ERP systems and ERPs are used interchangeably in this dissertation.

Go-live is a term used to designate the date and time that the new computer information system replaces the legacy system and becomes the functioning information system for an organisation.

The higher education sector is a term used to embrace universities, colleges and TAFE institutions. It includes the term higher education institution which is also used for universities, colleges and TAFE institutions.

A legacy system is an existing computer system which continues to be used because the user (typically an organisation) does not want to replace or redesign it. Many people use this term to refer to "antiquated" systems (Wikipedia, 2006).

Shadow systems are systems developed by end users to support required business functions that duplicate centrally administered system information. They may have been developed within work areas to meet specific needs not met by current central systems.

A university is described in The Australian Concise Oxford Dictionary as an educational institution designed for instruction and/or examination of students in all or many of the more important branches of advanced learning, conferring degrees in various faculties, and often embodying colleges and similar institutions (Fowler, 1964,
The term university is generally used in this dissertation and can refer to a higher education institution.

*Vanilla* is a term used to describe implementing the ERP software as closely as possible to the manufacturer’s original product, e.g., a vanilla implementation.

### 1.10 Organisation of Dissertation

- **Chapter 1 – Introduction**
  This chapter outlines the nature and scope of the research: presents the aims and objectives of the study, the research questions and the justification and limitations of the study.

- **Chapter 2 – Literature Review**
  The study is contextualised through a consideration of the critical literature on ERP implementations in both the corporate and the higher education sector. The literature pertaining to ERP implementations provides the background of the adoption of ERPs and their impact on the higher education sector. It also provides the background to the research questions. The literature review will provide a framework for the methodology of the research.

- **Chapter 3 – Research Methodology**
  This chapter presents details of the approach to the research, the research study design – namely case study, the techniques of data collection and analysis and ethical considerations are described.

- **Chapter 4 – Results and Discussion**
  This chapter contains the data analysis for the focus groups and interviews data.

- **Chapter 5 – Conclusions and Recommendations**
  The final chapter draws together conclusions from the study and presents recommendations for both practice and further research. The study results are compared and contrasted with the literature in order to situate the study.
Recommendations for further study are made and the guidelines for facilitating ERP system implementations in universities are presented.
Chapter 2

LITERATURE REVIEW

2.1 Introduction

This research investigates issues relating to ERP implementations in three Australian universities through the focus of the perceptions of staff towards these implementations. This chapter reviews the literature on the ERP phenomenon with a consideration of its introduction into the higher education sector. The purpose of this review is threefold as it examines:

- the context and changing nature of the higher education sector. This exploration is included to provide the background of the changing context of higher education and the significance of the problem of ERP implementations in universities internationally and nationally.
- the literature to identify the issues that have affected ERP implementations in the corporate sector. This literature provides a background for understanding the processes and issues affecting implementations in the higher education sector. The critical success factor literature in this area is also examined to provide a background to further understanding the management of ERP implementations in universities.
- staff perceptions in order to provide the background of other research undertaken in this area.

This literature is used, combined with the findings from this research, to develop the guidelines for effective and efficacious ERP implementation in universities presented in Chapter 5.

2.2 The Context of the Introduction of ERP and ERPs

It is necessary to explore the introduction of ERPs and the implications of their effect on organisations. This provides insights into the problems and issues which may be
associated with the introduction of ERP systems in the university sector and to understand the particular context of this study.

2.2.1 The Evolution of ERPs
As outlined briefly in Chapter 1, an ERP system is a complex, multidimensional, multi-faceted information system (Gibson, Holland & Light, 1999) which has the potential to integrate all the business systems and information required by an organisation (Davenport, 1998). ERP systems have become one of the most widespread IT solutions and they are now considered the standard technology base with which to operate a business or an organisation. According to Al-Mashari (2003), it was projected that, in 2002, total spending on ERP applications for global organisations would reach $72.63 billion. ERP spending has continued to increase globally.

From an historical point of view, the concept of ERPs traces its roots from their antecedent inventory control packages such as the Material Requirements Planning (MRP) systems in the 1970s and the Manufacturing Resource Planning (MRPII) systems in the 1980s. MRP systems were developed to reduce costs, market responsiveness and lead times, and improve organisational communication (von Hellens et al., 2005). Specifically, computer systems were used to improve productivity, profitability and information flow across the enterprise (Shehab, Sharp, Supramaniam & Spedding, 2004). According to Shehab et al. (2004), in the early 1970s the Gartner Group of consultants devised the term Enterprise Resource Planning (ERP), at that time, to describe a business software system that was the latest improvement of an MRP system. The applications and scope of ERP systems matured in the mid 1990s to the current type of ERP systems in use in most large organisations including universities. By the mid 1990s, the scope offered by an ERP system had expanded to include functions such as order management, financial management, warehousing, distribution production, quality control, asset management and human resources management.
The technological evolution of ERP systems has expanded further in recent years to include functions such as sales and marketing automation, electronic commerce and supply chain management systems (Chung & Snyder, 2000). While ERP systems traditionally have been used by manufacturing, construction, aerospace and defence industries, they have evolved to encompass a greater range of functions and consequently are now being used in the finance, insurance, retail, telecommunications and education industries (Chung & Snyder, 2000; von Hellens et al., 2005). For the last five years, IT software developers such as SAP, Oracle, PeopleSoft, Baan, and J.D. Edwards have been considered the top ERP vendors for all industries and control 70% of the market globally (Shehab et al., 2004). All these ERP vendors have tailored their products to target the higher education industry worldwide since the late 1990s. PeopleSoft had captured 55% of the Australian market in 2002 (Nielsen, 2005) and continues to be the market leader (Philipson, 2006).

2.3 Context of the Emergence of ERP in the Higher Education Sector

This section provides the background for the changes to the higher education industry which have provided the momentum and rationale for the introduction of ERP systems into this sector.

2.3.1 ERPs and the Higher Education Sector

ERPs were initially introduced into higher education institutions in the US as a response to the same issues which encouraged private sector industries to implement ERPs. In the US context, a number of factors have contributed to rapid changes in the higher education sector. These include a decline in revenue in both state and private universities, increasing competition between institutions, changing markets for higher education products, changing academic preparation of students and the increasing amount of information relevant to academic work. These have all contributed to create environments for the sector that have been described as turbulent (Alkin, 1993; Drucker, 1999). Governments across the world have exerted pressure on the higher education environment to improve operational efficiency and
to reduce duplication of resources. This has led to higher education institutions implementing advanced information systems, which span a range of operations in the institution, to improve their administrative processes (Allen & Kern, 2001; Pollock & Cornford, 2004). These factors have created a need for an improved integration of information management systems in previously highly differentiated organisations.

The introduction and implementation of ERPs in the US higher education sector was essentially a strategy used by the universities to integrate the major administrative systems which they had been using for at least thirty years. US higher education institutions viewed ERP adoption as a method of gaining greater integration of their management systems to better manage increasingly complex operations (Frantz, 2001). As in the corporate world, the decision to implement an ERP in universities was thus a response to both internal and external influences requiring more efficient management processes (Allen & Kern, 2001; Pollock & Cornford, 2004).

Additionally, as discussed in Chapter 1, ERPs were also considered a strategy to improve customer service delivery to a more discerning customer base.

As discussed in the previous section, the software companies retailing ERPs originally developed the systems for global manufacturing organisations and, in the mid 1990s, redesigned them initially for US higher education institutions and subsequently for the global education market (Frantz, 2001). Concern about the impending impact of the Y2K issues on existing information management systems was another issue leading to the adoption of ERP systems by the university sector in the late 1990s (Frantz, 2001). The trend of ERP adoption has continued into the higher education environment globally (Allen & Kern, 2001; von Hellens et al., 2005) and specifically into the Australian environment since 1998.

However, as noted in Chapter 1, the implementation of ERPs in the higher education sector has resulted in organisational issues for universities because these systems were primarily designed for the corporate world with little customisation for the
sector (Beekhuizen, 2001; von Hellens et al., 2005). The implementation of the ERP software is inherently challenging because its packaged nature requires organisations to either adjust their business processes to fit the ERP system or, alternatively, to develop costly modifications so that the ERP software fits the processes of the organisation (Gates, 2005; von Hellens et al., 2005; Boonstra, 2006). The difficulty for ERP implementations in higher education institutions is adjusting the organisation to fit ERP processes designed for the corporate world (Gates, 2005; von Hellens et al., 2005). As indicated in Chapter 1, higher education institutions increasingly have adopted business processes from the corporate sector. However, the advent of an ERP creates an additional pressure to do this in a specified time. It is this accompanying pressure to change the organisation which impacts on the implementation of an ERP in a university and inevitably changes the organisation itself (Pollock & Cornford, 2004).

2.3.1.1 The Changing Context of Australian Universities

The worldwide trend of increased pressure by governments to improve the overall efficiency of their higher education sector operations (Allen & Kern, 2001) also has impacted on the Australian higher education sector. During this period of change to the higher education industry, there has been a decreasing level of government funding per student, changing consumer needs and increased government expectations of quality and performance, combined with an increasingly competitive global higher education environment (Marginson, 1996; McConachie, 2001, Stilwell, 2003). As a result, universities have introduced strategies to increase their efficiency including competitive work and management practices drawn from the private sector (Coaldrake, 1995; Marginson, 1996, Stilwell, 2003). Many of these changes required the public sector to import management practices from the private sector, often facilitated by technology (Davenport, 2000, Stilwell, 2003). Australian universities have responded to the increased demands of government imperatives by the adoption of business and industry organisational and management structures (Bessant, 1995 Marginson & Considine, 2000). Stilwell (2003, p. 52) describes these changes as an increasing growth of the “entrepreneurial character” of universities
and the development of “systems of line management at the expense of collegial or democratic structures”. Marginson and Considine (2000, p.242) reported that these entrepreneurial strategies do not necessarily flow through to the academic operation of universities and consequently reported increased tensions between university managers and academics and increased competition between faculties, schools and departments for financial support. It is this period of change that provides the background to this study.

2.3.1.2 The Introduction of ERPs in Australian Universities

In the past two decades, Australian universities have been impacted by externally initiated organisational changes, as mentioned above, combined with new work practices which have evolved in private and public sector organisations (Guthrie & Neumann, 2001). The effect of these trends has been to increase the pace of organisational change in Australian universities (Marginson, 1996). From the Dawkins restructuring in 1986 through to the quality audits in the early 90s, the Hoare Report in 1995, the Vanstone financial cutbacks of 1996, the West Review of 1997 and more recently to the Nelson reforms of 2003, universities continue to be forced to critically examine their management practices and to become more efficient in their operations (Dawkins, 1987; Hoare, 1996; West, 1997; Kemp, 1998; Nelson, 2003). The following excerpt from University Z’s Annual Report (2004, p.49) illustrates the context of change faced by the higher education sector:

The operating environment for higher education has changed significantly over the past decade. A lowering of government funding support, a growing diversity in the student body, changing expectations amongst all stakeholders, radical changes in the nature of work, and the impact of globalisation, corporatisation and the emerging knowledge society, are all continuing to have a major impact on the University’s operations and have obliged the University to deal with change as the norm. Since 2003 significant change has occurred in the Australian higher education sector through the introduction of the Backing Australia’s Future reforms.
The impetus for change also has driven attempts by universities to become competitive global industries. The increased use of technology for both teaching and administrative purposes in universities (McConachie, 2001) increasingly has been employed to provide enhanced customer service strategies and the development of a range of e-commerce strategies (Frantz, 2001). Higher education now is strongly influenced by externally driven demands for institutional accountability and quality; combined with increased competition for a market share of customers (Marginson & Considine, 2000; Gregor, Wassenaar & Marshall, 2002). In Australia, current federally-driven quality audits and the establishment of a centrally accessed Higher Education Information Management System (HEIMS) are examples of this increased need for accountability and control by the federal government (Gallagher, 2001; Karmel, 2001; Nelson, 2003). Concomitantly, in response to the increasing cost of higher education to the student, there is expectation by the community that universities should provide an enhanced quality of learning experience for more demanding and discerning customers (Hoare, 1996; Reid, 1996). A consequence of the foregoing has resulted in changes to university organisational structures and practices to become more centrally managed and administered. These changes are in response to the federal government’s increasing control over the sector to ensure that it becomes more accountable (Karmel, 2001) and include downsizing, restructuring and the rationalisation of faculties and administrative areas and, more recently, the implementation of ERP systems (Kemp, 1998; Nielsen et al., 2005).

Finally, Marginson, writing in 1996, described the Australian Government’s “economic rationalist political agenda as providing a substantial economic imperative to force changes in the management of universities” (p.119), so that they can operate with less dependence on federal funding generally and accommodate the prospect of decreased government funded student numbers. This trend has continued with the federal government continuing to exercise increasing centralised authority over universities in Australia (Karmel, 2001). Scott (2003) noted that for a university to become economically viable, increasingly it needs to implement efficient management practices which mirror those in the corporate sector.
Concurrently, to achieve long-term sustainability, universities are required to produce a range of globally marketable products (Giddens, 1994; Reid, 1996). It is because of the range of pressures outlined in this section of the study that Australian universities, like their US counterparts, have found it imperative to implement administrative information technology (IT) systems or ERPs to address their administrative needs (Oliver & Romm, 2000; Nielsen et al., 2005).

2.3.1.3 ERP Systems Implementation Research in Australian Universities
This section briefly describes the introduction and evolution of the use of ERP systems since the late 1980s to provide the background to the implementation of ERPs in Australian universities.

At the end of the 1980s, the difficulties posed in meeting information requests from the federal government led universities to consider a cooperative approach to IT systems development. As outlined briefly in Chapter 1, the Core Australian Specification for Management and Administrative Computing (CASMAC) steering committee was formed in 1989 by the Australian Vice-Chancellors’ Committee (AVCC). CASMAC was based on a similar project initiated in 1988 by the University Grants Committee (UGC) in the United Kingdom that became known as the Management and Administrative Computing (MAC) initiative. Both CASMAC and the UK MAC initiative were based on the premise that there was a high degree of commonality in the core functionality needed to support the administrative and management functions of universities. The AVCC believed that there were benefits to be obtained by specifying these requirements and sharing the development and ongoing costs of the resulting systems (Oliver & Romm, 2000).

Ultimately, the CASMAC initiative resulted in the development of the Student One system, which emerged from Curtin University and the Callista system from Deakin University. Eleven Australian universities subsequently adopted these systems (Nielsen, 2005). Additionally, nineteen Australian universities formed an alliance to develop a software system based upon the Cognos (Powerhouse) product, a project
that ultimately failed to deliver a usable system (Oliver & Romm, 2000). In a further
development of the use of ERPs, as the Year 2000 (Y2K) issues impended in
combination with the requirement for all institutions in Australia to have systems to
deal with GST, it was logical that universities adopted ERPs as a means of
integrating a range of administrative information systems and to prepare for both
Y2K and GST. The actual use of different ERPs also can be seen as a milestone in the
Australian higher education environment as universities ceased to work
cooperatively as they had during the CASMAC project and proceeded to implement
individual ERP systems.

As previously discussed in Chapter 1, the use of ERP systems emerged in Australia
during the 1990s when the University of New South Wales (UNSW) undertook this
initiative in 1998, closely followed by Central Queensland University (CQU). Since
then most Australian universities have initiated some form of ERP system and are in
a cycle of upgrading these ERP modules on a regular basis (Nielsen, 2005).

2.3.1.4 Research on ERP Implementation in the Australian Context
Research literature investigating ERP system implementations in Australia has
started to emerge in the last three years (von Hellens et al., 2005). Research which
focuses on an Australian environment appears limited despite the fact that, by 2004,
86% of universities had adopted an ERP system (Beekhuyzen et al., 2002). As yet, in
the Australian university context, there appears to be only a few research papers on
the management of ERP implementations. However, the research is growing with
the publication in 2005 of an edited book in this area (von Hellens et al., 2005).

2.4 ERP Implementation Processes
The first sections of this chapter have considered the background of the introduction
of ERP systems into organisations and into the higher education sector specifically.
This next section examines the particular issues affecting the processes associated
with the implementation of ERPs in universities.
2.4.1 ERP Adoption and Implementation Issues

A successfully implemented ERP system can be used to manage and integrate all the necessary business functions within an organisation (Shehab et al., 2004). It is this capacity to integrate all the business processes that is the feature of ERP systems, which provides the advance for higher education institutions on previously separate administrative information systems. Furthermore, the capability of ERPs to be used across multi-sites and globally is another feature adding to their adoption success and creating challenges for an organisation. A particular challenge for an ERP adoption and implementation is choosing the right “fit” or match between the particular ERP package functions and the business requirements of the organisation (Rao, 2000; Al-Mashari, 2003; Shehab et al., 2004; von Hellens at al, 2005; Boonstra, 2006). How an organisation determines this fit between available ERP products and business requirements has been problematic and is outside the scope of this investigation. This study does not investigate specifically the choice of ERP software.

Allen (2001, p.150) describes ERPs as a “method of integrating cross functional information resources to eliminate traditional barriers to communication and provide a seamless flow of information” across the organisation. Universities traditionally have a set of information systems operated by different sections of the institutions with discrete sets of data belonging to their respective owners in different areas. The integration of a number of systems into one central system creates the need for standardised data entry formats and for users to have access to a range of data which may not have been possible previously. This integration of data from all areas of an institution can impact on both ownership and access to data and potentially cause organisational difficulties, conflicts and “turf wars” (Frantz, 2001; Kennerley & Neely, 2001). Feemster (2000) described the difficulties experienced of an ERP software implementation in a US college as “merging a system of decades – old databases and re-educating campus employees” and as causing “enormous cost and pain” (p.25). In a study of UK universities implementing ERPs, the primary concern of staff was the centralisation of information and the consequent shift of management power that accompanied the implementation (Beekhuyzen et al., 2002).
This integration of information management systems provided by ERPs is different to the traditional methods of information systems employed in universities which are often “disparate and lead to duplication of resources and services” (Allen, 2001, p.151).

The implementation of ERP systems in universities has resulted in organisational management issues new to universities, because these systems were primarily designed for corporate non-university organisations (McConachie, 2001; Nielsen, 2002; Beekhuyzen, 2001). Managing the changes to business processes across a university to match the business processes in the ERP system is a process not easily achieved in a university (Pollock & Cornford, 2004). If the business processes are not changed to fit the processes in the system, changes to the ERP systems must be made. This can make upgrades extremely difficult and decrease the value that an organisation obtains from an ERP implementation. In this respect, Esteves and Pastor (2005) found that universities are not easily able to make changes to business processes in the short time frame of an implementation. It is as a result of the need to change the business processes quickly, the need for standardised data entry discussed above, and the access to this data by staff across the organisation that these implementations impact on an organisation such as a university (Randolph & Main, 2005). Beekhuyzen et al. (2002) argued that the introduction of ERPs has resulted in a new layer of change in universities as they replace administrative systems across an organisation and impact the entire organisation. The management of the accompanying changes to the organisation caused by the ERP implementation has been shown to be critical to successful organisational performance (Buchanan, Claydon & Doyle, 1999). Furthermore, McConachie (2001) reports that traditional change management strategies do not work in an unpredictable environment. This research found that the increased use of information technology for both administrative and teaching purposes is one of the main factors causing this unpredictability (McConachie, 2001). Olsen (2000) further asserts that managing the human and organisational risk when implementing technology is more difficult than managing the technical risks. He also found that the human and organisational
aspects are crucial to the success of the implementation of an ERP although these issues tend not to receive as much focus as the technical issues (Olsen, 2000).

Another aspect of ERP implementations that requires a particular focus for the higher education sector is the university’s relationships with corporate consultants and ERP vendors. Unlike the corporate sector, the higher education sector traditionally has not had relationships with corporate consultants and vendors to any large extent prior to ERP implementations. The Allen and Kern (2001) study of four implementations in UK universities found that the ERP projects placed the universities in complex and difficult relationships with the ERP vendors and their implementation consultants, relationships which were new for universities. McCredie and Updegrove (1999) similarly reported that it is difficult to manage the role of the consultant in an implementation in the higher education sector. Similar literature based on higher education implementations suggests that the use of external consultants needs careful management to ensure that the organisation gets value for money and skills transfer to the organisation (McCredie & Updegrove, 1999; Smith, 2000).

2.4.2 Re-engineering Processes

As mentioned previously, the nature of an ERP implementation can become challenging because of the packaged nature of the software and the necessity for the organisation to adjust their business processes to fit the package (von Hellens et al., 2005). The packaged multi-faceted nature of ERPs, while being its strength, is also the aspect that can create difficulties for an organisation (Al-Mashari, 2003). In the higher education context, universities face the ERP dilemma of how much customisation should be made to the ERP package or whether the university can initiate changes to fit in with the ERP package (Pollock & Cornford, 2004). The challenge related to the one above is the need for an organisation to either adjust its business processes to fit the package and implement the minimal customisation or Vanilla package or, to build extra functionality around the package, often requiring an external consulting company and further costs to assist the organisation through
Despite the foregoing issues, this accompanying re-engineering of business processes is one aspect of an ERP implementation that has the capacity to deliver strategic benefits for an organisation (Kennerley & Neely, 2001). Shehab et al., (2004 p.362) reports that studies have illustrated that an ERP system is not just a software package to be tailored to an organisation, but an organisational infrastructure that affects how people work and “imposes its own logic on a company’s strategy, organisation, and culture” (Davenport, 1998; Lee & Lee, 2000). Research by von Hellens et al. (2005) describes universities finding that the business processes within ERP packages do not fit easily with university processes. This was shown to be possibly a result of particular structures and decision-making processes which are different to those in the corporate world (von Hellens et al., 2005). Allen and Kern (2001) also found that the academic culture of universities made it particularly difficult to implement a large ERP system. Nevertheless, adjusting the business processes of an organisation such as a university is often more difficult than in a private sector organisation. This is a consequence of the particular culture of a university where changes to structures and processes traditionally do not happen quickly; an issue which will be discussed later in this chapter (Frantz, 2001). Further, the introduction of ERP systems in large organisations such as universities, and the subsequent process of re-engineering existing internal structures and processes, impacts substantially on the organisation and its people (McCredie & Updegrove, 1999; Gregor et al., 2002). It is this all encompassing impact on organisations in the higher education sector that sets ERPs
apart from their predecessor packages and creates the need for careful preparation and implementation requirements in a university environment.

2.4.3 Summary
Al-Mashari (2003) notes that the literature indicates that the adoption of an ERP system in an organisation requires intense focus on the technological, business and human aspects of the implementation. When ERPs are successfully implemented, these can offer operational, managerial and strategic benefits to an organisation (von Hellens et al., 2005). A critical factor in the success of these efforts is an adequate level of organisational preparedness for initiating an ERP (Rao, 2000; Botta-Genoulaz et al, 2005). Organisational preparedness includes a range of issues which need to be considered in all stages of an ERP implementation such as the fit between the ERP functions and the business requirements of the organisation. Undertaking the necessary BPR and planning identified in the CSF literature also contribute to preparing an organisation to obtain value from their ERP implementation. For a university environment, there are potential difficulties in being able to change business processes in the short time frame of an ERP implementation. The next section provides an overview of the critical success factor and change management research designed to maximise the efficacy of an ERP system implementation.

2.5 Research on ERP implementations
This section outlines the research that has emerged in response to the need for improving ERP system implementations. This includes the critical success factor (CSF) research, practitioner research and change management literature. It considers the development of this ERP implementation research and its recent focus on higher education institutions; most recently on the Australian sector.

2.5.1 ERP Failures
Notwithstanding the benefits of an ERP system as discussed earlier in this Chapter, there are many reported failures of ERP system implementations. Numerous examples of both public and private organisations experiencing ERP system failures
and major budget overruns have been cited in the literature including the implementation failure at Royal Melbourne Institute of Technology (RMIT) (Davenport, 1998; Whittaker, 1999; von Hellens et al., 2005; Buckell, 2003). Al-Mashari, Al-Mudimigh and Zairi (2003) report that 90% of ERP implementations are not completed within intended timeframes or are over budget. The small amount of research on implementations in universities shows that they have experienced similar difficulties to non-university organisations.

Common difficulties of ERP system implementations include cost containment for implementations because of budget overruns and time delays (Davenport, 2000; Frantz, 2001; Al-Mashari et al., 2003) which have resulted in numerous organisations abandoning their ERP implementations. These difficulties are cited as common concerns to ERP implementations irrespective of whether the end results are considered a success or a failure. Other criticisms include the lengthy and difficult customisations of the ERP system to match existing business processes and sometimes their mediocre results (von Hellens et al., 2005). Gupta (2000) suggests that other problems associated with ERP implementation can include the poor training of end-users and the resistance of staff to change or to using the new system, when, for example, some employees become reluctant to learn new techniques or accept new responsibilities. Although organisations expend millions of dollars on ERP packages and the implementation process, there is extensive evidence that they experience considerable problems, particularly during the actual implementation process (Shehab et al., 2004).

Nielsen (2002) and Beekhuyzen et al. (2002, p6) cite the literature on the record of costly failures of ERP implementations both in the corporate world and in the Australian context. Factors that have limited the success of these implementations have been reported as budget overruns and lack of functionality of the system once it has been implemented (Lawnham, 2001; Madden, 2002; Philipson, 2006). Australian newspapers have cited ERP projects that have failed for various reasons at the University of New South Wales (UNSW), Adelaide University and Royal Melbourne
Institute of technology (RMIT) (Lawnham, 2001; Madden, 2002). It was reported that the cost of the ERP system implementation at UNSW was $40 million — twice the original estimate of costs (Lawnham, 2001). The implementation at RMIT apparently failed after go-live which cost the university $50 million in implementation and repair costs (Buckell, 2003). The student records database was corrupted and was not available for either staff or students for a period of time impacting on the institution’s capacity to operate. Because of the relatively large allocations of budget for an ERP implementation in a university, if it is not managed efficaciously there are implications for the well-being of the institution and its staff and students. There have been similar cases cited in US colleges and universities (Olsen, 2000).

In summary, failure, or near failure, of the implementation of ERPs can be accounted for by the following issues:

- lack of appropriate planning leading to budget overruns
- time delays
- staff resistance to the new system
- the need to reengineer business processes to gain strategic benefits from the system leading to difficult customisations of the software
- poor end products
- user resistance to using the new system and processes.

2.5.2 The Emergence of Critical Success Factors (CSF) Research

This section broadly covers the field of CSF and identifies the factors which are commonly cited in the literature and cover a range of issues which may have application for ERP implementations in universities.

In response to the literature citing numerous and costly ERP implementation problems a body of literature has developed which addresses the difficulties of ERP implementation by proposing critical success factors (CSF) and frameworks for implementation (for example, Davenport, 1998; Bancroft et al., 1998; Holland & Light, 1999; Markus et al., 2000; Cotteleer, 2001; Nah et al., 2001; Somers & Nelson,
The applications of CSF are aimed at improving the processes and, therefore, the planning, for a more successful ERP implementation. For a definition of CSF devised by Holland and Light (1999, p.31) see Chapter 1. According to Al-Mashari (2003), as the amount of money being spent on ERP implementations increases, it is becoming more urgent to establish a research agenda to understand these critical success issues.

Much of the current CSF research agenda is based on research originally undertaken by DeLone and McLean (1992, 2003) on information system implementation success. Kennerley and Neely (2001) identified some shortcomings of the DeLone and McLean framework including issues such as the impact on an organisation, the organisation’s strategy and the environment of the organisation where the system is implemented. This research was extended by Bancroft et al. (1998) who provided nine CSF specifically for ERP implementations, including top management support, the presence of a champion, good communication with stakeholders and effective project management. In another study, Holland and Light (1999) developed a CSF framework to help managers successfully plan and implement an ERP project. Their CSF framework, shown in Table 2.1 below, is a useful inventory for universities as it divides the critical success factors into a strategic list, such as the overall implementation strategy factors, and a tactical list such as technical software configuration and project management variables (Shehab, 2004; Nielsen, 2005).

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<tr>
<th>Strategic</th>
<th>Tactical</th>
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<td>Legacy systems</td>
<td>Client consultation and acceptance</td>
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<td>Business vision</td>
<td>Personnel</td>
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<td>ERP strategy</td>
<td>BPR and software configuration</td>
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<td>Top management support</td>
<td>Monitoring and feedback</td>
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<tr>
<td>Project schedule and plan</td>
<td>Communication</td>
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</table>

Table 2.1 A CSF framework with strategic and tactical factors for an ERP implementation process adopted from Holland and Light (1999)
Nah, Lee-Shang Lau and Kuang (2001), in their integrative work on CSF research which had been developed previously, further refines a set of CSF and identified eleven factors critical to ERP implementation success: ERP teamwork and composition; change management program and culture; top management support; business plan linked with the vision of the organisation; BPR with minimum customisation of the software; project management; monitoring and evaluation of performance; effective communication; software development, testing and troubleshooting; a project champion; and appropriate business and IT legacy systems.

In order to minimise the possibility of costly failure in ERP implementations, Gupta (2000), as cited by Al-Mashari et al. (2003) suggests that the critical issues in relation to successful implementation of ERPs include securing top management commitment, forming cross-functional task forces to link project management with business units, carrying out an assessment exercise of hardware requirements, making deployment a step-by-step introduction rather than all at once, starting early to plan the user training and user support, streamlining decision-making to move implementation quickly, and being patient, as ERP implementation takes time. Cissna (1998) similarly finds that factors relating to top management support, assignment of the “best” people to implementation teams, and strong involvement of people from the field were important in reducing the resistance to changes involved in ERP implementation.

A number of studies on CSF have identified factors that work against the success of an ERP implementation. In a study aimed at determining the CSF in the implementation of ERP systems in small to medium businesses, Marsh (2000) identified a number of strategic factors which can lead to a possible failure of an implementation, including top-down or consultant-driven implementations, IT department-driven implementations, or implementations where the ERP is seen as a quick technological fix to problems within the operation of the business, rather than as a strategic investment. Willcocks and Sykes (2000) further explored this issue of
ERP implementations from the perspective of the information technology (IT) managers of a company. They reported that most IT departments seem to have been “asleep at the wheel” in understanding and dealing with the ERP phenomenon. They suggested that the IT managers and their IT departments may need transformation to deal with the challenges of adopting, implementing and, if necessary, adapting ERPs to the particular needs of their organisation. Their results also indicated that implementation effort not only increases with the number of modules and sub-modules that were implemented but that each system user in the organisation added extra costs to the implementation.

The research by Somers and Nelson (2001) provides an extensive review of CSF literature (Parr & Shanks, 2003; Nielsen, 2005) and also shows the critical importance of top management support for an ERP implementation. The Somers and Nelson (2001) research identifies twenty-two ERP success factors with the literature illustrating that, importantly, if the top management support is low, then the ERP implementation is considered a failure, and conversely the reverse (Akkermans & van Helden, 2002). Further, according to Botta-Genoulaz, Millet & Grabot (2005), Somers and Nelson’s research is useful as it categorises which activities are important to be associated with the various critical implementation steps of an ERP implementation. Further, Bancroft at al (1998), Markus et al. (2000) and Parr and Shanks (2000) have all proposed phased implementation models for ERP implementations to further understand and organise the array of CSF in the literature. Parr and Shanks have proposed a three phase model for an implementation project that provides guidance for practitioners when implementing ERP projects in addition to researchers (Parr & Shanks, 2003; Shehab et al., 2004).

In summary, the foregoing review of CSF research indicates that one of the most widely-cited variables critical to the successful implementation of a large customised system, is top management support. Of lesser importance, though regularly cited in the literature, are issues such as the existence of a project champion, effective planning processes and effective project management including having the right
people with the necessary skills and ensuring that staff are involved to minimise possible resistance to the new system.

2.5.3 Critical Success Factors for ERPs in the Higher Education Sector

Literature on CSF for implementing ERPs, discussed in the section above, in non-university organisations (Hall, 1999; Whittaker, 1999; Butler, 2000; Cotteeleer, 2001; Frantz, 2001; Somers & Nelson, 2001; Livingstone et al., 2002; Skok & Legge, 2002) implies that corporate sector management strategies may translate to other sectors including, in a number of articles, the higher education sector (Livingstone et al., 2002; Cotteeleer, 2001; Skok & Legge, 2002; Frantz, 2001). Nielsen’s (2002, 2005) CSF developed specifically for the higher education sector, shown in Table 2.3, is the first synthesis of success factors for the higher education environment. Nielsen (2005) developed his framework of twenty-nine CSF based on those developed previously by DeLone and McLean (1992, 2003), Brown and Vessey (1999), and Holland and Light (1999) (von Hellens et al., 2005). In his research, Nielsen interviewed nine implementation staff members and managers of user groups at one Australian university to refine his factors. Nielsen’s interviewees identified 22 of the 29 factors in the study that he undertook with staff at one university and they identified a further four factors: competitive edge, service for students, knowledge management and system ownership.
Table 2.2 Adapted from Nielsen’s CSF for ERP implementations from literature

<table>
<thead>
<tr>
<th>CSF No.</th>
<th>Critical Success Factors</th>
<th>Key Authors</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Appropriate decision making framework</td>
<td>McCredie and Updegrove, 1999</td>
</tr>
<tr>
<td>2</td>
<td>Management structure</td>
<td>Sumner, 1999; Nelson &amp; Somers, 2001</td>
</tr>
<tr>
<td>3</td>
<td>Top management support</td>
<td>Bingi et al., 1999; Holland &amp; Light, 1999; Sumner, 1999; Gable et al., 2001a; Nah et al., 2001; Nelson &amp; Somers 2001</td>
</tr>
<tr>
<td>4</td>
<td>External expertise (use of consultants)</td>
<td>McCredie &amp; Updegrove, 1999; Sumner, 1999; Nelson &amp; Somers, 2001</td>
</tr>
<tr>
<td>5</td>
<td>Balanced project team</td>
<td>Nah et al., 2001</td>
</tr>
<tr>
<td>6</td>
<td>Research</td>
<td>McCredie &amp; Updegrove 1999</td>
</tr>
<tr>
<td>7</td>
<td>Clear goals, focus and scope</td>
<td>Holland &amp; Light ,1999; Markus &amp; Tanis, 2000; Nah et al., 2001</td>
</tr>
<tr>
<td>8</td>
<td>Project management</td>
<td>Holland &amp; Light, 1999; McCredie &amp; Updegrove, 1999; Markus &amp; Tanis, 2000; Gable et al., 2001a; Nah et al., 2001; Nelson &amp; Somers, 2001</td>
</tr>
<tr>
<td>9</td>
<td>Change management</td>
<td>Holland &amp; Light, 1999; McCredie &amp; Updegrove, 1999; Nah et al., 2001; Nelson &amp; Somers, 2001</td>
</tr>
<tr>
<td>10</td>
<td>User participation</td>
<td>McCredie &amp; Updegrove, 1999; Gable et al., 2001a</td>
</tr>
<tr>
<td>11</td>
<td>Education and training</td>
<td>McCredie &amp; Updegrove, 1999; Sumner, 1999; Trimble, 2000; Gable et al., 2001a; Nelson &amp; Somers, 2001</td>
</tr>
<tr>
<td>12</td>
<td>Presence of a champion</td>
<td>Sumner, 1999; Gable et al., 2001a; Nah et al., 2001; Nelson &amp; Somers, 2001</td>
</tr>
<tr>
<td>13</td>
<td>Minimal customisation</td>
<td>Trimble, 2000; Nah et al., 2001; Nelson &amp; Somers, 2001</td>
</tr>
<tr>
<td>14</td>
<td>Business process re-engineering</td>
<td>Nah et al., 2001; Nelson &amp; Somers, 2001</td>
</tr>
<tr>
<td>15</td>
<td>Discipline and standardisation</td>
<td>Sumner, 1999</td>
</tr>
<tr>
<td>16</td>
<td>Effective communications</td>
<td>Sumner, 1999; Gable et al., 2001a; Nah et al., 2001</td>
</tr>
<tr>
<td>17</td>
<td>Best people full-time – planning of this</td>
<td>McCredie &amp; Updegrove, 1999</td>
</tr>
<tr>
<td>18</td>
<td>Technical and business knowledge</td>
<td>Sumner, 1999</td>
</tr>
<tr>
<td>19</td>
<td>Culture</td>
<td>Nah et al., 2001</td>
</tr>
<tr>
<td>20</td>
<td>Monitoring and evaluating of performance</td>
<td>Nah et al., 2001</td>
</tr>
<tr>
<td>21</td>
<td>Software development testing and troubleshooting</td>
<td>Nah et al., 2001</td>
</tr>
<tr>
<td>22</td>
<td>Management of expectations</td>
<td>Nelson &amp; Somers, 2001</td>
</tr>
<tr>
<td>23</td>
<td>Vendor/customer partnerships</td>
<td>Nelson &amp; Somers, 2001</td>
</tr>
<tr>
<td>24</td>
<td>Use of vendors’ development tools</td>
<td>Nelson &amp; Somers, 2001</td>
</tr>
<tr>
<td>26</td>
<td>Interdepartmental cooperation and communication</td>
<td>McCredie &amp; Updegrove, 1999; Nelson &amp; Somers, 2001; Akkermans &amp; van Helden, 2002</td>
</tr>
<tr>
<td>27</td>
<td>Hardware issues</td>
<td>McCredie &amp; Updegrove, 1999</td>
</tr>
<tr>
<td>28</td>
<td>Information and access security</td>
<td>McCredie &amp; Updegrove, 1999</td>
</tr>
<tr>
<td>29</td>
<td>Implementation approach</td>
<td>McCredie &amp; Updegrove, 1999</td>
</tr>
</tbody>
</table>
Nielsen’s CSF framework focuses on the broad areas of strategic factors, organisational context, system and information quality, project scope and user satisfaction and use. These factors are a useful guide for this research in which a range of staff are interviewed at three different universities. However, the foregoing suggests that there is a need for further research on the factors affecting implementations of ERPs in the Australian university environment. Nielsen’s research was conducted at one university and with a limited group of implementation project staff and user group managers. Nevertheless, his research is a useful inventory of the range of possible factors to be considered in universities as identified by the critical success literature discussed earlier in this chapter.

Work by Esteves and Pastor (2001) in the synthesis of the earlier ERP implementation research, and later in the Spanish higher education environment (2005), suggests that most problems in ERP implementation projects are not necessarily technological but can be attributable to organisational factors including the contextual influence. Esteves and Pastor (2005) suggest that the factor approach to ERP implementations may be too narrow and that there is a lack of research on the management of these CSF. Further, they suggest that it is important to examine ERP implementations using a process approach perspective, which includes a consideration of the organisational context, in addition to the CSF. Esteves and Pastor advise that in a process approach to an ERP system implementation it should be viewed as “sequences of discreet events that lead to outcomes of particular interest” (p42).

Similarly, Romm Livermore (2005) and Aladwani (2001, p.67) suggest that factor research needs to be combined with a process approach for ERP implementation research as factor research “adopts a static view, which limits its adequacy in explaining the dynamics of the implementation process”. ERP implementations, rather than being viewed as static processes, are dynamic processes interacting with a range of issues in their particular organisational contexts.

Esteves and Pastor’s (2005) in depth study of a Spanish university ERP system implementation showed that the highly bureaucratic and cautious organisational
culture would not allow for the maximum benefits from the ERP system to be achieved. The framework, developed by Esteves and Pastor (2005) derived from the Holland and Light (1999) research discussed earlier, as shown in Table 2.1, and is presented in Table 2.3. The table has application for this research investigation in establishing the guidelines and is considered further at the conclusion of this Chapter. Esteves and Pastor’s (2005) framework has application for this research in establishing the guidelines for an effective and efficacious ERP implementation. This framework has been adapted by the researcher to include other issues obtained from the range of research covered in this study. It reflects the importance of this process approach and the organisational context of ERP implementations, and is a useful model for consideration in the higher education sector. This framework emphasises the strategic and organisational factors that appear to be particularly important for the higher education sector. The tactical issues in the model are also important; however, they are influenced in turn by the level of impact of the strategic and organisational factors. The technical factors included in this model need to be considered though they appear to be dependent on the other factors being given appropriate attention. This process model structures the large number of elements in the critical success factor research to make sense of it for the higher education sector.

Table 2.3 Adapted from Esteves and Pastor’s (2005) factors for ERP implementations

<table>
<thead>
<tr>
<th>Organsational</th>
<th>Strategic</th>
<th>Tactical</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Effective change management</td>
<td>Strong communication</td>
</tr>
<tr>
<td></td>
<td>Comprehensive BPR</td>
<td>Adequate training program</td>
</tr>
<tr>
<td></td>
<td>Adequate project sponsor/champion role</td>
<td>Preventive trouble shooting/risk management</td>
</tr>
<tr>
<td></td>
<td>Relationship with vendor</td>
<td>Appropriate use of consultants</td>
</tr>
<tr>
<td></td>
<td>Adequate project manager role and project team</td>
<td>Empowered decision makers</td>
</tr>
<tr>
<td></td>
<td>User involvement and participation</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Technological</th>
<th>Adequate ERP implementation strategy</th>
<th>Adequate infrastructure and interfaces</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Avoid customisation - vanilla</td>
<td>Adequate legacy systems knowledge</td>
</tr>
<tr>
<td></td>
<td>Number of modules implemented</td>
<td>Hardware requirements planned</td>
</tr>
<tr>
<td></td>
<td>ERP version</td>
<td>Adequate testing of the new system</td>
</tr>
</tbody>
</table>
The foregoing review of CSF in the higher education sector strongly suggests the importance of the strategic and organisational perspectives that support and augment the CSF research discussed earlier in the chapter. Further, this literature suggests that universities have been largely ignored in the research and in the discussion of critical success factors. Recent research on critical success factors has applied these findings to case studies in higher education institutions in the UK (Allen & Kern, 2001; Pollock & Cornford, 2004). CSF provide a framework for organising the array of factors which need to be considered in ERP implementations. The complexity of an ERP implementation requires both multi-faceted planning and dynamic implementation processes in any organisation. CSF provide a comprehensive list of issues which can provide guidance in the planning and execution of an implementation.

2.5.4 ERP Practitioner Research in the Higher Education Sector

Another body of literature which further informs the research on ERP implementations are the articles written by practitioners who have been involved in implementing ERP systems. Practitioner-based experience augments the CSF literature by examining the issues specifically related to the higher education sector (Carnevale, Berestka & Morrissey, 1999; Eleey & Oppenheim, 1999; Jaacks & Kurtz, 1999; Feemster, 2000; Smith, 2000; Olsen, 2000). This literature covers the experiences of the management of ERP system implementations in the US higher education sector and has potential applicability to this research as there are many similarities between the US and the Australian sectors and is considered in the remainder of this section.

From the practitioner-based literature on ERP implementations in US higher education institutions, it is argued that workloads for staff are greatly underestimated by senior and project managers and it is left to operational managers to deal with the increased workloads and resultant workplace issues as a result of the implementation of an ERP system (McCredie & Updegrove, 1999; Smith, 2000). The implementation of an ERP system characteristically results in end users having to
input a greater amount of data than they previously did and the implications of this are the increased workloads reported for staff across the institutions. Failure to manage the increased workloads accompanying an ERP implementation has been shown to impact on the attitude of staff to the ensuing changes to the organisation and in the use of the new system (Smith, 2000). Similarly in Australia, anecdotal evidence from staff involved in ERP implementations in universities appears to support this resultant underestimation of workloads for administrative staff across universities (Van Dyke, Gadenne & Watts, 2002; Van Dyke & Sinclair, 2003).

In related literature, Livingstone, White, Nelson and Tabak (2002) noted that managing an ERP implementation needed to be the responsibility of senior managers to ensure that an ERP implementation was demonstrably supported and that appropriate planning and monitoring occurred across the organisation. They further stated that ensuring that change is effectively managed, including the training of staff, the management of staff workloads and staff attitudes, staff consultation and communication were also the responsibility of senior management. In addition, Livingstone et al. (2002) reported that senior management has primary responsibility for influencing staff attitudes and acceptance of the associated changes that accompany an ERP implementation. Further, McCredie and Updegrove (1999) recommend that senior managers not overestimate the capacity of their organisation to absorb the magnitude of changes associated with an ERP implementation. They also suggest senior managers in a higher education institution employ a change management strategy of “under promising and over delivering” as more likely to positively influence staff attitudes and acceptance of the changes associated with the new system.

In addition to the issues discussed above, there are a number of other issues raised in practitioner literature that may be particularly pertinent to ERP implementations in the higher education sector. These include managing timelines, the role of consultants and changes to the software. For instance, Livingstone et al. (2002) reported that attitudes towards change and the adoption of new technology became
more positive following a delay in time frames in a large university implementation as opposed to the literature from the corporate sector that values keeping to specified timeframes. Given the traditional view that a successful ERP implementation is ‘on time and on budget’ this research is useful in determining factors appropriate for the higher education sector. McCredie and Updegrove (1999) advise that it is important to clearly manage the role of the consultant in a higher education implementation. Generally, the consultants who are employed in a higher education sector implementation have been working on ERP systems in the corporate sector and they are used according to the ‘on time and on budget’ view of an ERP implementation (McCredie & Updegrove, 1999). Finally, Feemster (2000) reports that in ERP system implementations in the higher education institutions in the US it appears that institutions where the software was not greatly customised (staying vanilla) had more successful outcomes. This has ramifications for the higher education sector, particularly in the earlier ERP implementations, as the software was adapted from systems developed for businesses and it did not easily match the processes required for universities. This was particularly the case for student administration ERP modules in Australian universities where the ERP modules were new and relatively untried products (Philipson, 2006). The concerns raised by this US practitioner literature are issues which need to be investigated as being pertinent to the Australian ERP system implementation context and may provide additional insights for ERP implementations in the higher education sector.

From this practitioner literature, it does appear that the experience of ERP implementations has followed similar patterns, in the US and Australia, of numerous difficulties in implementing ERPs. Similar to the CSF literature, the importance of the role and responsibility of senior management to the outcomes of an ERP implementation has been supported demonstrably by the practitioner-based literature. Additionally, operational managers have a role in managing increases in staff workloads and in the resultant attitude of staff to the ensuing changes to the organisation as the use and role of consultants to assist with ERP implementations is a relatively new phenomenon in the higher education sector, ensuring that the
consultants are managed effectively and according to what is required in a higher education environment is essential. Minimal customisation of ERP software resulting in an implementing vanilla ERP systems and a delay in go-live timeframes has also shown to be related to successful outcomes in higher education ERP implementations in the practitioner based literature.

2.5.5 Change Management Literature
Managing change in the university sector is particularly important because of possible resistance to change by staff who work in a culture and context where change is traditionally difficult. An understanding of the change management literature is deemed important to consider as it affects the perceptions of the people in an organisation towards the implementation and ultimately the use and efficacy of an ERP system. Furthermore, the larger body of literature which considers the management of large scale change initiatives may provide a model for guidelines for universities for an ERP system implementation. As well, change management strategies developed and employed in other industries may provide a model for change management strategies in universities during the implementation of an ERP. As Aladwani (2001) noted, successful change management strategies are those that ensure that the ERP implementation is less likely to fail.

According to Buchanan et al. (1999) it can be difficult for managers to translate change management theory from one setting into practice in their own organisations. However, the change management literature on managing the transformation of organisations provides a useful model for examining large scale change implementations in the higher education environment. The change management literature was initiated by Kurt Lewin who, in the late 1940s, developed the concept of a number of distinct phases of change. In the 1990s, the emergent approach to managing change evolved through the work of both Kanter (1992) and Kotter (1996) who provided guidance for implementing the stages of change in organisations through a series of steps. The steps which Kotter developed include the following:
establishing a sense of urgency
- creating a guiding coalition
- developing a vision and strategy
- communicating the change vision
- empowering broad based action
- generating short term wins
- consolidating gains and producing more change
- anchoring new approaches in the culture.

Kanter, in addition to developing similar steps to provide guidance for managing change, also focused on the critical importance of effective leadership in facilitating change in organisations. Kanter (1985) and other theorists on leadership and change make a case that not all change is of the same order of magnitude (Bridges, 1991; Rogers, 1995). Some changes have greater implications than others for stakeholders and this is referred to as first order and second order change. A change is regarded as second order when stakeholders are unclear about how it will make things better for them; they need to master new skills and processes, and they feel that the change conflicts with personal values and organisational norms to master the change (Waters and Grubb, 2004).

In the foregoing context, an ERP implementation is regarded as creating second order change in an organisation such as a university (McConachie, 2002). When change is being implemented in an organisation, it is important to assume that not all stakeholders will perceive change in the same way and that leaders need to tailor their change management strategies both to the magnitude or order of change that they are managing and to their various stakeholders who may be perceiving both first order and second order change.

Based on the literature on change management it is possible to synthesize a number of common principles, from the work of Kotter, Kanter and others, which are likely to be essential to successful change management strategies in a variety of public and
corporate organisations. However, these principles for implementing organisational change, though useful, need also to take into account the specific issues relating to the university sector. Following on from the work of Kanter et al., Hall (1999) lists six key principles of successful business change management strategies. These are commonly cited core elements in the literature for both corporate and higher education change agendas and include the following necessary steps:

1. a clear project sanction or endorsement by the senior executive of the organisation including an identified sponsor responsible for the project (Cooper, 1990; Kotter, 1996; Davenport, 1998, 2000; Hall, 1999; Whittaker, 1999; Milford & Stewart, 2000; Aladwani, 2001; Cotteleer, 2001; Frantz, 2001; Skok & Legge, 2002)

2. a detailed planning and preparatory process underpinning the effective management and control of the project (Kotter, 1996; Hall, 1999; Davenport, 2000; Aladwani, 2001; Frantz 2001; Skok & Legge, 2002)

3. the identification of a process to monitor and manage possible risks to the project’s operation and success including the risks from personality conflicts (Hall, 1999; Aladwani, 2001; Frantz 2001; Skok & Legge, 2002)

4. the development of effective communication strategies appropriate to the particular culture of the organisation and timely training for the new processes and skills (Kotter, 1996; Hall, 1999; Aladwani, 2001; Skok & Legge, 2002)

5. gaining staff commitment for the change and paying attention to the culture and the order of change impacting the organisation is a critical factor (Kanter, 1992; Kotter, 1996; Hall, 1999; Aladwani, 2001; Skok & Legge, 2002)

6. a project review to learn from the experience of the current project for future change projects (Hall, 1999; McCredie & Updegrove, 1999; Nah et al., 2001).

In summary, the literature on change management provides an insight into the strategies which need to be considered during the management of change accompanying an ERP system implementation in any organisation. The change management principles espoused by Hall above provide strategies to be considered
to minimise the difficulties associated with potential staff resistance to an ERP implementation in universities.

2.5.6 Staff Perceptions

The role of staff perceptions in the ERP implementation process is one that is referred to most commonly in the literature as one of a range of issues being examined. In this study, staff perceptions are the focus of the research and the lens through which the three ERP implementations are examined. This section will briefly examine the literature pertaining to staff perceptions of information technology implementations as these have not previously received a great deal of attention in the literature.

According to Waters, Marzano and McNulty (2003), people’s attitudes and perceptions influence both their learning and how they perceive change. Different perceptions about the implications of change influence whether the change is accepted or not (Waters et al., 2003; Waters & Grubb, 2004; Boonstra, 2006). Amoako-Gyampah and Salam (2004), discussed earlier in this chapter, demonstrated that the Technology Adoption Model (TAM) which posits that perceived usefulness and perceived ease of use of IT, are major determinants of its usage. These researchers applied TAM to an ERP implementation and showed that a shared sense of belief among staff in the benefits of a new ERP system in an institution can affect the usage intentions at both the individual and institutional level. Amoako-Gyampah and Salam (2004) showed that the perceptions about the benefits of a system can be changed through managerial interventions of training and communication with staff. These authors also found that the magnitude or order of change has less to do with change itself and more to do with how stakeholders perceive the change. This research also revealed that staff perceptions of the change associated with the ERP system implementations can influence how they view the success or otherwise of an implementation and, as discussed earlier, an ERP implementation is perceived by most staff as second order change.
McConachie (2002) focused on how change was perceived by different sub-cultures of staff at an Australian university during an ERP implementation and found that staff wanted a system implemented; however, were weary of the complexity associated with an ERP system. According to McConachie (2001) the staff were also weary of the continual organisational changes which had taken place at this institution over the previous years. The changes at that university included restructuring of faculties, appointment of new senior managers and an increase in the number of operating locations (campuses), together with increased promotion of commercial activities. McConachie (2001) found that these changes led to a climate where further change was not welcomed by the staff. Furthermore, her research demonstrates that the particular context described by McConachie was not one that was supportive of any major changes at that time in its development as an institution. It would therefore seem that in planning for an ERP implementation, the antecedent events affecting a particular context and process within the institution need to be acknowledged and understood.

In examining the issues contributing to effective and efficacious implementations of ERP systems it appears that the research available has examined ERP implementations through the focus of particular sub-cultures in organisations. These sub-cultures are usually managers, end users or project implementation staff. Von Hellens et al. (2005) reported that an influential factor in the efficacy of an ERP implementation is the integration of end users into the implementation process. A considerable amount of literature exists on information systems user satisfaction with a variety of types of users ranging from computer specialists to managers to end users (Mayer, 2005). In this respect, a number of researchers have found that user satisfaction is often a factor affecting whether an implementation is viewed as successful; however, many studies on success factors had been based on the perceptions of managerial level employees only (Frantz, 2001; Amoako-Gyampah, 2004). For instance, Amoako-Gyampah (2004) examined the difference in perceptions between managers and end users on selected ERP implementation factors and found a difference in their perceptions. In this study, managers appeared
to have a more positive view of an implementation than the users, who in fact were the ones most affected by the changes brought about by the ERP system. Daher (2003) similarly reported that user perceptions were deemed most important in a case study investigating factors affecting the outcome of business process re-engineering. There appears to be a dearth of literature on staff perceptions of issues contributing to an effective ERP implementation or which examines an ERP implementation from the perspective of a range of subcultures or staff roles in a number of universities.

In summary, the foregoing suggests that there is a gap in the literature of research available which examines staff perceptions of issues affecting ERP implementations, particularly from the perspective of a range of staff roles in a number of Australian universities. The literature shows that a number of researchers have found that user satisfaction can be a factor affecting whether an implementation is viewed as successful. It also has shown that staff perceptions can be changed through the use of change management strategies such as communication and training. These research results have implications for this study as it examines implementation issues from the perceptions of a staff at a range of different roles and levels at three universities.

2.5.7 Summary of the Literature
The above section has outlined the research that has emerged in response to the need for improving ERP system implementations. This has included the critical success factors (CSF) research, practitioner research and the change management and staff perception literature. It has considered the development of ERP implementation research and its recent focus on higher education institutions and most recently on the Australian sector.

In summarising the range of issues that impact on an ERP implementation, it appears that there is a relatively common set of issues which may have particular relevance for the higher education sector implementations. There are some additional issues
which have relevance for implementations in the higher education sector. For example, Romm Livermore (2005) reported that the studies which focus on critical success factors for ERP implementations tend to define success in terms of project characteristics such as adhering to timeframes, working within budgets, achieving managerial objectives and sustaining harmonious relationships among the various participants. Some of these success factors, as discussed earlier in this chapter, especially adherence to timeframes, are not necessarily transferable to the university sector. Although the CSF discussed in this chapter provide a useful checklist for ERP implementations, these need to be further examined for use as guidelines for effective and efficacious ERP implementations in the higher education environment.

The major findings from research on CSF for ERP implementations in both the corporate and university sectors, and in particular the university sector, acknowledge the importance of the following:

- demonstrated support by top management for the ERP implementation processes
- senior management support for the development of a project team staffed with the “best” business and information technology people (Romm Livermore, 2005)
- a commitment to manage change throughout the organisation brought about as a result of the ERP implementation
- monitoring and managing staff perceptions of the change as these will influence the success of an ERP implementation (Amoako-Gyampah & Salam, 2004)
- the impact of the organisational context and culture in research on ERP implementations in Spanish and UK universities (Allen & Kern, 2001; Esteves & Pastor, 2005)
- a consideration of the antecedent events impacting on the context of an institution need to be considered prior to planning an ERP implementation (McConachie, 2001).
2.6  Issues from the Literature Informing the Research Questions

This section presents the identified common themes, synthesised from the literature, which need to be considered for an effective and efficacious ERP system implementation, in universities in particular. In synthesising the literature on ERP system implementations, the context, process and other issues can form the framework for considering ERP implementations in universities. There will be a discussion of the findings from the literature about the context, the process and other issues impacting on ERP implementations in the higher education sector with reference to Research Question 1 identified in Chapter 1. These issues include a consideration of the university context including the culture of universities and the issues that impact on ERP implementation processes, such as the antecedent history of the institution, leadership, appropriate planning and effective change and project management to ensure staff participation and to minimise resistance to the implementation.

2.6.1  Context

There are a number of contextual issues that impact on an ERP system implementation process in the higher education sector and this section considers the main themes from the literature. The work that Esteves and Pastor (2005) discussed earlier suggests that most problems in ERP implementation projects are not technological but are attributable to organisational factors including the culture and the contextual influence (Allen & Kern, 2001). However, as indicated by their study of the multi-site ERP implementation, Markus, Axline, Petrie and Tanis (2000), claimed that implementing ERP systems can be quite straightforward when organisations are simple structures and operate in one or a few locations. Markus et al. (2000) also argued that when organisations are structurally complex and geographically dispersed, as universities increasingly are, implementing ERP systems involves increased difficulties (Markus et al., 2000). Willcocks and Sykes (2000) indicate that the implementation effort required increases with the number of ERP modules and sub-modules being implemented and that the number of users involved increased costs.
The literature nevertheless suggests, as indicated by Sumner (2003), that there are risk factors and some unique challenges associated with ERP projects. This research revealed the challenge of re-engineering business processes to “fit” the processes in the ERP software that can be a challenge in a university environment. Baldrige, in 1971 in his classic case study of New York University, noted that the bureaucratic nature of universities creates a unique context that does not deal adequately with the problem of change and, until relatively recently; this situation had not changed significantly. ERP system implementations, as discussed earlier, create a need for change to happen relatively quickly in an organisation. The requirement for a university to re-engineer its business processes requires decisions to be made in a relatively short time frame and, as the literature indicates, this is not easily achieved in a university with its hierarchical and bureaucratic structure of command (McCredie & Updegrove, 1999). The foregoing suggests that the university sector may have particular issues relating to the unique structures and organisational decision-making capacities that need to be taken into account in planning an ERP implementation.

From this research it can be argued that the nature of the culture of universities is an aspect that needs to be taken into account when considering the impact of ERPs on the sector. In this context, Weber’s classical bureaucracy is often applied to universities as the structure that most closely describes academia (Birnbaum, 1992). A bureaucracy is based on hierarchical principles and can be limited by formal structures of command and systems of communication. It is well documented that bureaucratic characteristics are prevalent in many areas of universities. This includes the hierarchical structure of the chains of command from vice-chancellors down to tutors, formal communication channels, policies and procedures, graduation requirements, fixed salaries and the security of tenure. Such a model of a university, described by Baldridge, is a “community of scholars” which holds that “academic decision-making should not be hierarchical but rather that members of the academic community should participate in its management in a democratic ideal” (1971, p.9). The democratic ideal, known as a “collegial” paradigm, has been applied to
universities; however, the notion of collegiality is often an ideal and if it is applicable at all, it is to the academic part of the context (Baldridge, 1971). Indeed, most of the academic work of a university is carried out in work units called academic departments managed and controlled by academics themselves (Alkin, 1993). Alkin (1993) describes this academically controlled structure in universities as usually being supported by a group of staff known as administrators or general staff with responsibilities for obtaining and allocating resources and for managing and maintaining supporting facilities (Alkin, 1993). The foregoing intimates that universities need to be viewed in terms of their dual structures for both administrative and academic staff. McCredie and Updegrove (1999) report the need for higher education institutions to develop decision making frameworks specifically to assist ERP implementations as, from their experience in US institutions, consensus decision making does not work for ERP projects. It is this complexity and duality of cultures which exist within universities that differentiated them as organisations from the corporate sector. Therefore it can be seen from the foregoing that universities have particular requirements in relation to planning and implementing large scale change such as that required in implementing an ERP system.

The literature which has been considered above suggests that another issue related to ERP implementations is that of an accompanying shift in the dynamics relating to the power and politics accompanying the implementation of change in an organisation. In this context, Markus (1983) (as cited in Goodwin et al., 2005, p.183) reported that, when power was taken from remote departments and given a central finance system, so that department lost the capacity to control their information, this created political conflict similar to that created in an ERP installation. Thus, the implementation of an information system is likely to cause a perception of power redistribution, whether it is real or otherwise (Randolph & Main, 2005). Randolph & Main (2005) report the form of reaction to the new system as likely to be some sort of unconstructive political behaviour, typically obstructive resistance as described by Markus (1983), or conflict, or the development of shadow systems. In their research Randolph & Main (2005) describe a number of activities indicative of resistance to new systems
accompanying an ERP implementation in a university. These activities included frequent complaints about the new system, parallel operation of both the new and old systems, poor cooperation in dealing with problems and avoidance of the system. It follows that consideration of the impact of the shift in power on staff of a university as a result of the implementation of an ERP needs to be managed during the process of an implementation and will be addressed in this research.

The foregoing literature has identified a number of issues in relation to the contextual influences on an ERP system implementation in a university. These include the following:

- the particular culture of universities where decisions are not made easily or quickly
- the capacity and readiness of an organisation to absorb change
- the complexity of the organisation
- the number of ERP modules being implemented
- the number of potential users of the new system
- the need to manage the impact of the resultant shift in power resulting from an ERP implementation.

2.6.2 Process

A number of issues impact on the ERP system implementation process in universities and this section identifies the main human and organisational themes from the literature. Issues to consider during the process of an ERP implementation include issues of leadership and top management support, planning, project management, staff participation and effective change management.

From the foregoing research literature on ERP systems, it can be argued that an overarching issue with the implementation of an ERP system in a university is senior management’s impact on the ultimate outcome of an ERP system implementation. Given the cross-functional nature and large budget of a typical ERP implementation, the extent of top management support appears to be the most important
characteristic. As previously discussed, the corporate sector literature supports the importance of the senior manager’s demonstrated sponsorship and involvement in the front end planning of an implementation, especially the role that senior management plays in technology implementations. In this respect, Frankel (1990) suggests that managers are responsible for the choice, timing, scale, rate of introduction and the utilisation of the new technology. Furthermore, Akkermans and van Helden’s (2002) research demonstrating that if top management support is low, then the ERP implementation is considered a failure, and if the support is high then the implementation is generally considered a success is particularly important. It therefore can be concluded from the literature that top management support and involvement is a critical success factor in the outcomes of information systems implementations (Cooper, 1990; Davenport, 1998, 2000; Hall, 1999; Whittaker, 1999; Butler, 2000; Milford & Stewart, 2000; Cotteleer, 2001; Somers & Nelson, 2001; Skok & Legge, 2002; Parr & Shanks, 2003, Botta-Genoulaz et al, 2005).

Closely aligned with top management support, two types of top management support roles can be identified from the literature for systems implementation projects: the project sponsor and the project champion roles. The project sponsor is responsible for budgetary support and ensuring that key business representatives play a role on the project team. The project champion may or may not be a formal member of the project team, but can play a key role in change management efforts. In some organisations, the sponsor also serves as the business champion for the project; in other situations, a champion emerges from among the key business leaders (Brown & Vessey, 1999). The presence of a project sponsor and/or champion, as discussed in the literature, provides demonstrated and tangible support by the senior management of an organisation for an ERP system implementation.

In relation to the above, demonstrated senior management support and sponsorship may impact on a number of other issues associated with the effectiveness of implementations of technological change. Effectiveness of corporate information systems projects involves achieving planned outcomes in particular time frames and
within specific budgets (Romm Livermore, 2005). The responsibility for initial planning and development of the scope of a system implementation usually rests with senior management initially, and then is delegated to project managers (Livingstone et al., 2002). A risk for senior management in organisations, including universities, is that they may view the implementation of an information system as primarily a technological task and delegate responsibility for the management to their information technology managers (Bailey, 1993). However, Willcocks and Sykes (2000) report that delegation of this responsibility to technology managers is not necessarily the most effective method of implementation. Further, Milford and Stewart (2000) show that project managers who are appointed from technical staff and who employ technological project managers may be associated with ineffective change. They further report that ERP implementations are similar to information system implementations in that they are “likely to have difficulties due to technical issues being given more importance than the people issues” (Milford & Stewart, 2000, p.952). Marsh’s (2000) research, cited earlier in this chapter, discussed the possible failure of IT department-driven implementations or implementations where the ERP is seen as a quick technological fix to problems within the operation of the business, rather than as a planned and strategic implementation.

Similarly, according to Jiang, Klein and Chen (2001) and Boonstra (2006), the skills and abilities of project managers, including their technological and people skills, may impact heavily on project outcomes such as keeping to prescribed timelines, budgets and deliverables. Davenport (1998) and Frantz (2001) warn that senior managers must retain control of the implementation rather than delegating it to technologists because management may find itself controlled by the system. Frantz (2001) further reports that an implementation project can fail if the project is viewed as being of special interest to one department or area of the organisation. This advice relates to universities which view an ERP implementation as of interest only to the information technology area of the organisation and not as a whole of organisation issue. However as reported by Milford & Stewart (2000, p.952) an ERP system, unlike an
information system implementation, requires planning to be undertaken for the whole organisation as “an ERP will effect the whole organisation”.

A further issue influencing outcomes of an ERP implementation in universities, derived from the CSF literature, is the integration of end users into the implementation process (von Hellens et al., 2005). Amoako-Gyampah’s (2004) research shows that user satisfaction is closely aligned with the perceived success of an ERP system implementation. This author reported that the impact on end-users needs to be taken into account during all phases of an implementation (Amoako-Gyampah, 2004). Furthermore, a number of researchers suggest that lack of effective user involvement in the implementation process of ERP system projects also can lead to poor engagement with the outcomes of the implementation and possibly to staff resistance to the new system and poor morale (Jaacks & Kurtz, 1999; McCredie & Updegrove, 1999; Smith, 2000; McConachie, 2001). Additionally, Davenport (2000) reported that many technology projects fail because of both a lack of user acceptance of the system and of understanding about the need for change.

In relation to the need for user acceptance for a new system, participative change strategies involving consultation and communication with staff, are strongly endorsed by Buchanan, Claydon and Doyle (1999) and Butler (2000). These authors maintain that the reality for most organisations is that human factors and particularly communications and training, tend to be managed poorly. Communicating the purpose of the associated re-engineering of processes, in addition to the benefits of the ERP implementation in the organisation, is critical for senior management to ensure the staff across the organisation accept the change. Amoako-Gyampah and Salam (2004) showed in their research that both training and project communication influence the shared beliefs which users form about the benefits of the technology which in turn affects the perceived ease of its use and how it is ultimately adopted and used. In addition, Jaacks and Kurtz (1999) and McCredie and Updegrove (1999) stress the importance of timely and comprehensive training for all levels of the organisation to assist in the user acceptance of the new system.
They also emphasise the importance of regular communication about the changes occurring as a result of the implementation, in language that is understood by those at all levels of the organisation, so that all staff understand what is happening. Therefore the level of appropriate training and communication affects the perceptions of users and the level of use of the new system in an organisation.

In summary, issues identified in the literature for ERP implementation processes for universities, similar to those in the corporate sector, are as follows:

- the importance of the role of senior management in the overall efficacy of an implementation
- the identification of a project sponsor and/or project champion
- senior management’s responsibility to ensure that effective planning and monitoring of the implementation is undertaken
- the management of the project should not be a technology project as it affects the whole organisation and the choice of project manager and project team should have an appropriate mix of technology, organisational and business skills
- the employment of appropriate change management strategies to influence the perceptions of users of the new system and to ensure user involvement in the implementation processes.

2.6.3 Other Issues in Contributing to Implementations in Universities

Other issues identified from the ERP practitioner literature, discussed earlier in this chapter, which may contribute to findings for Research Question 1 include:

- Attitudes towards change and the adoption of new technology became more positive following a delay in time frames in a large university implementation as opposed to the literature from the corporate sector that values keeping to specified timeframes.
- Managing the role of consultants is particularly important in a higher education implementation.
From literature on higher education ERP implementations, it appears that institutions where the software was not greatly customised or had implemented the vanilla version of the software reported more favourable outcomes.

- The likelihood of an increase in workloads for staff that may result from an ERP system implementation.
- Vendor relationships need to be maintained particularly when the sector is not the core business focus for the particular products.

In synthesising the literature on ERP system implementations, the context, process and other issues need to be considered in implementing an effective and efficacious ERP system. These issues included a consideration of university context including the culture of universities and the issues that impact on ERP implementation processes such as the antecedent history of the institution, leadership, appropriate planning and effective change and project management to ensure staff participation and to minimise staff resistance.

2.7 Conclusions

This dissertation concerns an exploration of an implementation of an ERP system at three universities. This literature review guides the research and underpins the design of the study:

- by determining the research questions
- in selecting the case studies
- by suggesting data collection techniques.

The foregoing literature review has identified the research associated with the issues influencing the efficacy of ERP implementations generally and specifically in the higher education environment. This is to establish the extent that research has been undertaken in this area and to seek out possible guidelines to underpin this study.
This review has established that there is a plethora of research on ERP implementations in the corporate sector and a relative dearth of literature on ERPs in the higher education sector. This literature reveals that there are similar problems encountered in implementing ERP systems in both the corporate and higher education sectors. This literature review has identified the issues that have affected ERP implementations in the corporate sector and provides a background for understanding the issues affecting implementations in the higher education sector. The literature that informs this dissertation is mainly the literature on ERP implementations in the corporate sector. It includes:

- the critical success factor literature
- the ERP practitioner literature
- the change management literature
- the staff perception literature.

More recently there has been an emergence of literature on ERP implementations in the higher education sector. The literature on implementations and the higher education sector revealed a similarity with the corporate sector but at the same time identified differences attributable to the higher education environment.

The ERP critical success factor literature was examined to provide a background to further understanding the issues involved in the management of ERP implementations in universities. The CSF literature, evolving from earlier IT and IS adoption literature, provides a comprehensive background for understanding the issues that impact on ERP system implementations in any organisation. The CSF literature provides coverage of a range of issues and frameworks to view higher education ERP implementations. The overarching importance of senior management responsibilities in relation to ERP implementations in any organisation is acknowledged in all the ERP literature. Further, it may be argued that university ERP implementation processes require especially careful planning and monitoring by senior management.
The change management literature provides the background to understanding ERP system implementations and may provide insights to help minimise the problems associated with ERP implementations. ERP's create the opportunity for users to access data they previously could not access, with consequent shifts in power that accompany the changes to the organisation. The literature revealed that in universities, because of the particular culture that exists where staff routinely question management decisions, there is a greater likelihood of staff resistance to the changes resulting from an ERP system implementation. This suggests that a consideration of the particular institutional context is required in order to plan for the management of change and the importance of engaging university staff during the implementation process.

The ERP practitioner literature revealed that organisations need to be able to make changes to their business processes in relatively short time frames to benefit from the ERP system and that this is not easily done in universities. It was also shown in the practitioner literature that staff became more positive towards an ERP system following a delay in time frames in a university implementation. Relationships with corporate consultants and ERP vendors are another area that universities previously have not had experience in managing.

The literature on staff perceptions was considered in order to provide the background of why staff perceptions are important to the efficacy of ERP implementations generally and to this study specifically. The foregoing review has established that gaps exist in current research and practice relating to the ERP implementation factors in the higher education field generally and in the Australian environment in particular. Staff perceptions previously have not received a great deal of attention in the literature as contributing to the outcome of an ERP system implementation. The role of staff perceptions in an ERP implementation is one that is referred to most commonly in the literature as one of a range of issues being examined. The above review showed that staff perceptions of the changes associated with ERP system implementations influence whether an implementation is viewed
as successful though many success factor studies have been based on the perceptions of managerial level employees only. Additionally, this review of the literature showed that investigating an ERP system implementation through staff perceptions has been a perspective chosen by few researchers and that the gap in the literature is in the perspective of a range of staff roles in a number of Australian universities.

This review has presented the literature to identify the issues that have affected ERP implementations in the corporate sector. This literature provided the background for understanding the processes and issues affecting implementations in the higher education sector. There is evidence that ERP implementations in higher education are different in nature to those in business organisations; however, there are many lessons to be learned by examining the research from these corporate ERP implementations. Further, it identified that gaps exist in current research and practice relating to ERP implementation issues in the higher education field generally and in the Australian environment in particular. ERP research has focused on the strategic, the organisational, technological, business process re-engineering impacts, with the impact of the organisational context a noted omission from the CSF literature and the ERP literature generally. There is little research that identifies the issues affecting the implementation of ERP systems in the Australian higher education environment through staff perceptions. This literature review has highlighted the need for further research which explores the perceptions of staff of issues impacting on ERP implementations in the higher education sector.

This literature review has considered the context and changing nature of the higher education sector as a backdrop to the rationale and adoption of ERP systems into the global higher education industry and into Australian universities in particular. This exploration provided the background for the changing context of higher education surrounding the recent introduction of ERP and the significance of the problem of the introduction of ERP implementations in universities. The effect of an ERP system on universities was discussed, including the reasons why it is likely to impact upon the entire organisation as opposed to previous information technology.
implementations that only affected part of the organisation. These issues pertaining to the particular context of universities was explored as a precursor to understanding the context of this study of ERP implementations in three institutions. The lesser amount of higher education research revealed that the particular context of universities may exert a more significant influence on the process and efficacy of ERP implementations than for corporate organisations.

In summary, the above synthesis of the literature provides a direction for the investigation of pertinent issues to be explored in relation to ERP implementations in universities in general and Australian universities in particular. This provides direction to determine how these issues can be identified and developed as guidelines for improving the management of ERP implementations in universities. This review of the literature supports the rationale of the study and its significance for higher education management and ERP implementations specifically. The next chapter will discuss the research method and methodology for carrying out this research study.
Chapter 3

RESEARCH METHODOLOGY

3.1 Introduction

Previous chapters provided details of the background and literature pertaining to this study on the issues that may affect the implementation of an ERP system with particular reference to its effective and efficacious implementation in three Australian universities.

In this chapter, the research methodology used for this study is presented. The chapter begins with an explanation of the ontology and epistemology for the research and the assumptions in the study related to the chosen paradigm of interpretivism. The chapter proceeds to discuss the use of case study methodology for the exploration of the research questions to be addressed in this study as identified in Chapter 1. A profile of the proposed universities and participants in the study is described. This chapter then outlines the data collection and analysis techniques that have been used. The scope of the study is provided along with the limitations of the research and ethical considerations. The chapter concludes with a summary of topics covered.

3.2 Ontology and Epistemology

This research investigates issues influencing an ERP system implementation in the university sector. The research context includes both the organisation and the users, namely the staff using the system. It is assumed that the users are generally free willed and that there is a focus on the social nature of the institutions. This view of human choice is adopted in this research as it emphasises the flexibility of technology and the possibility of human control and human responsibility for technological development (Nielsen, 2002). Based on Burrell and Morgan’s (1979)
taxonomy of paradigms, the philosophical assumption underlying this research is of a subjective reality (as cited in Weber, 1997) where this reality is perceived as a social construction. According to Iivari (1991), the “view of humans” evolves around assumptions about this view as either being free willed or being shaped by their surroundings.

Following on from the above, as an ERP system is packaged software, it can be seen to have a deterministic nature itself. However, ERP systems are able to be adapted by the organisations that are implementing them i.e., there is some customisation during implementation and the final product is rarely a vanilla ERP (Iivari, 1991). An institutional view of information systems being regarded as “social systems technically implemented” as opposed to “technical systems with social implications” has been adopted in this research (Morgan & Smircich, 1980). Within this free willed view of the research participants, namely the staff of the universities, and their context, it was necessary to recognise, through an exploration of staff perceptions, that there are some divergent views of the role of an ERP in an organisation. As highlighted in the previous chapter, for example in the research cited by Davenport (1998), Lee and Lee (2000) and Shehab et al. (2004), what sets an ERP implementation apart from other technology implementations is that studies have shown that an ERP is not just a software package to be tailored to an organisation, but that it does impact on how people work and the organisation’s culture and structure. However, as noted by Askenas and Westelius (2001), there may be views by some staff that an ERP is a technology system imposed on an organisation and that staff are required to adapt to the ERP system. This view will not necessarily be the view of the researcher though the alternative view needs to be taken into account during the analysis of the data as some staff may hold this view.

In choosing a research approach as suggested by Yin (1994) and Silverman (2000) it is necessary to be guided by the nature of what is being researched. The methodological approach for this research will be qualitative as the research seeks to explore the changing organisational environment of the three universities during
their ERP implementations from the point of view of the individuals who are to be studied and understood (Iivari, 1991). In this respect the research approach selected is based on the typical research methods derived from the literature commonly used for studying ERP implementations (Marshall & Rossman, 1989; Nielsen, 2002).

The research questions presented in Chapter 1 serve to explore a particular situation in its organisational context through the perceptions of the staff involved. The particular context of the research is considered by drawing on literature from the wider context of ERP implementations in organisations generally. The interpretivist perspective is thus central to the study in order to focus on the whole complexity of a university environment in a time of change initiated by an ERP implementation into this environment.

As ontology influences the epistemological approach, a description of the epistemology for the research is considered along with discussion of the case study methodology. Epistemological assumptions relate to the nature of information the research is attempting to discover and how we acquire this knowledge (Nielsen, 2002). As proposed by Burrell and Morgan (1979), as cited in Beekhuyzen (2001, p.49) an anti-positivist epistemological assumption which maintains that “the social world can only be understood from the point of view of the individuals who are directly involved in the activities to be studied” will be proposed for this research. This approach maintains that an understanding can be achieved by occupying the frame of reference of the participant in action and assumes that the researcher participates in the action of the scenario (Iivari, 1991). Thus, findings of this research will be derived primarily from the frame of reference of the staff involved in their ERP implementation. It is expected that the findings of the research will not be universally generalisable; however, it is expected that they will add to the knowledge about the nature of the particular research context and situation. Nevertheless, the findings may be applicable to the wider social world of ERP implementation research in the higher education sector.
3.3 Research Paradigm

The specific phenomenon explored in this study focuses on the staff members’ perceptions of the issues influencing ERP implementations in their university. By the use of semi-structured focus groups and interviews the researcher is able to explore participant’s interpretation of their views and experiences of an ERP implementation. The researcher’s conceptual lens, via the framework of the literature and the focus groups, led to the conceptual structure and the construction of the questions for the in depth semi-structured interviews. Thus underlying philosophical assumptions that relate to this dissertation include the assumptions that underpin an interpretive research paradigm. Interpretive studies attempt to understand phenomena through the meanings that people give to them (Denzin & Lincoln, 2000). Interpretive research methods applied to the study of information systems are aimed at “producing an understanding of the context of the information system, and the process whereby the information system influences and is influenced by the context” (Walsham, 1993, pp.4-5). The emphasis in the interpretivist approach is on empathic understanding of human behaviour and their perceptions and reactions towards and about the ERP implementation (Denzin & Lincoln, 2000). Interpretive research studies generally attempt to understand phenomena through the meanings people assign to them and assume that knowledge of reality is only revealed through social constructions as described in Klein & Myers (1999). An interpretive approach to the research data, obtained from the interviews with the staff at the three universities, created an understanding of the related social constructions that provided the language, shared meanings and other artefacts in this study (Klein & Myers, 1999). In the consideration of the research questions presented in Chapter 1 from the study, this research was not so much concerned with explanation but rather to gain an understanding of how the staff, who have lived through the ERP implementations, constructed this experience. Thus, the research focus of the study was one of discovery and understanding of issues influencing ERP implementations in Australian universities rather than verification.
3.4 Choice of Research Method

A number of research methods were considered as possible options for examining the research questions in this study. Case study method was chosen rather than survey methods to enable a more in-depth investigation of the field by being able to gather information from a number of sources and to ask more detailed questions of the participants (Meredith, 1998). This research could be viewed as a field study; however, case study method was preferred over field study research as field study research is usually a research approach that is considered very time consuming (Myers, 1997). Ethnographic research, though similar to a case study (Myers, 1997), was also considered to be too time consuming in comparison with the case study method. Action research has not been adopted for this study as the researcher, while a staff member at one university, would not have any influence on the outcome of the ERP implementation projects. Similarly, a grounded theory method was not used as this study was not concerned with theoretical frameworks to explain the data as it adopted a practical research approach (Markus, 1997).

The aim of the research was to explore the impact of the ERP implementations from the perspective of the participants themselves, in their particular context, and to then develop guidelines to ensure more successful ERP implementations in the future. To gain an understanding of how the staff constructed their experience of the ERP implementations in their organisations, an interpretive case study and the adoption of a practical research approach were chosen as an appropriate method to investigate and demonstrate the research assumptions discussed so far. According to Guba and Lincoln (1994), the choice of research methodology must be consistent with the paradigmatic assumption concerning the phenomenon under investigation. Case study is applied to a social situation and uses multiple data collection modes and sources (Yin, 1994) and is further discussed in this chapter. For this reason, case study was considered to be an appropriate method for exploring the social situation of university’s experience of ERP implementations using multiple sources of data. ERP implementations are a set of real life events for staff involved in universities where there is little known about the
phenomenon and the focus of this research has not been undertaken in this way previously.

Based on the review of literature in Chapter 2 there is an increasing use of qualitative research methods for ERP research rather than quantitative methods. Current research practice in the information systems field generally advocates using a range of methodologies and in particular, case study (Taylor, 2002). It is intended that this research will be useful for practitioners and will result in practical practitioner research in the field of ERP implementations. Practical research fits with Yin’s (1994) revelatory case study category which can involve unique or leading edge situations. The study of ERP implementations in Australian universities, particularly from the perceptions of staff, is leading edge research.

3.5 Case Study Methodology
This section provides the rationale of the use of case study methodology and its use in this research.

3.5.1 The Nature and Purpose of Using Case Study
As alluded to above, in this research a case study method is used and, as Allen and Kern (2001) report, case research exploring ERP implementations has become increasingly common in a range of higher education contexts in addition to the corporate sector.

A case study can be described as an in-depth investigation of an organisation in a field setting (Schatzzman & Strauss, 1973). The case study method may use a variety of techniques to gain a picture of the aspects of the organisation under investigation (Robson, 2002). Case study is known as a useful methodology where the focus is on a contemporary phenomenon within a real life context and when little is known about it (Yin, 1994). Yin reports that a "major strength of the case study data collection is the opportunity to use many different sources of evidence" (p.91). Yin argues that the case study methodology relies on using the same techniques as
historians but adds two further sources of evidence — direct observation and systematic interviewing — and this research employs systematic interviewing.

A review of current research practice in the information systems field favours using a range of methodologies to obtain an appropriate set of findings (Taylor, 2002; Myers, 2003). Case study research increasingly is favoured by information systems researchers using a mixture of research methods, rather than using quantitative methods such as survey methods (Jick, 1979; Allen & Kern, 2001; Nielsen, 2002). In contrast to survey research methods, case study enables more meaningful follow-up questions to be pursued which can result in more extensive findings and in-depth insights (Meredith, 1998). The nature of what is to be studied has guided the research approach and literature on typical research methods for ERP implementation success factors favours case study (Marshall & Rossman, 1995; Myers, 2003). Case study allows for more in-depth exploration of issues and experiences not generally able to be accessed by research methods such as surveys which were used in the earlier period of information systems research (Meredith, 1998).

It is argued that case studies are a preferred method when the investigator has little control over events and when the focus is on “an empirical study that investigates a contemporary phenomenon within its real-life context, especially when the boundaries between phenomenon and context are not clearly evident” (Yin, 1989 as cited by Vega, 2001, p271). The investigation of the implementation of ERP systems in universities, the focus of this research, is a contemporary phenomenon that is creating a range of changes in organisations which need to be understood in their context (Beekhuyzen, 2001). As in the Yin statement quoted above, the boundary between an ERP implementation and its university context is not fully understood as to the influence each has on the other (McConachie, 2001). This study explores, in part, the influence of the particular context of the institution for three ERP implementations through staff perceptions. The case study gives the researcher the ability to explore the issues relating to the impact of an ERP implementation and its
context in a very specific circumstance i.e., Australian universities. The particular findings of case studies can be considered in terms of their specificity and generality.

Baldridge (1971), an early researcher in the higher education sector, views the case study method as useful when there is little data on the research area, if it is exploratory and in-depth research, and if “change and dynamic processes are crucial to the investigation” (p.33). Another major advantage of the case study according to Baldridge is that it allows an exploration of the processes of an organisation rather than just gathering data on the formal structures. The proposed research fits within the parameters proposed by Baldridge. As outlined in Chapter 2, there has been limited research done on ERP implementations in the higher education sector generally and obtaining data on the impact of implementations of ERPs in Australian universities is a critical part of the research.

3.5.2 The Use of a Case Study Approach in this Investigation

In this research the use of case study methodology enables the researcher to study the “interplay between humans, technology, information and socio-cultural contexts” (McKay & Marshall 2001, p.48), making it an appropriate approach for research in the information systems fields. The case study method is a recognised way of adding to the body of knowledge in the information systems field because the case strategy is particularly well suited to information system research (Benbaset, Goldstein & Mead, 1987; Holland & Light, 1999; Allen & Kern, 2001). Benbaset et al. (1987) outlines reasons why case study research is a viable information systems research strategy: case study research can be conducted in a natural setting; it allows the researcher to understand the nature and complexity of the processes taking place; and it is an appropriate way to research an area where few previous studies have been carried out. Table 3.1 shows a list of the common characteristics of a case study method identified by Benbaset et al. and the link between these characteristics and the present study. This table demonstrates that a case study research method used for this investigation was appropriate for the research project to be undertaken.
Table 3.1 Key characteristics of a case study

<table>
<thead>
<tr>
<th>Characteristics of a Case Study</th>
<th>Application of case study to this research</th>
</tr>
</thead>
<tbody>
<tr>
<td>Phenomenon is examined in a natural setting</td>
<td>Yes</td>
</tr>
<tr>
<td>Data are collected by multiple means</td>
<td>Yes</td>
</tr>
<tr>
<td>One or few entities (person, group or organisation) are examined</td>
<td>Yes</td>
</tr>
<tr>
<td>The complexity of the unit is studied intensively</td>
<td>Yes</td>
</tr>
<tr>
<td>Case studies are more suitable for the exploration, classification and hypothesis development stages of the knowledge building process; the investigator should have receptive attitude towards exploration.</td>
<td>Yes this study is exploratory</td>
</tr>
<tr>
<td>No experimental controls or manipulation are involved</td>
<td>Yes</td>
</tr>
<tr>
<td>The investigator may not specify the set of independent and dependent variables in advance</td>
<td>None set</td>
</tr>
<tr>
<td>The results derived depend heavily on the integrate powers of the investigator</td>
<td>Yes</td>
</tr>
<tr>
<td>Changes in the site selection and data collection methods could take place as the investigator develops new hypotheses</td>
<td>Possible</td>
</tr>
<tr>
<td>Case research is useful in the study of why and how questions because these deal with operational links to be traced over time rather than with frequency or incidence.</td>
<td>Yes</td>
</tr>
<tr>
<td>The focus in on contemporary events</td>
<td>Yes</td>
</tr>
</tbody>
</table>

As discussed in Chapter 2 of this dissertation, there are potentially many issues identified in the literature which could contribute to the effective and efficacious implementation of an ERP in a university. There are additional issues which university staff perceive as important to ERP implementations. To establish a level of generalisability of this research to the university sector, two other universities were used in this study. This investigation seeks to gain an understanding of staff perceptions of ERP implementations and whether these are similar to or different from what was experienced both in corporate implementations and other Australian universities in particular. This multi-site case study was used to determine the applicability of this research to the university sector. It is for this reason that a decision was made to approach two other universities and a multi-site case study is used for this study. A multi-site case study method was considered appropriate to deepen the understanding of the phenomena under investigation and to make findings more predisposed to generalisation (Miles & Huberman, 1994; Yin, 1993). That is, this approach enabled issues emerging from one

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1 Adapted from Benbasat et al (1987, p. 371) and from Nielsen (2002)
case to be compared and contrasted with issues from the other cases. This enhances the validity and generalisability of the findings.

As considered in the remainder of this chapter, the research was conducted in universities utilising focus groups and interviews aimed at furnishing rich descriptions of the experience of the university staff involved in ERP implementations (Skok & Legge, 2002) and in an area of research where few studies have been carried out.

3.6 Study Design

The research design for this study consists of two phases. The first phase of the study involved the conduct of a series of focus groups at one university. This was done to enable the identification of problems and issues related to an ERP system implementation in one university. The second phase of the research undertakes in-depth interviews which involved collecting data about these identified problems and issues at three universities derived both from the first phase of the study and the relevant literature. The interview data was then used as a framework for establishing the staff perceptions of an ERP system implementation at three universities. Figure 3.1 (below) shows the two phase research plan that starts with the first stage at University X with focus groups and proceeds to stage two of the research plan with the conduct of in-depth structured interviews at University X, University Y and Z.

![Diagram of research process](image-url)

Figure 3.1 Diagrammatic view of the research process
Underpinning the research questions outlined in Chapter 1 is that staff perceptions of ERP implementations and the surroundings issues impact on the success or failure of these implementations. Research Question 1 allowed the researcher to link the first phase of the study, which involved conducting a series of focus groups, to the second phase of the study which involved interviews. In this way, therefore, the dissertation is testing out the extent to which staff perceptions of the context, process and other issues, impacts on ERP implementations. Research Question 2 takes these perceptions further by assisting the researcher to develop guidelines for effective and efficacious ERP system implementations in universities. Both research questions allow the researcher to investigate the ERP field in terms of what is perceived to impact on ERP implementations within a university context.

The perceptions of staff in three universities contribute to the validity of the data, in that there may be a number of different ways of interpreting the ERP implementations in three different sites providing data from a number of perspectives (McKay & Marshall, 2001). This is the reason for deciding to approach two other universities who had implemented ERPs. Individual characteristics and contexts of universities may effect an ERP implementation. Interviews at three universities with different characteristics assist in overcoming these possible individual variations and characteristics. Using the three universities included in this research allowed for triangulation between the universities to strengthen the internal validity of the study and to allow comparisons and contrasts to be made between their ERP implementations. In this way the results from this research are able to be applied more generally to the university sector.

The three universities included in the study consist of a sample of three Australian universities including an older large university located primarily on one site and two regional Australian multi-campus universities with different characteristics of their environments, their operations and their ERP implementations. To protect the anonymity of the universities involved in this study, the three universities will be
referred to as University X, University Y and University Z. These three universities will be discussed in more detail in the next section of this chapter.

3.7 Sample and Data Collection Methods

This section describes the processes used to determine both the data collection methods and the sample of universities and participants in the study.

3.7.1 Determining the Data Collection Methods

In formulating the research strategy and data collection methods for this study, a process of exploration and discussion with other researchers, supervisors and participants in the field was undertaken and augmented the literature searches. The process to determine possible data collection methods, samples of sites and participants, was undertaken with supervisors, other researchers and staff involved in the ERP implementation field. This assistance was invaluable in determining the proposed data collection strategy used in this study. The method of data collection was chosen in order to elicit the understanding of ERP system implementations from staff perceptions. This required a method that would be appropriate for a range of staff and the particular universities involved in the data collection process. The protection of the identity of the staff and universities involved in the study was an important issue to be considered in the choice of data collection methods. Thus this process has been undertaken to determine the appropriate strategy and methods to address the proposed research questions in this investigation and be appropriate to the field of inquiry.

In discussion with senior staff with experience of ERP implementations at a different university to those involved in the study, it became apparent that there were a number of problems that would be encountered in conducting focus groups at this university and in others. The sensitive nature of conducting focus groups versus interviews at their university was discussed with these staff. They suggested that individual interviews would be less threatening for both individual staff members and senior managers in universities. Therefore although focus groups were initially
considered for use in the second phase of the study it was decided that interviews would be preferable for this research. Interviews would allow staff to discuss their perceptions of the implementation process at their university in more depth and more openly and honestly. A focus group process may have inhibited staff discussing the issue honestly and giving individual opinions (Kreuger, 1994; Morgan, 1998). The approach adopted by this researcher for this study was to ensure that the best quality data was obtained in addition to protecting the participants and the universities which agreed to be involved in the study. This resulted in the use of individual interviews, rather than focus groups, as a method of collecting data for this second phase of the study.

3.7.2 Determining the Sample of Data Collection Sites
In determining the sample of data collection sites to be included in the study, a number of issues were considered. It was necessary to be able to explore the research questions in the Australian university context by having access to a number of sites that could provide case study findings. These case studies could then be analysed both in terms of their specificity and generality and this was the basis for deciding to approach two other universities to be part of the study. The two regional universities implemented their ERP systems very differently from each other. There are some similarities in the way the older university and one of the regional universities had implemented its ERP system. This provides some similarities and differences in the types of institution and the style of their ERP implementations for purposes of this study. The two other universities were approached in addition to the phase one case study university because:

- the researcher had relevant contacts in these universities
- the universities were in the same state and relatively easy to access
- the universities provided a number of similarities and differences.
3.7.3 Determining the Institution Sample

Table 3.2 sets out the main characteristics of the three research sites.

Table 3.2 Comparative characteristics of the three research sites

<table>
<thead>
<tr>
<th>University</th>
<th>Location</th>
<th>University type</th>
<th>Campus type</th>
<th>Mode of delivery</th>
<th>Modules implemented</th>
</tr>
</thead>
<tbody>
<tr>
<td>X</td>
<td>Regional</td>
<td>New generation</td>
<td>Multi-campus</td>
<td>On campus and distance</td>
<td>Finance Student</td>
</tr>
<tr>
<td>Y</td>
<td>City</td>
<td>G08</td>
<td>Primarily one campus</td>
<td>On campus</td>
<td>Student</td>
</tr>
<tr>
<td>Z</td>
<td>Regional</td>
<td>New generation</td>
<td>Primarily one main campus with satellite campuses</td>
<td>On campus &amp; distance</td>
<td>HR Finance Student</td>
</tr>
</tbody>
</table>

It was crucial to obtain the permission of senior management for the universities to be included in this study. Members of senior management at each of the universities gave their written permission to be included in this study. Given the reported negative publicity caused by some university ERP implementations (Beekhuizen, Goodwin & Nielsen, 2002) it was deemed essential that senior managers be provided with appropriate safeguards for their reputation management in any subsequent publication of research results. Management at University X agreed for the institution to be involved in the study after appropriate ethical processes were undertaken. Also, as University X is the institution where the researcher was employed, this provided opportunities for ease of access to interview a variety of staff in various positions in the university. As there was a network of university staff implementing PeopleSoft systems, it was decided to approach other universities implementing the same ERP system. Initial approaches to a number of staff at other universities implementing PeopleSoft systems yielded two other universities that agreed to participate in this study. Their proposed participation was on the basis of the formulation of an appropriate data collection, i.e., interviews with individuals while protecting identities of individuals and universities, and an ethical clearance strategy for the next phase of the study.
3.7.4 Determining the Staff Sample

The intended sample of staff at the three universities was designed to be a representative sample of staff in various designated roles matched in the three universities. Interviewing a range of staff at different levels and in different roles provides a range of staff perceptions of an ERP implementation. Previous research on staff perceptions, as discussed in Chapter 2, has examined implementations from the perspective of users or managers only, rather than the range of roles as in this study. The range of staff interviewed in this study provides perceptions from similar groups of staff matched in each institution. Participants for the research were identified from those involved either directly or indirectly in ERP implementations at their university. Staff were selected for the focus groups and interviews on the basis of their role and position in the organisation in relation to the implementation of the ERP. Thus, a selected group of staff from a range of levels and roles in the organisation were invited to participate in the focus groups and interviews including representatives of the following groups:

- senior management
- managers
- administrative staff who were end users of the system
- academic staff
- technical staff
- staff employed in implementation projects.

Staff were chosen as participants in the interview process with at least one staff member from each category for each of the research sites. This was undertaken to ensure comparability between the three case studies and to enable the views from each of the above categories to be collected. The categories of staff include the main sub-cultures of staff able to be identified in universities and also in relation to an ERP implementation with the inclusion of administrative or technical staff who were involved in an implementation project. Staff were also selected for interviews on the basis of their knowledge about the implementation in addition to their role and position in the organisation in relation to the implementation of the ERP system.
This sampling method of interviewing, focusing on a particular type of well informed interviewee, is described by Marshall and Rossman (1995) as “elite interviewing”.

3.7.4.1 The Institution Sample

As discussed previously, the three universities included in the study, consist of an older large university and two regional Australian universities. This sample provides some similarities and differences in the types of institution and the style of their ERP implementations for purposes of this study. The rapidly changing environments in which all three of the universities have operated, particularly over the last ten years, produced a situation in which they needed to replace their legacy administrative information systems. From the interviews conducted with staff at the three universities it was revealed that the existing administrative systems were unable to continue to satisfactorily provide the required information systems and processes to ensure the legislative compliance and management of increasingly large and complex organisations. The three universities, in conjunction with a corporate implementation partner, implemented ERP systems that involved re-engineering related administrative processes. The decision to implement ERP systems was viewed by all three universities as an important investment of substantial resources designed to improve operational efficiency and productivity while advantageously positioning the universities in the global higher education environment.

The universities involved in this investigation are detailed in the following section.

University X

University X is a regional Australian university originally established as a College of Advanced Education (CAE) in 1967 which achieved full university status in 1992. The range of courses initially offered was limited to science and engineering and, like the other CAEs in Australia, it started to offer courses primarily focused towards careers in education and business which were not generally offered by the universities of the day. In the mid-1980s, selected programs were rolled out at the
four emerging regional campuses. The use of existing distance education course materials were used to support delivery at the regional campuses (Oliver, Luck & Vieth, 1998). By the beginning of the 1990s, University X had reshaped its identity from an emergent single campus institute to a multi-campus network (Oliver et al., 1998).

In the mid-1990s, a private institution offering programs to fee-paying international students invited University X to provide its programs in a capital city. This the university did by delivering its course materials, supported by tutorials, to international students across multiple sites to engage in a joint venture with the private institution at five other sites in Australasia. University X has continued its expansion in the international arena by providing supported distance education materials to Full Fee Paying Overseas Students (FFPOS) in nationally and internationally in conjunction with other educational providers. These campuses, especially those in the state capitals, have developed to a significant size and the enrolments in the courses they offer usually exceed those on the regional campuses by a considerable margin.

This institutional evolution generated increasingly complex demands on administrative systems to support the management of the organisation, which in turn has focused attention on the information systems necessary to support this function. In addition to changes in the structure and focus of the institution, University X, along with all the other universities in Australia, was faced with the need to respond to increasing information requirements from the federal government (Oliver & Romm, 2002). Despite the remediation that had taken place to comply with Y2K, the underlying systems continued to be regarded by the university’s senior management as inappropriate to these changing circumstances and a Request For Proposal (RFP) was initiated. As the student system was the most critical issue facing the university, and as it lacked the capacity to provide the information required for core business activities, the RFP was sent only to software suppliers of student systems. Following a process that evaluated the responses from
these providers, PeopleSoft was selected as the preferred software supplier (Oliver & Romm, 2000). Their ERP product is primarily recognised as having a strong HR capability, however PeopleSoft market a student system which has achieved significant market penetration in the USA and has been adapted for both Australian and New Zealand requirements. The planned three stage ERP implementation was initiated in June 1999 with the first stage implemented being finance, the second was student and it was proposed for a third stage to be the HR module; however, this has not happened as yet (Oliver & Van Dyke, 2005).

**University Y**

University Y was established early last century and is one of Australia’s leading learning and research universities and the oldest university in the state. University Y has teaching and research sites throughout the state with its major campus in the capital city and subsidiary campuses on the outskirts of the city. It gradually expanded as demand for higher education increased in the state and in 1999, University Y opened a campus to the west of the main campus that was purpose-built and completely web-enabled. It is a founding member of the Group of Eight (Go8) coalition of Australia’s research-strong universities and has been developing a group of international quality research centres to keep it at the forefront of emerging research fields, particularly the biosciences (University Y Annual Report, 2003).

University Y was involved in the CASMAC project to attempt to develop common administrative systems for universities. When the consortium group divided into two rival groups, University Y was involved in the UniPower consortium of Australian universities which attempted to adapt a system from British software house CHA (Philipson, 2006). Philipson (2006) reports that ultimately CHA did not deliver, the partners lost money from the project and UniPower members migrated to using either the Australian Student One system or, in University Y’s case, PeopleSoft for their student administration system.
University Y has been able to implement internal strategic reforms and build on its achievements despite the growing financial pressures placed on all Australian universities. In 1997, University Y began setting aside increased levels of operational funds to support strategic initiatives such as strengthening the university’s infrastructure. As a result a series of organisational changes was initiated within the institution to shift from small, discipline-based academic departments to a smaller number of larger academic faculties. The concurrent reorganisation of the non-academic support areas was undertaken to match the functional responsibilities in this new academic structure with the devolution of some university activities and the retention centrally of some institutional responsibilities. The university has attempted to develop common operating procedures across these seven new faculties. Concurrently with the increased devolvement of activities across the university, the structure of academic courses and programs was changed prior to the adoption of the new student system. From 1998 to 2000 staff across the university were involved in program restructuring, policy development and implementation planning for the course standardisation that was required prior to the implementation of the software for the new student administration system. The replacement of the legacy student information system in 2001, with a commercial ERP system produced by PeopleSoft, was a substantial investment in new infrastructure for University Y. (University Y information was partly accessed from the annual reports from this university and to cite this reference would be to breach the confidentiality that was agreed to prior to undertaking research in this institution.)

University Z

University Z came into existence as a university in 1990. Previously the institution was a CAE offering distance education programs to students from 1977 with its programs available to students off-shore in Asia from 1983. University Z has been an early leader in the field of the provision of distance learning programs that were a viable alternative to on-campus study. It also has been successful in attracting international full-fee students both in Australia and internationally. University Z has two conventional campuses: the main campus in a large regional city and a smaller
one in a coastal city with approximately 75% of the student population studying in an off-campus mode.

In the late 1990s when University Z was expanding, there was an accompanying consolidation of its administrative systems and, in part, of its management structure. At the same time the university started to refine and promote its institutional direction as a leader in the field of distance education providing access to lifelong learning and aiming to be a potentially world class “multi-mode” university (University Z Annual Report, 2003). The emerging educational environment focused on capitalising on its expertise and experience in flexible learning pedagogies on-campus, off-campus and online was based on the institutional strengths developed over the previous twenty-five years (Taylor, 2003).

In mid-1999, University Z selected an ERP system to update its existing business systems, which required major updating, both in scale and functionality. With a budget of almost AUD$10 million, the university set about implementing an integrated information system based on the PeopleSoft software. This initial commitment led to the implementation, during 2000, of a new financial management system and subsequently the implementation of the Human Resources and Payroll modules. The student administration module was implemented in 2002. The upgrading of their ERP system to a web enabled system fits with University Z’s strategic commitment to the provision of a range of web enabled applications including e-Enrolment, e-Administration, e-Commerce, e-Publishing, e-Content Management System and e-Learning (Taylor, 2002). University Z’s approach to the use of technology and e-Learning strategies has implications for the increasing use of technology to further automate aspects of their interaction with the students. The increasing reliance on the use of technology by University Z is intended to assist the institution to achieve its stated goals of improving the cost-effectiveness, reducing the cost to students and increasing access to higher education on a global scale and ultimately to increase the University’s student numbers (University Z Annual
Report, 2003). *(University Z information was also partly accessed from the annual reports from this university and this reference is not cited.)*

### 3.7.4.2 Focus Group Participants

The participants involved in the focus groups at University X were an invited representative sample of staff selected on the basis of the their position in the university. Purposeful sampling was selected as appropriate for the research (Patton, 1990) and allows the collection of critical information with participants selected for their capacity to generate insight into the issues under investigation (Krueger, 1998). Participants were chosen so that the focus groups would be as homogenous as possible to minimise the potential effects of different levels of staff on the group dynamics and on the quality of the information obtained (Morgan, 1998). The numbers of focus groups were also decided in light of the number of types of distinct occupational communities within the university which may have had different views of the ERP implementation in the time frame. The focus group participants were also chosen on the basis of their knowledge and experience of the implementation and the new system. Each of the groups was selected because it was considered that the participants would give a different perspective on the ERP implementation. All focus groups had six to eight participants, as between six to twelve participants is considered as optimum for appropriate focus group discussions (Morgan, 1998).

For this research each focus group consisted of four to eight staff members drawn from:

- deans or division heads or their nominees
- administrative staff who were experienced users of the system
- administrative staff from divisions that were not major users of the system
- academic staff
- general staff from regional campuses.
3.7.4.3 Interview Participants

It was planned to interview approximately six to eight staff at each of the case study universities using a similar representative group at each university. The numbers of staff at the three universities and in the different groups is shown in Table 3.3 below. However, the availability of staff during specific days of scheduled interviews was limited at University Y and Z. The availability of staff for interviews at University X was over a longer period of time and able to accommodate varying needs of the participants to a greater extent. It was also possible to interview more staff in the various sub-cultures with a greater variety of views and experiences at University X. The rationale for the choice of the different sub-cultures of staff in this strategy was that staff at various levels and functions in the university have different views of the ERP implementation depending upon their experience of it and how it affects them. While all staff in these organisations have some view of their ERP implementation, the choice of staff was influenced by the range of differing views gained through the focus groups from the different stakeholder groups.

<table>
<thead>
<tr>
<th></th>
<th>University X</th>
<th>University Y</th>
<th>University Z</th>
</tr>
</thead>
<tbody>
<tr>
<td>Senior Management</td>
<td>2</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Administration staff</td>
<td>3</td>
<td>4</td>
<td>2</td>
</tr>
<tr>
<td>Academic staff</td>
<td>2</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Technical staff</td>
<td>2</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Project staff</td>
<td>2</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>Total Interviews</td>
<td>11</td>
<td>9</td>
<td>6</td>
</tr>
</tbody>
</table>

Participants for the research were identified from those involved either directly or indirectly in ERP implementations at their university. Staff were selected for interview on the basis of their role and position in the institution in relation to the implementation of the ERP. Thus staff, representing a number of levels in their universities, were invited to participate in the interviews. These included a representative of senior management, administrative staff who were end users of the system, academic staff, technical staff and staff employed in implementation projects. Organising arrangements for staff to be interviewed at University X were arranged by the researcher. Contacts were organised at both University Y and Z to ask staff,
representative of the proposed groups, to participate. The staff were interviewed by the researcher.

3.7.5 Data Collection Methods
As alluded to earlier in this Chapter the research design for this study consisted of two phases. The section will examine the data collection methods used in both phases of the study.

3.7.5.1 Phase 1
In phase 1 of this research focus groups were used to obtain data about the conduct of the ERP implementation at University X. This phase of the research was conducted in March 2002 and served as a basis for the development of the research process undertaken in the second phase of the study.

Use of Focus Groups
The use of focus groups of staff in the first phase of this research enabled the researcher to gain an understanding of the staff perceptions of the issues affecting an ERP implementation at University X (Kreuger, 1994). Focus groups were used in this research as they are a common form of qualitative research method in management research to produce data and insights which are not able to be as accessible with other methods (Denzin & Lincoln, 2000). The results of the analysis of the focus group data together with the relevant literature were used as a framework for the development of the research process for the second phase of the study.

Focus Group Sample
Seven focus groups were conducted for Phase 1 of the research. The focus group participants were selected on the basis of their role in the university, geographic location and perceived ability to offer relevant data on the implementation at University X. Each focus group consisted of staff members and included the following:
Focus Group A: Nominees of Deans or Division Heads comprising six administrative staff from a number of faculties who had a high level of involvement in the implementation processes such as user-groups. These staff were primarily faculty managers (six persons)

Focus Group B: Eight administrative staff from administrative service divisions who were high level users of the system (eight persons)

Focus Group C: Six administrative staff from divisions that were not major users of the system and who felt somewhat isolated from the decision-making processes concerning the system implementation (eight persons)

Focus Group D: Six academic staff from the main campus who were from faculties which consider themselves leaders in the innovative use of technology (six persons)

Focus Group E: Two general staff and four academics from regional campuses, who had a need to use the systems (six persons)

Focus Group F: Three human resources (HR) staff who did not use the system and who were required to deal with the impact on staff in both the organisation and in the ERP implementation project (three persons)

Focus Group G: Eight administrative staff employed in the financial services division who were major end users of the system and were impacted by the secondment of numbers of their staff to the ERP implementation project (eight persons).

Focus Group Questions

A series of focus group questions was developed by this researcher, in conjunction with another researcher in the field, drawing on the literature on focus groups and evaluations. The focus group questions were based partly on the types of information that senior staff required to be able to evaluate the first part of the ERP implementation at University X. Such information could then be used to initiate planning for the second stage of the ERP implementation at University X. The participants were asked the reasons that they perceived the institution decided to implement the ERP system. Then the participants were invited to identify any
perceived benefits from the implementation to date and to identify perceived impediments to the successful implementation of the ERP system conducted at their University. Staff were also asked about any changes to their workloads either as a result of the ERP implementation or from other factors such as an increase in student numbers and workloads generally.

The focus group questions, the information sheet and the consent forms were emailed to participants prior to their attending the focus groups (refer Appendix A). An external consultant to the university facilitated the focus groups as an added strategy to try to ensure that staff would be able to speak as openly as possible during each of the sessions. A transcript of the discussion was typed during each focus group by another researcher. In compiling the comments obtained from the focus groups, care was taken to ensure that any responses were anonymously cited to protect the identity of individual participants in any reporting of views and comments.

3.7.5.2 Phase 2

Phase two of the study involved conducting interviews at the three universities. This second phase of the study, undertaken during a period of time in the latter half of 2002, used interviews as a primary source of data for the development of the case studies (Fontana & Frey, 2000).

Use of Interviews

The purpose of the interviews was to ascertain whether the staff perceptions of the management of the ERP implementations in their university aligned with the focus group findings and the identified issues impacting on ERP implementations in the literature. Interviews with participants in this study were used to examine in depth the dynamics and problems of the ERP system implementations at three universities. Patton (1990) defines interviewing as a way of finding out what is on someone’s mind without directly observing them. The interviews provide important sources of information for this research and are a mechanism to further explore the focus group
results and the issues impacting on ERP implementations identified in the literature (Yin, 1994). A further purpose of conducting interviews was to ascertain the views of individuals, rather than collective focus group views, to obtain a frank and personal view of the management of the ERP implementations in their university.

The use of semi-structured interviews enabled the researcher to explore particular issues in more depth than in the first phase of the study. Semi-structured interviews allowed staff to provide a range of additional data about their perceptions of their ERP implementation not specifically asked in the interview questions. It also enabled the researcher to ask a number of structured questions as well as discussing some broader issues and to be guided, to some extent, by the interviewee’s responses. Patton (1990) further advises using open-ended interviews when complex and sensitive issues are being probed to be able to access the perspective of the person being interviewed.

The use of semi-structured interviews was two-fold. Firstly, it provided some comparability across the three different universities by asking a set of specific questions based on the both the outcomes from the initial focus groups and the synthesis of the relevant literature on success factors affecting ERP implementations. Secondly, it allowed individual participants to more fully explore the issues affecting their ERP implementations in their university. Interviews allowed the researcher to explore particular aspects of ERP implementations with a representative group of staff involved in three different implementations at three different universities.

**Interview Sample**

As discussed earlier in this Chapter, the twenty-six participants interviewed in the research process were identified from those involved either directly or indirectly in ERP implementations at their university. Staff representing a range of roles and positions were selected and invited to participate in an interview in relation to the implementation of the ERP in their institution. These included a representative of senior management, managers, administrative staff who were end users of the
system, academic staff, technical staff and staff employed in implementation projects. The focus groups had not included the staff employed on the project during the evaluation of the first stage of the implementation. As discussed earlier in Chapter 3 it was proposed to conduct six to eight semi-structured interviews with a number of staff at each university; however, the availability and willingness for staff to be involved during the period of interviewing was a factor in the final number of interviews conducted. Data on the interviewees at each institution is found in Table 3.3.

**Development of Interview Process**

The research design and interview process were developed initially in consultation with supervisors. The interview questions and protocols were developed based on the themes identified from both the findings from the focus groups, and this literature search, combined with discussion with supervisors. As discussed earlier in this Chapter, the proposed interview protocols and questions were piloted with staff at a fourth university who had agreed to be part of the development of the research process for this study. The researcher is indebted to these individuals for their engagement with the research plan discussions and for the assistance in the formulation of an appropriate research strategy and case study format.

Combined with a synthesis of the literature on ERP system implementations in general and the success factor literature in particular, the findings from the first phase of the study assisted in the development of the research design and process undertaken in the second phase at the three universities in the study. The literature in existence at the end of 2001 and start of 2002 was primarily on information technology adoption and implementation with practitioner research starting to appear and early research on ERP system implementations being published. The emerging issues from the analysis of the data obtained from the focus groups and the literature also assisted in framing and developing the research questions designed for the particular cohort of staff who were involved in the focus of this research study i.e., university implementations. The research “logic” process in Figure 3.2
below shows, in diagrammatic form, the research process developed from the initial
focus group findings and the literature.

![Diagram of research process]

**Figure 3.2** A research “logic” adapted from Lankshear and Knobel (2003, p.1)

*Interview Content*

The themes which emerged from both the analysis of the focus groups of staff in
phase 1 and the issues identified in the literature on ERP implementations were used
as the basis for the development of the questions used in the interviews in phase 2 of
this research. The interview questions concern the following:

- details about the organisation and its context
- the rationale for the adoption of the ERP
- the process for implementing the ERP including how the project was
  managed and the relationship with the corporate partners
- level of senior executive support and sponsorship for the implementation
- any risks and difficulties encountered and how were these addressed
- how the staff felt about the implementation
- an effectiveness of the training of staff (academic and general) and the
  communication mechanisms
- the lessons learned about the implementation of the ERP system in their
  institution.

The interview questions are included in Appendix E.
**Interview processes**

Participants for the research were identified from those involved either directly or indirectly in ERP implementations at their university. Staff were selected for interview based on their role and position in the organisation in relation to the implementation of the ERP. Interviews were undertaken at each of the case study universities using a similar representative group at each university with a total of twenty-six interviews conducted, as previously shown in Table 3.3. The rationale for this strategy was that staff at various levels and functions in the university have different views of the ERP implementation depending upon their experience of it and how it affects them. All staff in these organisations have some view of their ERP implementation; however, the choice of staff is influenced by the range of differing views gained through the focus groups from different stakeholder groups.

Arrangements for staff interviews at University X were made by the researcher. The interview questions were sent to participants prior to the interviews and the hour set for the interviews provided adequate time to cover the interview questions and any other issues the interviewer and participants wished to explore. At University Y and University Z contacts were used for organising particular staff representative of the proposed groups to participate in the interviews and this investigation. Thus staff representing a range of groups in their universities were interviewed at the three institutions.

Each interview was tape recorded on a voice-activated audio recorder (except for one staff member who preferred the researcher to take written notes) with the participant’s permission for later transcribing and analysis. The interviews were transcribed soon after the completion of the interviews by a research assistant and the document was emailed to each participant for their comments and edits if required and their final approval to use the interviews. Staff already had given their approval for the transcripts to be used in the study prior to the interview process as per the Ethical Clearance process (*refer Appendices B, C, and D*).
Data Analysis and Interpretation

The data obtained from both phases of the study was transcribed and entered into the NVivo qualitative software tool (Richards, 2000). The software was a useful tool to organise and categorise the data as it enabled the analysis to be undertaken on this organised data. The software provided the researcher with a method of grouping respondents’ answers into different topics relating to the questions they were asked. The key words initially used to categorise the transcribed data were obtained from the key words in the questions asked for the first iteration of the data analysis. The NVivo database was interrogated using the issues identified in the literature to further organise the data. The headings used to organise the NVivo data were determined from the main topics in the questions asked of the participants. This included the role of the focus group participant or the interviewee, the reason for the implementation from the interviewee’s perspective, senior management’s role in the implementation, staff attitudes, training, communication, benefits and difficulties of the implementation, risk management, lessons learned, evaluation processes and a personal rating of the implementation. An understanding of staff perceptions of the issues that staff perceived as important for university ERP implementations was interpreted from the content analysis of the data obtained from the focus groups and interviews.

In the next phase of the data analysis, key themes that had emerged in the first iteration of the analysis were identified by the frequency of reference to a particular issue and the data was categorised for a second time. It enabled the researcher to link responses to different questions and on different themes and for the different groupings of staff for both the focus groups and interviews. The software allowed the frequency of themed issues to be identified to be able to make observations about the significance of particular themes and the conclusions for the study.

Focus Group Analysis

This section describes the analysis of the focus groups themes. The transcripts from the focus groups were analysed and organised into broad themes by the researcher
who typed the transcripts (McConachie, 2002) as part of her own research project and separately by the researcher. With the data grouped under headings in NVivo, issues identified by participants in relation to the implementation of stage one of the ERP system implementation in their university, were grouped under further broad headings that were generated and referred to as issues. The similarities and differences between the different groups were identified; however, there were minimal variations of views between the groups. The variations were related to the degrees of emphasis on particular issues between the groups and the way that the issue was expressed.

The steps used in the analysis of the focus groups data to identify the major themes were as follows:

a) the grouping of all the data for each question from all seven of the focus groups

b) the data from each question was scanned to identify themes and issues. The common themes were identified from recurring issues in the data. A recurring issue identified a number of times in the data becomes a theme. The extent to which recurring issues occurred for the different groupings of staff were noted and used as a basis for generating themes. Some issues were not mentioned by specific groups and these omissions need to be reported e.g., particular issues relating to the implementation may be ignored by senior managers. Summaries were made and documented. Any differences in views between groups were also noted

c) the overall themes and recurring issues for all of the focus groups were then compiled and developed into concept maps

d) this process was likewise independently undertaken by another researcher with expertise in conducting and analysing focus groups to establish the verification of the themes and recurring issues

e) the analysis undertaken by both researchers was compared and discussed.
This approach, used in consultation with supervisors, enabled the refinement of themes and a process of understanding and ordering the key findings from this stage of the research.

**Focus Group Themes**

The grouped broad headings of issues generated initially were the tangible and intangible benefits resulting from the ERP implementation in relation to the needs of the university, the perceived impediments to the successful implementation of the ERP and the perceptions of the change management process and issues relating to increased workloads. In an analysis of the data related to the perceived impediments to the successful implementation, it was found that themes emerged relating to the overall management of the implementation and to leadership and planning in particular. The further identified issues arising from the data were senior management failings, the rationale for ERP adoption, planning and management of the project, workloads and staffing, communication and training. These groupings of issues from the data were then collapsed into themes according to the frequency of the responses relating to the particular issue and in consultation with supervisors.

The issues raised by the staff at the university were similarly identified in Chapter 2 in both the CSF and other ERP literature as important issues to be considered for the efficacy of an implementation of a system in an organisation. These themes were able to be linked with the themes in the ERP implementation literature and questions developed for phase 2 of this research. In this investigation the focus group results were analysed and, combined with the themes synthesized from the ERP literature, used as the basis for the development of the research questions used in the semi-structured interviews (Kreuger, 1994). The identified focus group themes are presented in Chapter 4 of this dissertation.

**Interview Analysis**

The interviews were transcribed in full and the data was organised using NVivo software. Initially, the headings used to organise the data in NVivo were based on
the interview questions (refer Appendix E). Data from the different interviewees and universities was then organised under the same headings based on the questions. Within the data grouped into headings, issues identified by participants in relation to the efficacy of the implementation of the ERP system in their university were grouped under further broad headings and referred to as issues. These issues were grouped under broad headings as they related to each of the interview questions, specifically information about the organisation and its context, the rationale for the adoption of the ERP, the process for implementing the ERP (including how the project was managed and the relationship with the corporate partners), the level of senior executive support and sponsorship for the implementation, perceived risks and difficulties encountered, how the staff felt about the implementation, the training of staff, the communication mechanisms and an overall evaluation (including the lessons learned about the implementation at their institution). The compiled data from all the interviews, then organised under the issue headings, was re-arranged into larger groupings of data around common issues identified within these headings and according to the numbers of groupings of data under different headings. These groupings of issues from the data were then collapsed into broader themes according to the frequency of the responses relating to the particular issue and in consultation with supervisors.

The supervision process was used to identify common themes. Both supervisors examined a sample of three interview scripts and discussed their findings and the implications of their analysis. Focus group themes and the analysis of the literature provided guidance for the development of the interview questions. NVivo assisted in the process of organising the data to scan all answers to a particular question from all sources of data. Reflective analysis of this categorised data was conducted to determine themes.
The steps used in the analysis of the interview data to identify major themes were as follows:

a) the grouping of all the data by the researcher for each question from all 26 interview transcripts
b) the data from each question was scanned to identify themes and issues. The common themes were identified from recurring issues in the data. A recurring issue identified a number of times in the data becomes a theme. The extent to which recurring issues occurred for the different groupings of staff were noted and used as a basis for generating themes. Some issues were not mentioned by specific individuals and these omissions need to be reported, e.g., particular issues relating to implementation may be ignored by senior managers. Summaries were made and documented. Any differences in views between interviews and universities were also noted
c) the overall themes and recurring issues for all of the interviews were then compiled
d) both supervisors examined a sample of three interview scripts and discussed their findings and the implications of their analysis with the researcher. This process was used to establish the verification of the themes and recurring issues
e) the analysis undertaken by the three researchers was compared and discussed.

Interview Themes
As described above, the interview data was categorised under emergent themes. The themes identified during both phases of the investigation pertained to the organisational context, rationale for the implementation, leadership, planning and preparation, project management, use of consultants, workloads, staff attitudes including morale issues, communication, training, change management, benefits achieved by the implementation and other or peripheral issues. Discussion with supervisors occurred after they had analysed a selection of the interview data to corroborate the analysis by the researcher. A cross-case analysis was performed on
the themes, based on similarities, differences and anomalies. The cross-case analysis was undertaken by comparing the three sets of findings from the three universities. These two sets of data from both phases of the study were then compared and contrasted in order to determine the factors that staff perceived contributed to the effective implementation of the ERP at University X, then triangulated with the other university interview data in order to determine which issues may have influenced their results and to what extent.

During this second phase of the research there was more ERP literature available than during the first phase of the research. After collating data for phase 1 a search of the literature revealed an increase in available research in relation to ERP implementations. It was therefore possible to identify some of the issues in the interview data that appeared to relate positively with those emerging in the literature. The issues raised by staff at the universities could be identified in both the CSF and other ERP literature as important issues to be considered for the efficacy of an implementation in any organisation and some issues that related to universities in particular.

During the process of the analysis of the interview data the common issues and themes that emerged were developed into a series of concept maps. Both the identified themes from the data analysis and the themes identified from the ERP implementation literature were mapped and discussed with supervisors. As the interviews were analysed common themes emerged. Concept maps (see Figure 3.3 for an example of a concept map for University X) were developed, in consultation with supervisors and as determined by chosen case study methodology went through a process of refining these maps to understand the key findings from the research. This approach enabled the refinement of themes and a process of understanding and ordering the key findings from this second phase of the research.

The identified interview themes and the results from this data analysis are presented in Chapter 4 of this dissertation.
3.8 Research Ethics

The ethics of research concern the responsibility of a researcher for the consequences of their research and its results (Iivari, 1991). This research followed the principles espoused in the Code of Ethics for Research developed by the Australian Association for Research in Education. Protection of both organisational and individual confidentiality was agreed to as part of the ethical clearance procedure. It is the researcher’s responsibility in any publications, including this dissertation, to protect the anonymity of the participants and the universities. This was a basic premise of the research undertaken. It is for these reasons that each university in the study has a *nom de plume*. For this research, there were a number of ethical issues cited by Miles and Huberman (1994) which needed to be considered.
The main ethical issues in this research concerned the protection for the focus group participants and interviewees and the universities. All possible interviewee identification was hidden and pseudonyms were used for participants and universities. Written permission from senior university managers at the three universities involved in this study was obtained. The information supplied to the universities and the protection afforded the participants as reported in the CQU Ethical Clearance processes provide further assurances of confidentiality for both the universities and participants. Ethical Clearance was approved by the CQU Human Research Ethical Clearance Committee in May 2003 (refer 02/04-31, Appendix D).

Obtaining informed consent to use the information from all the focus group participants and the interviewees was also a critical issue. The participants needed to have detailed information about the purpose and process of the study so that their informed consent could be obtained. In this research, participants were informed and protected by the use of an Information Sheet and Consent Form approved by the university’s Human Ethics approval process (refer Appendix B, C and D). This involved the provision of written and verbal information about the research project emailed to all interview participants prior to their participation (refer Appendix B). Participants were required to sign the consent forms prior to participation and any questions they may have had were answered prior to the face-to-face interviews either by email, telephone or face-to-face (refer Appendix C). If participants did not wish to be taped (in one case), provision was made to make written notes by myself during the interview and a copy was sent to the participant later by email. Written notification of the right to withdraw from the project was contained on the consent form. At the interview, participants were verbally reminded of this right. The Information Sheet which was used specified how the results were to be used and what the participant was consenting to. Participants had the right to refuse their interview being used as part of the study when they were sent the email of their transcript for possible editing.
The issue of confidentiality, anonymity and identifiability of the participants in the study was addressed in a number of ways. All interviewees consented to be involved in this research on the condition that they would not be individually identified in any of the publications resulting from this research. In this research the data has been aggregated into categories of different staff at the three different universities and used for research and analysis purposes such that no individual can be identified. The interviews were tape recorded, except in the case mentioned above, and transcribed in full with participants being sent an email copy of their transcript. Demographic data was coded then split according to demographic details. Interview data was coded and split according to interviewee type and question sets. Data was then compared and contrasted across demographic and interview data codes or categories. The names of the participants and the universities have not been used in any publications and any references to the identifying characteristics are general. The confidentiality of the participants was assured by the coding of the interview data numerically. All electronic data stored on a computer was password protected using a password known only to the researcher. All hard-copy data, including interview audio-tapes and transcripts, are kept in a locked filing in her home office cabinet to which only the researcher has a key. The names of the universities used in the research are protected with a pseudonym to be used in any publications and in this doctoral dissertation. Given the confidentiality procedures to which the researcher adheres and the level of informed consent obtained, no negative consequences are envisaged in the case of the participating universities or the interview participants.

3.9 Summary

Informed by the literature review in Chapter 2 on the issues affecting ERP implementations, a research methodology involving interpretive assumptions was chosen as appropriate to gaining further understanding of the critical success factors affecting these organisations conducting large scale technology implementations. This chapter described the study’s underlying method and methodological assumptions. In the context of the research questions as stated in Chapter 1 the use
of a case study methodology has been shown to be the most appropriate methodology to serve the purpose of assisting the study to generate useful knowledge of ERP implementations in universities. The study sample was described and the procedure for data collection discussed providing details of the study involving focus groups at the phase 1 case study university and the use of interviews for phase 2 of the research. The scope and limitations to the study were considered as well as the strategies to protect the universities and participants involved in the study.

The next chapter presents the results of the various types of data collected as part of this investigation. Chapter 4 presents the outcomes of the data resulting from the data collection process outlined in this chapter.
Chapter 4

FINDINGS AND DISCUSSION

4.1 Introduction
The previous chapters have examined the literature and associated methods and methodology used to explore the efficacy of the implementation of Enterprise Resource Planning (ERP) systems in Australian universities. This chapter presents the findings obtained from this research conducted in three Australian universities. The research findings are interpreted from the focus group and interview data. The findings from both phases of the study are presented in this chapter including a consideration of the Research Question 1 in light of these results.

4.2 Phase 1 Findings
This section presents an analysis of the focus group data collected during the first phase of this study as detailed in the Data Analysis section of Chapter 3. The analysis of phase 1 data, together with that from the literature, was used to develop a preliminary structure for the study. Thus, the findings from the analysis of the Phase 1 focus group data, in conjunction with the relevant literature, were used to enable the researcher to undertake a broader exploration of ERP implementations through interviews with staff at three universities for the second phase of the study.

The data in the following section is presented as a number of broad themes in a series of tables and was obtained from the analysis of the findings from the focus groups.

4.2.1 Focus Group Findings
The focus groups were conducted to help the researcher undertake a preliminary investigation of how the context, process and other issues as outlined in research
question one, potentially impacted on ERP systems implementation. The identified themes used for the detailed analysis presented below are as follows:

- organisational leadership
- organisational planning
- staffing impacts
- change management
- other issues.

The results presented below are organised into a series of tables according to the above five identified themes. These results have been presented as either the summarised data and/or reflective quotes from participants in the different groups.

The comments obtained from the focus groups are noted in the tables and listed according to the groups of staff to which they belonged. As detailed in Chapter 3, the participants in the focus groups consisted of the following groupings:

**Focus Group 1**: Faculty managers

**Focus Group 2**: Administrative staff who were high level users of the system

**Focus Group 3**: Administrative staff that were not major users of the system

**Focus Group 4**: Academic staff

**Focus Group 5**: Staff from regional campuses

**Focus Group 6**: Human resources staff

**Focus Group 7**: Administrative staff employed in the financial services division who were major end users of the system.

### 4.2.2.1 Organisational Leadership

Table 4.1 provides the summarised data and comments from participants derived from each of the focus groups relating to the theme of organisational leadership of the ERP system implementation at University X. Organisational leadership issues were identified by the researcher through the use of the words “management”, “senior staff”, “senior executive”, the Vice-Chancellor, VC, DVC, ownership,
support, sponsor, sponsorship and champion in comments and/or statements made by the respondents.

### Table 4.1 Organisational leadership - focus group data

<table>
<thead>
<tr>
<th>Focus group</th>
<th>Focus group participant’s perceptions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Faculty Managers</td>
<td>Poor leadership and management, no champion, senior staff were not dealing with personality conflict</td>
</tr>
<tr>
<td>Admin staff [a]</td>
<td>No understanding of implications of the project</td>
</tr>
<tr>
<td>Admin staff [b]</td>
<td>VC’s comments in media regarding the project affected morale of staff</td>
</tr>
<tr>
<td>Academics</td>
<td>$ savings publicised by VC and in reality no savings were made</td>
</tr>
<tr>
<td>Regional staff</td>
<td>VC’s comments - save 200 jobs &amp; 48% return on investment - impacted on staff morale and lack of ownership by staff. Consultants were viewed as running the implementation not the university. Cost overruns of the project. Violated good management practice</td>
</tr>
<tr>
<td>HR staff</td>
<td>Senior staff did not understand what they were getting into and the impact on organisation.</td>
</tr>
<tr>
<td>Finance services</td>
<td>Senior staff did not understand the size of the impact on organisation; $ savings comments impacted on staff, no champion until DVC took it on; no ownership of the project by senior staff.</td>
</tr>
<tr>
<td></td>
<td>Senior executive did not understand the impact on organisation, purported $ savings impacted on staff, no senior champion.</td>
</tr>
</tbody>
</table>

**Note:** There are two focus groups in Table 4.1 to 4.5 with the heading “admin staff”. The first one in the table refers to a group of administrative staff who were high users of the new system and they are referred to as Admin staff [a] and the second group refers to administrative staff who were not major users of the system and marked as Admin staff [b].

The comments captured in Table 4.1 show that staff were concerned about both the lack of understanding of the magnitude of the impact on the organisation and the poor state of leadership of the ERP implementation by senior staff. Faculty managers, finance and HR staff identified the need for a person from senior management to be the champion for the implementation. The absence of an identified champion was viewed as an issue impacting negatively on the implementation. Faculty managers also reported that the senior executive of the university did not deal with the personality conflicts among other senior staff during the implementation and that this issue impacted on the process and outcomes of the implementation. The academic group suggested that the leadership from within the university was so poor that the implementation consultants were viewed as leading
the implementation rather than the university leaders. The Vice-Chancellor’s quote that “the project will save 200 jobs and provide a 48% return on investment” was regularly mentioned by staff in all focus groups as well as the perception that such a comment impacted negatively on the staff morale and the level of ownership for the new system and the project by all staff at the university. The comments from the Vice-Chancellor had a particular impact on administrative staff. The administrative staff perceived that they would be most affected by the implementation of the ERP system. It was these staff who were concerned that they may be most likely to be among the 200 staff who would lose their jobs. This issue appeared to impact negatively on staff morale and attitudes to the new system and the project. Further comments pertaining to staff morale are cited in Table 4.3. The academic staff group perceived that the senior staff, including the Vice-Chancellor, did not appear to understand what they were taking on in an ERP implementation. This perception was demonstrated by the Vice-Chancellor’s comments concerning the proposed impact of the ERP on the institution. Staff in the academic group were aware of ERPs accompanying an increase in staff numbers and costing more than originally planned in other universities.

4.2.2.2 Organisational Planning
Table 4.2 presents summarised data and comments by focus group participants in relation to the organisational planning theme. Staff comments in relation to this theme were identified by comments impacting on the organisational context or environment, the scope, preparation and, to some extent, the rationale for the implementation of the system. Comments were also identified that related to both the state of the organisation and its readiness for the ERP implementation and whether there was any evidence of staff resistance to it.
From the comments summarised in Table 4.2, the staff perceptions suggest that there was no overall articulated planning approach evident to staff. For instance, faculty managers could not fully understand the rationale for the implementation of the finance module as their perception was that the previous finance system worked well. Nevertheless, the faculty managers and the academic group recognised the need for the outdated legacy student system to be replaced by a new system. Comments made by participants in the faculty managers group showed that the organisation was generally ready for the necessary change accompanying the ERP implementation and particularly ready for the student system module.

It also can be seen from Table 4.2 that the lack of planning in relation to the computer hardware requirements to support the implementation was mentioned by a number of groups. The lack of attention to planning was noted by the HR staff who commented on the absence of HR planning for the staffing of the implementation project. Furthermore, it can be noted from Table 4.2 that the administrative staff group, who were the main users of the system, commented that the scoping for the implementation was limited and the process re-engineering was not done at all.
The administrative staff who were high level users of the new system perceived that the process re-engineering had not been done prior to the implementation and that the system was replicating the existing processes. A comment from another participant in this group was that “the organisation was modified to suit the software” for the finance system implementation. The detailed analysis of the focus group data indicated that there was evidence of resistance both from this group and the financial services group, as they believed that the new system was not as effective as the existing system and shadow systems continued to operate alongside the new system (shadow systems are defined in Chapter 1). The regional staff also commented that there was resistance to the use of the new system as “shadow systems continued to be used”. These two groups were the only ones to mention these issues as shadow systems were a feature of the implementation and its aftermath in all areas similar to that reported in the literature by Jones, Behrens, Jamieson & Tansley (2004). As the regional staff were more geographically isolated from the administrative centre, it follows that they were depending on their own systems to be able to operate. The foregoing results indicate there was staff resistance to the new system as evident in this focus group data.

As in the comments noted in Table 4.1, the academic group was likewise critical of the role of consultants, commenting that the same consultants scoped and implemented the system. The regional campus group and the finance group noted the absence of academics in planning the implementation process. The system implementation was viewed as a technology implementation according to the HR group reinforcing the comments from the Table 4.1 on the perceived lack of leadership in relation to the implementation.

4.2.2.3 Staffing Impacts

Table 4.3 presents summarised data on staffing impacts in relation to the ERP system implementation. The impacts tended to concern issues of staff morale, workloads, staffing numbers and management styles. Each group commented on the increased workloads for administrative staff and most of the groups reported that the numbers
of staff employed at the university had increased during the period of the implementation. HR staff also reported increased workloads and an increase in staffing levels occurring concurrently with the implementation. The increase in workloads is demonstrated by a comment made by a regional staff member that “Finance used to be half a day and it is now four days”. This increase in workload occurred despite the comment, reported by many staff, from the Vice-Chancellor that 200 jobs would not be required because of the new system. The increase in staffing levels appeared to be influenced by other factors occurring at the university including the concurrent increase in campuses and student numbers, particularly for international students.

**Table 4.3 Staffing impacts - focus group data (University X)**

<table>
<thead>
<tr>
<th>Grouping</th>
<th>Focus group participants perceptions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Faculty</td>
<td>Poor morale, staffing levels and workloads increased.</td>
</tr>
<tr>
<td>Managers</td>
<td><strong>Admin staff [a]</strong> Increased staff workloads. <strong>Admin staff [b]</strong> Workloads increased. <strong>Academics</strong> Workloads and staff numbers increased. It actually requires more people.</td>
</tr>
<tr>
<td>Regional staff</td>
<td>More staff needed. Increased staff workloads with very dedicated staff.</td>
</tr>
<tr>
<td>HR staff</td>
<td>Increased workloads and staffing levels. Management of project staff by consultants very different to the practices of the university. Them and us culture. Staff worked 55 hours per week and more on the project for higher levels of pay. Staff not engaging with the implementation across the university.</td>
</tr>
<tr>
<td>Finance services</td>
<td>Increased staff required across the university. Loss of staff to project impacted on organisation.</td>
</tr>
</tbody>
</table>

The focus group comprised of administration staff that were high users of the system reported that the loss of staff to the project team impacted on their capacity to function. Staff were not easily able to be replaced and this in turn increased the workloads of staff in areas which had already lost staff to the implementation project. The HR staff group commented that the management of the staff seconded to the implementation project created some problems because of the differences in the two management cultures. It was reported by HR staff that staff seconded to the implementation project were required to work at least 55 hours per week with, in most cases, a considerably higher salary than staff would have received in their
previous role. In this respect, the management of the staff seconded to the project was also perceived to be undertaken by the external consultants using management practices that were more akin to the corporate world than the practices in the rest of the university. This was perceived to partly result in the “them and us culture” described by a HR staff member. The results suggest that it was this disparity in culture between the university and the implementation project that contributed to resistance to both the implementation and the use of the new system.

With respect to the foregoing commentary, the faculty managers commented on the ongoing low staff morale with one manager describing the “shocking state of morale” at the university. This is a recurring theme consistent with comments in Table 4.1. The morale of staff may be related to the change weariness of staff to continual change at the institution. As discussed in Chapter 2, McConachie (2002) reported that staff can become weary of the continual organisational changes that can take place at their institution over the previous years and did not welcome the change brought about by an ERP implementation. The foregoing results are also supported from the literature in Chapter 2 on ERP implementations in US universities and colleges where workloads for staff were shown to be underestimated by senior managers and operational managers were dealing with the increased workloads and resultant low staff morale (McCredie & Updegrove, 1999; Smith, 2000). The faculty managers reported that they now need “three people where they previously needed one person” to do a particular job with the new system and they have “burned the candle at both ends” themselves to keep on top of the increased workloads. The foregoing results, as cited in the literature above, suggest that the staff perceptions of increased staff workloads and poor leadership and planning for the implementation, in addition to the changes occurring at the institution, were impacting negatively on staff morale at the time of collecting the data for this research.

### 4.2.2.4 Change Management

Table 4.4 presents summarised data and focus group participant comments pertaining to the change management theme. Change management issues include
managing the impact of the new changes to the organisation, communication with staff about the system implementation, changes occurring as a result of the implementation of the new system and changes occurring to organisational processes and training on the new system provided for staff.

Table 4.4 Change management - focus group data (University X)

<table>
<thead>
<tr>
<th>Grouping</th>
<th>Focus group participants comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Faculty</td>
<td>Timing of training poor and not user friendly.</td>
</tr>
<tr>
<td>Managers</td>
<td></td>
</tr>
<tr>
<td>Admin staff [a]</td>
<td>Poor training, no change management.</td>
</tr>
<tr>
<td>Admin staff [b]</td>
<td>Poor timing and amount of training.</td>
</tr>
<tr>
<td>Academics</td>
<td>Consultants making all the decisions and did not manage change.</td>
</tr>
<tr>
<td>Regional staff</td>
<td>Senior executive did not understand the level of changes to the organisation. Training inadequate.</td>
</tr>
<tr>
<td>HR staff</td>
<td>Massive organisational change with no-one taking responsibility for managing it, limited training.</td>
</tr>
<tr>
<td>Finance services</td>
<td>Project did not manage change even though they had a change management team. Poor communication and training.</td>
</tr>
</tbody>
</table>

The change management issues noted in the staff comments tended to be in relation to the perceived general lack of planning in the organisation by senior managers as noted in the above sections. In conjunction with the noted overall lack of planning there were also comments pertaining to an absence of planning for change management processes. The financial services staff commented that “even though the project team had a change management team they did not manage change”. Again the academic group noted that the consultants were perceived to be making all the decisions and senior managers were not managing the change.

Poor timing and quality of training delivery was noted by nearly all groups. It was reported by staff that the training was conducted at a time during the implementation when computers were not configured to access PeopleSoft and staff were therefore unable to practice on the new system on completion of training. It was noted during this research that there was a period of some months before staff were able to access the software to use the new system. Staff reported that they had forgotten what they had learned at training by that time. Given the staff resistance to
the new system identified in the above sections, the level and quality of change management strategies, including the timing and amount of training, were issues that were also impacting on the outcome of the ERP system implementation at this institution. The above result suggests that change management issues need to be taken into account in any planning for implementations in universities.

4.2.2.5 Other Issues
Analysis of the focus group data revealed a range of issues that did not naturally fall into the themes considered in the above tables. These issues have been presented in Table 4.5. The number of comments relating to poor management of relationships, rumours and conflicts between staff was clearly noticeable and worthy of a theme in itself. Other issues noted were the frustration of academics at the funds being expended on the implementation project and two groups noted the lengthy period of time when they were not able to access any financial reports in the institution. The administrative staff who were high users of the system expressed their frustration at not having their suggestions acted upon in the scope of the new system. They reported that “we have spent a lot of money and it has not delivered what we wanted – even though there was a long consultation process”.

Table 4.5 Other issues - focus group data (University X)

<table>
<thead>
<tr>
<th>Grouping</th>
<th>Focus group participants comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Faculty Managers</td>
<td>High conflict between Financial Services &amp; project, rumours impacted staff, personality conflicts not managed.</td>
</tr>
<tr>
<td>Admin staff [a]</td>
<td>Rumours not managed. Staff suggestions as to what they wanted in the system were not listened to. People need ownership from the start</td>
</tr>
<tr>
<td>Admin staff [b]</td>
<td>Academics frustrated – funds going into the implementation of the system.</td>
</tr>
<tr>
<td>Academics</td>
<td>Frustration at length of time cannot access finance reports. Consultants viewed as running the implementation not the university.</td>
</tr>
<tr>
<td>Regional staff</td>
<td>Frustration at length of time cannot access finance reports.</td>
</tr>
<tr>
<td>HR staff</td>
<td>Relationship between financial services and project poor.</td>
</tr>
<tr>
<td>Finance services</td>
<td>Politics and rumours not managed.</td>
</tr>
</tbody>
</table>

Data analysis showed other issues perceived not to be managed by senior management included “the politics and rumours” reported by financial services staff, including the quote that the “Vice-Chancellor’s comments about the prospect of the loss of
300 jobs” (note the difference from other comments reportedly quoting the Vice-Chancellor saving 200 jobs). This example of a rumour continued to impact on staff morale as rumours about which jobs would not be needed and the increasing costs of the implementation continued to abound. The politics not being managed refers to the noted poor relationship between staff in the financial services division, a major system owner, and the implementation project staff was a major issue impacting on the implementation progress at a number of stages in the process. This issue reportedly influenced the progress of the implementation at various stages. The data revealed that staff were aware of the issues between the project manager and the head of the finance area and comments made by respondents suggest that this conflict was not managed by senior management. Rumours about the implementation were also reported not to have been dealt with by senior management. One Faculty manager stated that “because of all the nonsense and rumours of what one says to another we lose respect for our leaders”. This comment shows how staff perceived the level of disengagement of senior management with the project and was related to the view of their ongoing lack of both planning and proactive change management.

4.2.2.6 Summary from Phase 1 Data

The issues identified from the Phase 1 focus group data intimate that the institution in this research was on a learning curve for all levels of institutional staff associated with the implementation of an ERP. An overall perception evidenced in the data suggested that no-one really understood how the project would impact on the institution when the university commenced examining ERPs. The time, commitment and changes to the way of working for the majority of staff involved across the university were perceived to have been underestimated in the planning for the project. The perception was that there was an absence of effective co-ordination of the project by senior staff of the university and that they lacked an understanding of the scope of the implementation project and the magnitude of the change required. Staff felt that senior management assumed a subordinate position in relation to the consultants when, as perceived by some staff, it needed to be managed by the
university and not by the implementation partners. Comments from staff demonstrated the cultural differences between the university and the consultants impacted on the relationship between the two and contributed to staff feeling that their suggestions for what they wanted from the new system were not valued by the consultants. Staff resistance to the implementation and the new system evidenced by the existence of shadow systems and personality conflicts and rumours needed to be managed by senior staff and this was not evident to staff. The major issue cited by staff of increased workloads during the implementation was also related to the increased growth and complexity of the organisation in addition to the implementation and these issues also needed particular attention in a university environment.

A comment made by Turner (2004) in relation to an ERP implementation in another Australian institution at a similar time was that the university “did not manage the project appropriately, had a poor implementation plan, little senior management involvement” (as quoted by von Hellens, 2005) and that this institution was by no means unique. The issues identified in the data from the focus groups of staff at University X are supported in the ERP implementation literature, and particularly the practitioner literature, as issues of common concern at other higher education institutions.

4.3 Phase 2 Findings
This section considers the findings from the analysis of the data collected during the second phase of this study into ERP system implementations at three Australian universities. The analysis of phase 1 focus group data, together with that from the literature as discussed in Chapter 3, was used to develop both the interview process and a preliminary structure for the analysis of the interview data. Thus the findings from phase 1 enabled the researcher to undertake a more detailed and broader exploration of ERP implementations with a view to the identification of additional issues and issues as yet unidentified in the focus group data. The analysed data is presented in terms of broad themes of findings for all groups of staff interviewed at
the three universities. The process of determining the themes from the analysed data from the interviews is presented in more detail in Chapter 3.

4.3.1 Interview Themes

The differences in the interview data both from different groups of interviewees and different universities were able to be identified by the above process. In an analysis of data related to successful implementations it was found that themes emerged relating to the overall organisational leadership and, in particular, the organisational context impacting on planning. Staffing impacts, project management and change management issues were also identified as important; similar to the analysed data from the focus groups. The prominence of the project management and the organisational context themes identified in the interviews was not evident to the same extent in the data from the focus groups and as a result there are six slightly re-arranged themes (changes highlighted in bold) identified in the interview findings. The themes that were identified from the analysis of the phase 2 data include:

1. Organisational leadership
2. Organisational context and planning
3. Staffing impacts
4. Project management
5. Change management
6. Other issues not included in the above themes

4.3.2 Interview Findings

The following series of tables consider the interviewee comments at the three universities under the six themes identified from this phase of the research. The tables are followed by a discussion of the implications of the data for each theme and for each university. The tables allow for similarities and differences between the implementations at the three universities to be described and discussed.
4.3.2.1 Organisational Leadership

The summarised interviewee comments relating to perceptions of organisational leadership of the ERP system implementation at University X are presented in Table 4.6. It provides a summary of representative comments, derived from each of the groupings of staff interviewed, relating to the organisational leadership theme. Organisational leadership issues were identified by the use of the words “senior”, “senior executive”, the Vice-Chancellor, VC, DVC, leadership, ownership, support, steering committee, top, sponsor, and champion.

<table>
<thead>
<tr>
<th>Grouping of interviewees</th>
<th>Interviewee’s comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Senior managers</td>
<td>$4 million to be saved. Staff reduction to cover costs. Limited senior staff support – the deans often berated by VC about lack of support for the implementation. Steering committees did not work well.</td>
</tr>
<tr>
<td>Managers</td>
<td>Senior managers did not turn up to information sessions and to planning sessions. Will get rid of 300 staff said in VC forums.</td>
</tr>
<tr>
<td>Administrative staff</td>
<td>General staff to be halved – in reality it has doubled. People afraid of losing their jobs.</td>
</tr>
<tr>
<td>Academics</td>
<td>They did not understand what they were doing.</td>
</tr>
<tr>
<td>Technical staff</td>
<td>Senior managers did not understand what they were getting into and did not take responsibility for it.</td>
</tr>
<tr>
<td>Project staff</td>
<td>Did not have a lot of support or commitment from the top – did not understand what they were getting into. Second phase worked bottom up &amp; this was better. VC support undermined by other people and DVC support came later. Support from senior management – not system owners.</td>
</tr>
</tbody>
</table>

From the foregoing interviewee comments presented in Table 4.6, it is argued that the data indicates the perceived limited support and commitment shown for the implementation of the ERP at University X by the senior management level of the organisation. A lack of confidence in the senior leadership of the implementation process was shown by staff at all levels of the organisation with comments from one of the managers such as “they were like an iceberg — buy-in at superficial level but not really at the top” and another manager “only lip service support from senior staff”. The academics made statements such as “there was nobody at home” and that “we need intelligence at the top” in relation to the leadership of the implementation. Technical staff perceived that “senior staff abrogated their responsibility in relation to the project”.
The issue of the Vice-Chancellor’s comments concerning saving millions of dollars and cutting numbers of jobs from the implementation of the new system was regularly discussed by interviewees as unrealistic and creating a negative effect on staff. The figure of 300 jobs to be saved was reported to be stated by the Vice-Chancellor in these interviews indicating that this figure was now the standard one quoted as opposed to the 200 jobs originally quoted. One administrative staff member reported the actual situation was that “the system cost a great deal more then was originally reported and that the numbers of general staff have doubled”.

It can be seen in the data in Table 4.6 that senior managers are as critical of the senior executive’s support of the implementation project as other administrative staff. One senior manager reported that he and other senior managers had been berated by the Vice-Chancellor for not supporting the system implementation however there had not been clear support demonstrated by the senior managers themselves. Little difference is shown between the different groups of staff interviewed in their perceptions of the low senior support of the implementation project. The data notably indicated that staff employed in the implementation project were generally not as critical of senior support of the implementation as the other groups; though they observed that “senior people were bad mouthing the project from the top”. However, they reported that senior management support appeared to increase through the second stage of the implementation when the Deputy Vice-Chancellor became involved with the management of the project.

Table 4.7 Organisational leadership - interview data (University Y)

<table>
<thead>
<tr>
<th>Grouping</th>
<th>Interviewee’s perceptions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Senior managers</td>
<td>Important for the university. All senior staff supportive. Steering committee with influential senior staff involved to make necessary decisions. Academic registrar/s invaluable for project.</td>
</tr>
<tr>
<td>Managers</td>
<td>Senior staff always positive Steering group worked well.</td>
</tr>
<tr>
<td>Administrative staff</td>
<td>Senior staff supportive. Made timely decisions.</td>
</tr>
<tr>
<td>Academics</td>
<td>Supportive management.</td>
</tr>
<tr>
<td>Technical staff</td>
<td>Unsure though supported.</td>
</tr>
<tr>
<td>Project staff</td>
<td>Definite support from senior executive. Demonstrated managers support.</td>
</tr>
</tbody>
</table>
The data in Table 4.7 provides the range of comments derived from the interviews with staff on the issues of organisational leadership at University Y in relation to the implementation of the new student system. The perceptions of leadership at University Y were overwhelmingly positive about all the senior staff. The steering committee seemed to work well for the implementation and decisions appeared to be timely. There appeared to be evidence of good manager support from most managers across the institution. The technical staff member interviewed was unsure about this issue initially though he stated that “they seemed to be throwing money at it” and it did not appear to be an issue for this staff member.

Table 4.8 Organisational leadership - interview data (University Z)

<table>
<thead>
<tr>
<th>Grouping</th>
<th>Interviewee’s comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Senior managers</td>
<td>Registrar executive sponsor. VC would pat them on the back again and again. VC an engineer – had trouble understanding why it could not be precisely costed as you can a bridge.</td>
</tr>
<tr>
<td>Managers</td>
<td>If VC says jump ¾ staff say why or maybe. Had to battle to get senior support. VC came on board eventually – DVC ignored it. Assoc deans on side. Registrar did not ask for money up front.</td>
</tr>
<tr>
<td>Administrative staff</td>
<td>Senior staff seemed supportive.</td>
</tr>
<tr>
<td>Academics</td>
<td>Senior executive involved in choosing the system &amp; implementation partners.</td>
</tr>
<tr>
<td>Technical staff</td>
<td>There was a belief that the ERP would save costs and some jobs – but not the case. Support from senior exec was excellent. Groans for extra money requests.</td>
</tr>
<tr>
<td>Project staff</td>
<td>Support from senior staff – people with charisma here compared to other institutions.</td>
</tr>
</tbody>
</table>

The data presented in Table 4.8 provides the range of comments derived from the interviews with staff at University Z on the issues of organisational leadership in relation to the implementation of the new student system. The data indicates that the level of support from senior leaders at University Z was perceived to be high although perhaps not as high as in University Y. This conclusion was based on the positive comments from staff at both universities in regards to senior leadership support for the project; however, the comments made in relation to the Vice-Chancellor at University Z show that he took some time to demonstrate his support. The registrar was reported by staff as being fully committed to the implementation however the Vice-Chancellor needed to be encouraged to support it. Staff reported
that, as he was an engineer, he could not understand how the project could not be
precisely costed. However, he was perceived to be supportive of staff by his
attendance at various staff meetings thanking them for their efforts on the
implementation. The data indicated that most senior managers were supportive of
the implementation though the extra budget requests were perceived to be
somewhat difficult to obtain. The registrar was the executive sponsor and was
perceived to have a good relationship with the vendors.

The findings from analysis of the data at the three universities, in relation to
organisational leadership, show the importance of the staff perceptions of top
management support for the implementation of a new system to be demonstrated
within the institution. As previously discussed in Chapter 2, both the corporate and
higher education sector literature supports the importance of the senior manager’s
demonstrated sponsorship and involvement in the front end planning of an
implementation, especially the role that senior management plays in technology
implementations (Livingstone et al., 2002; Somers & Nelson, 2001; Whittaker, 1999;
Skok & Legge, 2002; Livermore, 2005). As well Akkermans’ and van Helden’s
research, cited in Chapter 2, showed that if the top management support is low, then
the ERP implementation is considered a failure, and if the support is high then the
implementation is generally considered a success, is particularly important (2002).
This outcome is evidenced by the data obtained in this study and, in particular, with
the evidence from this theme.

4.3.2.2 Organisational Context and Planning
The data presented in Tables 4.9, 4.10 and 4.11 present a range of summarised
comments made by interviewees in relation to organisational planning.
Organisational planning is identified by the terms of scope, technology, preparation
and rationale for the adoption of the system. The comments on the organisational
context can be identified by comments related to the context, culture, history and
readiness for the organisation for the ERP implementation and whether there was
evidence of resistance to the implementation.
The data in Table 4.9 shows that there are similarities in the comments from the interviewees on the lack of preparedness of the organisation to those in the focus groups at University X. The technical staff and project staff observed that the institution was an early adopter of the ERP system and that the organisation was not ready for early adoption of this technology and that it would have been prudent to wait until the institution was more prepared. A technical staff member commented that “we were too early and did not benchmark the product”. The planning processes were not viewed to have been linked to overall planning processes in the institution or undertaken to the level that prepared the organisation for the new system adoption. Data analysis indicated that the organisational re-engineering to the processes, identification of user requirements, hardware and computer requirements were all viewed as not to have been planned for prior to the system adoption. The comment cited below from a technical staff member expressed the overall view in relation to the lack of planning:

If an institution is serious about IT (at the cutting edge or even the blunt edge) you need to undertake IT planning and implementations and they need to be constantly enhanced and improved. Senior administrators thought that you could implement this system in a finite time with a finite finish to it.

Data obtained from senior staff and the academics interviewees indicated that they were not satisfied with the number and type of processes that were included in the scope of the system implementation and that they perceived that these did not match the user requirements. This view is reflected in a comment from an academic staff member that the “things we wanted were out of scope”.

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Table 4.9 Organisational context and planning - interview data (University X)

<table>
<thead>
<tr>
<th>Grouping</th>
<th>Interviewee’s comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Senior managers</td>
<td>Requirements from the new system were often out of scope according to consultants – could not afford it. Costs out of control for the project.</td>
</tr>
<tr>
<td>Managers</td>
<td>Looking for integration in systems and this did not happen. No planning for equipment. IT needs linking to strategic direction. Proper planning and preparation is crucial including the management and ongoing maintenance of the systems after they have been implemented.</td>
</tr>
<tr>
<td>Administrative staff</td>
<td>Support for student project. Organisational processes needed changing prior to new system. Need PCs for PeopleSoft – most staff on Macs— limited who could use it. Have two computers on the desk.</td>
</tr>
<tr>
<td>Academics</td>
<td>No planning prior to vanilla implementation. The functions wanted by academics were not included in the implementation.</td>
</tr>
<tr>
<td>Technical staff</td>
<td>Early adopters – should have waited a year or so. Need to do organisational changes prior to implementing rather than processes adapted to PeopleSoft. IT architecture and infrastructure needed upgrading prior to implementation.</td>
</tr>
<tr>
<td>Project staff</td>
<td>No process re-engineering or identifying our user requirements prior to implementation by consultants. Needed to change the process flows prior to system going in. Recognition that the student system was old and unworkable. Needed to go through the university to get rid of shadow systems after the implementation.</td>
</tr>
</tbody>
</table>

There were some consistent comments in the data that revealed that there were many staff in the organisation who recognised the need for a new student system, as the previous student system was clearly viewed by administrative staff as “old and unworkable” and by a manager as “in danger of falling over”. However, the comments in the data about the adoption of the finance system were consistently negative. One of the managers stated that the reason for the adoption of the new finance system was simply that the “new head of financial services changed the plans for order of ERP as he had the ear of the VC initially”. Comments about the adoption of the finance system would appear to be related to the reported undue influence of the new finance director who was perceived to have convinced the Vice-Chancellor to replace the finance system first rather than the student system as was originally planned.

The interviews with project staff identified the consultants as being responsible for the institution’s omission of both the identification of user requirements in the new
system and the re-engineering of administrative processes prior to the new system being implemented. From the interviews in both University Y and University Z these activities were undertaken by university staff and not undertaken by consultants. The comment from project staff concerning the need for shadow systems to be removed suggested a continuing resistance to the new system across the organisation. The ongoing use of shadow systems was also identified by staff in the focus groups at University X. The project staff viewed the ERP product very positively compared with staff in the other categories of interviews and stated “this is a great product - we need this.” The interviews with the project staff indicated that the university staff seconded to work on the ERP system project were consistently more positive about the implementation and the ERP product than staff in the rest of the organisation. These staff were working long hours on the project implementation and felt that it was a valuable activity for the organisation. Furthermore the project staff were critical about the level of support provided to the new ERP system by other staff at the university and particularly senior staff.

The data in Table 4.10 presents the perceptions of interviewees about organisational context and planning at University Y. The perceptions concerning the organisational context relate to the general preparedness and prior planning for the introduction of the student module. The data in Table 4.10 indicates that staff perceived that this institution had undertaken the necessary planning and re-engineering of the academic structures of the programs prior to the implementation. It would seem that this prior planning, driven by Academic Board and senior management, prepared the organisation to be change ready for the implementation according to the data from the staff at University Y. It was perceived by some staff that the planning was driven by academics to build a better system to better suit and service the students. The previous student system was recognised by one of the interviewed managers as being “so knackered – we need something new” that staff realised that a new one was needed. The following piece of advice from a manager at University Y about system implementations was “modify at your peril”. This advice reflected the view of the
implementation at University Y which was to undertake the process re-engineering prior to a system being adopted and to implement that system in a vanilla form.

Table 4.10 Organisational context and planning - interview data (University Y)

<table>
<thead>
<tr>
<th>Grouping</th>
<th>Interviewee’s perceptions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Senior managers</td>
<td>Undertook the planning and re-engineering of the academic structures of the programs prior to implementation. Academic Board drove changes to the academic system and rules. Legacy system would not cope with changes – had to have it. Tender process undertaken for the student system, planning study, hardware &amp; implementation services.</td>
</tr>
<tr>
<td>Managers</td>
<td>System designed to suit the student. Did not plan for post implementation support and maintenance after go-live – staff unclear of roles and the budget was inadequate.</td>
</tr>
<tr>
<td>Administrative staff</td>
<td>A quality service culture developing with the implementation. Getting people to realise that change was inevitable and that we needed the new system no matter what. Pockets of resistance. Some staff do not like using the system.</td>
</tr>
<tr>
<td>Academics</td>
<td>Academically driven implementation - not central administration. Academics involved in the advisory group.</td>
</tr>
<tr>
<td>Technical staff</td>
<td>Did not understand the rationale for the new system.</td>
</tr>
<tr>
<td>Project staff</td>
<td>Strategic imperative. Academic change driven by being fair to students in terms of workloads.</td>
</tr>
</tbody>
</table>

Another administrative staff interviewed recognised that there were pockets of resistance among staff in particular areas. One administrative staff member in a faculty commented that she did not like using the system and gave the tasks requiring the use of the system to more junior staff in her area. Whether there was other resistance to the new system, and how widespread it was, is not clear as mostly, the staff interviewed at this institution were very positive about the implementation at their institution. It was perceived that academics were accepting of the new system if and when they were aware of it.

One issue identified by staff at University Y revealed a gap in planning for the post implementation support and maintenance activities. It was indicated that a budget had not been set aside for this activity. One staff member reported that the “money stopped too quickly” at the end of the implementation. A manager at University X also raised the issue of the lack of planning for support and maintenance activities post implementation of the system.
The data presented in Table 4.11 shows the perceptions of interviewees in relation to the organisational context and planning undertaken prior to the adoption of the ERP system at University Z. The data suggests that there appears to be a perception of a relatively clear rationale for the replacement of student as, according to a project staff member at University Z, the student system had ‘crashed a few times’. The HR and Finance systems both had been replaced previously with an ERP and it was indicated that staff at University Z had learned a great deal from these implementations.

However, a senior manager commented that he “realised we were babes in the woods in implementing something like this” and as it was not the core business of universities they required assistance in the form of implementation partner consultants. A technical staff member who had worked in the corporate context, made this comment about implementing ERP systems in the university environment: A university is much more of a democracy than a corporation – there is no guy at the top saying this is what will happen and it happens.

This comment relates to explaining the particular culture of a university compared to a corporation and some resistance observed by a manager at University Z in relation to the implementation by staff. The findings from all three universities indicate that a university culture is not one that easily follows a decision made at the top of an organisation.

### Table 4.11 Organisational context and planning - interview data (University Z)

<table>
<thead>
<tr>
<th>Grouping</th>
<th>Interviewee’s perceptions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Senior managers</td>
<td>Scoping study done. Required assistance to implement and that this is not core business despite having a track record in ERP implementations.</td>
</tr>
<tr>
<td>Managers</td>
<td>Did some changes prior but also customised the system to fit the organisation. Did not cost the project adequately prior to the start of the implementation.</td>
</tr>
<tr>
<td>Administrative staff</td>
<td>Clear that a new student system was needed.</td>
</tr>
<tr>
<td>Academics</td>
<td>Work out what we wanted from the system prior – did not do that as well as we could. All staff to be asked – academics not asked.</td>
</tr>
<tr>
<td>Technical staff</td>
<td>Legacy system reaching the end of its life. HR and Finance vanilla – Student system has been modified rather than a vanilla implementation. Not enough planning undertaken to the extent needed.</td>
</tr>
<tr>
<td>Project staff</td>
<td>System crashed a few times – a good rationale for replacing it.</td>
</tr>
</tbody>
</table>
There was an acknowledgement by interviewees in a number of the groupings of staff that the planning and preparation could have been improved to a greater extent than undertaken for this implementation. This is highlighted by a comment from a technical staff member that the project was “a bigger exercise than we realised at the start”. The data analysis showed that, despite undertaking a scoping study and having a history of implementing PeopleSoft modules previously, the university did not work out fully what it wanted from the new system prior to the implementation. Some of the processes were modified prior to the implementation; however, there was some customisation of the system to fit the organisation at University Z. According to the participants the HR and Finance systems were previously implemented in vanilla forms at University Z. There was a view that the system was not costed well before they initiated it and that they needed to ask for more funds to be able to complete the implementation. One of the managers stated that: “the main lesson learned is to cost the damn thing properly”. This data appears to indicate that implementing a non-vanilla system implementation in a university may require more careful planning.

As mentioned in Chapter 2, the nature of an ERP implementation is challenging because of the packaged nature of the software and the necessity for the organisation to adjust their business processes to fit the package (von Hellens et al., 2005). University X and Z adjusted the system to fit their processes to a certain extent while University Y implemented a vanilla system. It was shown above that University Y had undertaken the re-engineering of their processes prior to adopting and implementing an ERP system and this is reflected in the mostly positive comments made by the staff interviewed in this study. As discussed in Chapter 2, Markus, Axline, Petrie and Tanis (2000), in their study of multi-site ERP implementations, claimed that implementing ERP systems can be quite straightforward when organisations are simple structures and operate in one or a few locations and the converse applies. This outcome is borne out in this study as University Y, although the largest of the three universities in the sample, is structurally the least complex, operating in mainly one location and the institution where the implementation
appears to be the most straightforward. Additionally, as the research from Esteves and Pastor (2005) states, most problems in ERP implementations are attributable to organisational factors including the contextual influence. It has been shown in the foregoing results that the context of a university implementation is an environment where there are likely to be additional problems with an ERP implementation compared with corporate organisations. As one senior manager described about their ERP implementation that universities are “babes in the woods” with this type of activity. The three issues of the prior re-engineering of processes, implementing vanilla systems and the organisational complexity require higher education institutions to adjust their planning processes to accommodate their particular context.

4.3.2.3 Staffing Impacts

The data presented in Tables 4.12, 4.13 and 4.14 address participants’ perceptions on staffing impacts in relation to the implementation. Staffing issues covered in these tables relate to the issues identified in phase 1, namely, staff morale, workloads, staffing numbers, user involvement and engagement and management styles.

Table 4.12 Staffing impacts - interview data (University X)

<table>
<thead>
<tr>
<th>Grouping</th>
<th>Interviewee’s comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Senior managers</td>
<td>More staff employed than prior to the implementation of the system.</td>
</tr>
<tr>
<td>Managers</td>
<td>Consultants wanted a different set of work conditions for university staff working in the project. HR only did the position descriptions and no change management initially. Difficult to get user commitment to the new system and the implementation.</td>
</tr>
<tr>
<td>Administrative staff</td>
<td>Staff did not embrace the system well. Only a few staff in faculties used the new system. Workloads increased. More responsibility and workload to faculties.</td>
</tr>
<tr>
<td>Academics</td>
<td>Staff pulled into project — bodysnatching. People feel bitter about the implementation.</td>
</tr>
<tr>
<td>Technical staff</td>
<td>Did not work on the project – wanted to keep my life.</td>
</tr>
<tr>
<td>Project staff</td>
<td>We were given the money to work on the project.</td>
</tr>
</tbody>
</table>

For University X the data demonstrated that staff resistance to the use of the new system was a consistent issue with interviewees. The resistance to the implementation and the use of the new system may have been fuelled by the widely
held view reflected in the comment from an administrative staff interviewee that the “biggest fear at University X was people losing their jobs from it”.

The method of employing staff in the project was referred to by an academic interviewee as “pulling people” or “body snatching” into the project and it was further observed that “people felt bitter” about this. The HR section of the university was perceived to have been inactive in relation to the method staff were employed and managed in the implementation project team. One of the managers interviewed was critical of HR for their apparent deficit in the way change was managed in the organisation until quite late in the course of the implementation. The 55 hour plus week worked on the project was commented upon by a manager as this was different to the usual hours worked by staff at the university. “Consultants wanted people to work 55 hours per week – in reality they worked more”. Staff were paid at a higher rate to compensate for the increased number of hours worked so they would not have to be paid overtime. The number of consultants was viewed to be of a larger number than the numbers of University X staff on the implementation project. Conversely, project staff complained that university managers did not “encourage and support their staff to get behind, allowing staff to be on the project”.

Administrative staff were the only group to comment on increased workloads. There appears to be a view from this group that more work and responsibilities were being allocated to the faculties as opposed to the central administrative areas of the university. In the focus groups at University X, increased workloads were mentioned by every group. The project staff interviewees said that they were paid to work the increased hours and did not discuss this as an issue of concern to them.

The data in Table 4.13 addresses participants’ views on staffing impacts in relation to the implementation at University Y. Staff working on the implementation project worked the usual hours with some overtime paid at the end of the project; however, it was stated by one manager that the “staff put in superhuman efforts”. Apparently, the data indicates that staff numbers were adequate for the implementation project.
until the last few weeks before go-live when staff temporarily increased their hours of work. Comments indicated that the consultants worked an eight hour day similar to staff at the university and were deliberately matched with a University Y staff member to ensure skills were transferred. Implementation at University Y workloads were able to be managed both for staff and consultants within the usual allocated workloads for a university.

Table 4.13 Staffing issues - interview data (University Y)

<table>
<thead>
<tr>
<th>Grouping</th>
<th>Interviewee’s perceptions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Senior managers</td>
<td>Staff working usual hours on the project. Some overtime paid towards the end. UY staff 7 ¼hr work days – Consultants 8hr – 57%/43%. $1000 bonus for university staff working on the project after it was completed. Enrolment staff moved from central to faculties. Some extra staff employed in some areas.</td>
</tr>
<tr>
<td>Managers</td>
<td>Encouraged staff to be involved and to ensure that the system would work for faculties. Some staff stayed negative towards the system and the devolution to faculties. Got funding and staff redistributed from central for this. Some of these staff did not want to move.</td>
</tr>
<tr>
<td>Administrative staff</td>
<td>Some staff do not like the system and find it cumbersome. Varies in different faculties – depending on the managers of the area. Pockets of resistance. More time at work and longer hours. Work pushed to faculties from student admin. Does not like using PeopleSoft and allocates the work with it to someone else.</td>
</tr>
<tr>
<td>Academics</td>
<td>Mostly academics not interested in the new system until it affected them.</td>
</tr>
<tr>
<td>Technical staff</td>
<td>Staff worked together well on the project.</td>
</tr>
<tr>
<td>Project staff</td>
<td>Staff warned that there would be more work inputting data in the system — enables more to be gained from the system. Needs more staff. Paid overtime for work on the project. Had plenty of staff allocated to the project.</td>
</tr>
</tbody>
</table>

The foregoing data revealed that some staff remained resistant to the system and the devolution of some processes to the faculties. The overall staff perception at University Y was that managers in faculties and service areas were very supportive of the new system implementation. There were some faculties and faculty managers who were not accepting of the new system; however, they were perceived to be in a minority. It was difficult to know how widespread this was given the choice of interviewees was mostly – though not all — made by the university project manager. Apparently resources, including staff, were redistributed from the central student administration area to the faculties to enable the faculties to address the increased
workloads that reallocation of processes created. It was reported that some of these reallocated staff apparently did not want to move from central administration to the faculties.

The data presented in Table 4.14 addresses participants’ comments on staffing impacts in relation to the implementation in University Z. Comments from a manager at University Z indicated that a system implementation requires having the best people involved. The manager stated that an ERP implementation is “about people and how those people commit and maintain focus” rather than a technology implementation; this is a theme identified by staff interviewed at this institution. The comment from one particular manager that “it’s about relationships” was also echoed in numbers of interviews at University Z. Participants indicated that the managers chosen for the implementation project roles were “respected managers who looked after their staff” according to an administrative staff member. A further comment from a manager, and reiterated by a technical staff member, was that not enough staff were allocated to do what was needed during the implementation and some of these staff worked very long hours on the project and were “dog tired” towards the end of it. It would seem that this view was not shared by all staff interviewed at this institution as some staff perceived that staffing levels were adequate.

Table 4.14 Staffing issues - interview data (University Z)

<table>
<thead>
<tr>
<th>Grouping</th>
<th>Interviewee’s comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Senior managers</td>
<td>Got staff from bodyshops and other unis. Still resentment from some academics. Got nothing to do with technology – it’s about people and how those people commit and maintain focus.</td>
</tr>
<tr>
<td>Managers</td>
<td>Get the best people involved. People dog tired at the end.</td>
</tr>
<tr>
<td>Administrative staff</td>
<td>Staff negative initially. Staff worked long hours – needed more staff.</td>
</tr>
<tr>
<td>Academics</td>
<td>Administration staff says it takes longer to enter data than with the previous system.</td>
</tr>
<tr>
<td>Technical staff</td>
<td>Lots of staff involved who knew the product well. In months before go-live, people working long hours. Too few staff to do the work.</td>
</tr>
<tr>
<td>Project staff</td>
<td>Small implementation team at University Z. Spend time building relationships. Lots of hours at the end prior to go-live. We were looked after. Good managers who are easy to talk to.</td>
</tr>
</tbody>
</table>
Analysis of the above data indicates that staffing impacts was an issue at all three universities in this study. As discussed in Chapter 2, the use of consultants to assist the workload of an implementation can be problematic for a university and finding enough staff to undertake all the work required in an implementation is not easily done. University Y had enough staff for the implementation and this was perceived to be related to the careful planning and resourcing of the implementation undertaken at this institution. The perception that staff were initially negative about using the new system as more time was needed to enter data into it was echoed at all three universities.

The above results support the literature in Chapter 2. This literature indicates that project managers of ERP implementations who are appointed from technical staff are associated with ineffective change and project outcomes (Milford & Stewart, 2000). It further reports that ERP implementations are likely to have difficulties when technical issues are more important than the people issues. The project managers of University Y and Z were appointed for their people skills in addition to their knowledge of university processes. These two managers were highly regarded by staff in the project team and within the university. The positive comments made by staff at University Y and Z about the quality of relationships on the implementation project teams and the managers were absent at University X where a technical project manager was appointed without experience of the higher education sector.

4.3.2.4 Project Management

The data in Tables 4.15, 4.16 and 4.17 present staff perceptions relating to the way the system implementation project was managed by both the university and the implementation external consultants. The project management issues can be identified by the terms consultants, project management or project managers.

It can be seen from Table 4.15 that the project staff were aware of the perception that the consultants were not accepted by university staff as reflected in the comment by a project staff member that the consultants “were hated by most people at University X” which was telling. However, as the project staff worked closely for long hours with
the consultants there is evidence for the claim that a positive work relationship between the project staff and the consultants developed. However, the project staff were aware that this situation was not a positive one for the project or the organisation. A comment was made by a technical staff member that “the project was too isolated from the rest of the university” and from a manager that the “project was a black box cut off from the rest of the university” which was referring to both the physical proximity of the project and the perception that the consultant culture was very different from that of the university. This difference in cultures is reflected in the comments made about the 55 hour weeks in data presented in prior sections. This gap between the university and the implementation project staff was shown in the data as an issue that was not tackled at University X.

Table 4.15 Project management - interview data (University X)

<table>
<thead>
<tr>
<th>Grouping</th>
<th>Interviewee’s comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Senior managers</td>
<td>Consultants were driving the implementation. The project was separate to the rest of the university</td>
</tr>
<tr>
<td>Managers</td>
<td>Consultants driving. Controlled committees.</td>
</tr>
<tr>
<td>Administrative staff</td>
<td>Consultants controlled the project.</td>
</tr>
<tr>
<td>Academics</td>
<td>Downfall was consultants were driving the project.</td>
</tr>
<tr>
<td></td>
<td>Consultants — only a few needed.</td>
</tr>
<tr>
<td>Technical staff</td>
<td>Project managers need choosing carefully – people and political skills needed. Ours chosen by partners. Consultants had limited knowledge of the product. Consultants worked to being on time on budget.</td>
</tr>
<tr>
<td>Project staff</td>
<td>Consultants were good – they could have charged us a lot more money then they did. Consultants are very tight. Project too isolated from the rest of the university. Consultants controlled the project management in first phase and shared in the second.</td>
</tr>
</tbody>
</table>

Table 4.16 presents the University Y staff data concerning the summarised comments on project management of the system by both the university and the external consultants. The perceptions from University Y concerning the role of the implementation consultants varied between different groups of staff. One senior manager and two managers strongly asserted that the university was driving the implementation. The view of the administrative staff interviewed indicated that the consultants tried initially to control the project and the view of a technical staff member was that the consultants were in control of the implementation. The project
staff did acknowledge that the transfer of knowledge from the consultants to University Y staff could have been more effective. This data indicates that the role of the consultants was a positive one in University Y after a few teething problems initially as the university learned how to best use the consultant expertise.

**Table 4.16 Project management - interview data (University Y)**

<table>
<thead>
<tr>
<th>Grouping</th>
<th>Interviewee’s perceptions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Senior managers</td>
<td>UY interests driving. UY also controlled the technical implementation and IT architecture. Consultants were excellent.</td>
</tr>
<tr>
<td>Managers</td>
<td>UY controlled the project – advice from consultants.</td>
</tr>
<tr>
<td>Administrative staff</td>
<td>Consultants tried to control initially but had staff resistance. Some things dropped out of scope because of deadlines.</td>
</tr>
<tr>
<td>Academics</td>
<td>Do not know.</td>
</tr>
<tr>
<td>Technical staff</td>
<td>Consultants driving the project. Did not drive IT – would have liked to. Skills transfer not done from consultants.</td>
</tr>
<tr>
<td>Project staff</td>
<td>Partnership with UY driving. Transfer of knowledge from consultants could have been better.</td>
</tr>
</tbody>
</table>

The data in Table 4.17 presents the University Z staff comments relating to the way the system implementation project was managed by both the university and the implementation external consultants. It was perceived by all staff interviewed that University Z used consultants sparingly and the university appeared to be clearly in charge of their implementation. One manager described the use of consultants at University Z as they “picked the eyes out of the consultants”. This view may be related to the history of the institution having undertaken an implementation previously when they implemented other modules of the ERP system. Previous PeopleSoft modules that had been implemented were HR and Finance and their implementation according to one manager “had gone very smoothly”. At one stage they were not happy with their particular consultants and a manager reported that they “got rid of them”. They perceived that they got good value from the consultants that were PeopleSoft experts and only used a few other consultants throughout the project.
Table 4.17 Project management - interview data (University Z)

<table>
<thead>
<tr>
<th>Grouping</th>
<th>Interviewee’s comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Senior managers</td>
<td>A few consultants – managed by the uni. Got staff from bodyshops and other unis.</td>
</tr>
<tr>
<td>Managers</td>
<td>A few consultants – managed by the uni. Some were not much value – got rid of them.</td>
</tr>
<tr>
<td>Administrative staff</td>
<td>Consultants were good – one in particular.</td>
</tr>
<tr>
<td>Academics</td>
<td>Hired contractors. Only a few consultants – some were good. Others were not. We controlled. A few independent consultants were preferable. Not the teams.</td>
</tr>
<tr>
<td>Technical staff</td>
<td>Consultants very good – just a few. UZ owned the project.</td>
</tr>
<tr>
<td>Project staff</td>
<td></td>
</tr>
</tbody>
</table>

The foregoing results support those found by Allen and Kern (2001) in their study of ERP implementations in UK universities. They found that the ERP projects placed the universities in difficult relationships with implementation consultants and as these relationships are new for universities they require careful management. The data in this research indicated that all three universities in this study were on a learning curve in the use of their consultants. As University Z had previously used consultants in earlier implementations, the staff comments show that they appeared to be the most successful at this task. The perception that the consultants at University X were clearly in control of the implementation of the ERP system seemed to be pervasive at that institution. The “consultants called the shots” was a comment from a technical staff member that was echoed by many other staff at University X. This perception has a number of implications. Firstly it impacted on the leadership of the organisation as they were seen to have lost control of a project as large, costly and important to the organisation as this one. Secondly staff resistance to the implementation was further increased to both the adoption and use of the system. Thirdly it has had implications for ongoing reticence in the use of consultants in future projects. This outcome suggests that cultural difference between university staff and consultants needs to be considered in future implementations where consultants are used in university projects.

4.3.2.5 Change Management

Tables 4.18, 4.19 and 4.20 cover interviewees’ perceptions in relation to change management issues. Change management issues include managing the impacts of
the changes to the organisation, communication with staff about both the system implementation and changes occurring as a result of the implementation of the new system, changes occurring to organisational processes and training conducted with staff that will need to know how to use the new system.

The data from in Table 4.18 concerning University X staff suggests that, with the exception of the project staff, staff were negative about the quality and timing of the training and communications strategies employed at their institution. An administrative staff member commented that she “needed to see what the system looked like earlier as it was not until it was time to use it that I realised that it worked well and I could teach myself”. The project staff, who delivered the training and communications to a large extent, naturally enough, commented that the training and communication activities provided were adequate. A project staff member commented that the problem of staff resistance to the new system could have been averted if a “marketing exercise” had been employed prior to the implementation project to gain staff commitment and keep it. Interestingly and characteristically the academics perceived that training was not needed on the new system as one academic commented “you can do it yourself”.

Table 4.18 Change management - interview data (University X)

<table>
<thead>
<tr>
<th>Grouping</th>
<th>Interviewee’s comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Senior managers</td>
<td>Communications and training inadequate.</td>
</tr>
<tr>
<td>Managers</td>
<td>Not enough training.</td>
</tr>
<tr>
<td>Administrative staff</td>
<td>Training was poor – had to spend lots of time learning yourself.</td>
</tr>
<tr>
<td></td>
<td>Good training — timing poor. Communication poor.</td>
</tr>
<tr>
<td>Academics</td>
<td>Training not needed – can do it yourself.</td>
</tr>
<tr>
<td>Technical staff</td>
<td>Training and communication perceived negatively – reinforced the “them and us”.</td>
</tr>
<tr>
<td>Project staff</td>
<td>Communication was OK. Needed a marketing exercise to sell it to the people first. Gain commitment and then keep it. Training was appropriate. Needed more training.</td>
</tr>
</tbody>
</table>

The project team, which was perceived by staff at University X to be synonymous with the external consultants, established a change management team to implement the change management strategies to accompany the implementation of the new system. The project team was viewed by staff at University X as controlled by the
consultants and thus the comment from staff as that training and communication strategies reinforced the “them and us”. This change management team developed a website, emails, information sessions and regular newsletters. Staff perceptions about these change management strategies were negative because of the technical language used and the cultural gap in the way the communications were presented. One administrative staff member described the newsletter as being written “in a foreign language”.

The data in Table 4.19 covers interviewees’ comments in relation to change management issues at University Y. University Y, as part of its thorough planning and preparation for the system implementation, allocated a dedicated change management team as part of the university staffing structures. One manager commented that the premise underlying the change management strategy at UY was that “change management looked like chatting to people. People have to feel that someone is listening to them”. Even with the dedicated change management team one of the senior managers suggested that the change management importance to the outcomes of the implementation project was underestimated. The change management strategies included regular meetings of implementation coordinators who then communicated with their work areas on regular updates on the progress of the implementation. Another strategy was the conduct of user reference groups which involved many coalface administration staff. A project staff member reported: “the big positives were in making sure you keep the university informed about what you are doing, having lots of involvement from expert users across the university and seconding them to the team where you can”. The change management team also developed a website, emails, information sessions and newsletters done by UY staff and these were perceived to be well received. One comment from a project staff member in relation to change management strategies was that “we kept the expectations low about what the system could deliver”. This comment reflects a style of change management that undersells the benefits of the new system rather than trying to sell the benefits to a critical audience. This style of change management, in contrast with the style employed at
University X where the system’s benefits were probably overstated, may be a more appropriate strategy for a university.

Table 4.19 Change management - interview data (University Y)

<table>
<thead>
<tr>
<th>Grouping</th>
<th>Interviewee’s perceptions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Senior managers</td>
<td>A change management team allocated. Probably overtrained. Keeping the uni informed of what happened and involving expert users most important. Importance of change management underestimated.</td>
</tr>
<tr>
<td>Managers</td>
<td>Ran training after go-live in addition to prior. No time to review what has been developed. Change management important — talking to people important. Initially thought it was a monstrosity — consultation process pulled us in. Faculty managers were implementation coordinators.</td>
</tr>
<tr>
<td>Administrative staff</td>
<td>Regular meetings of implementation coordinators who communicated with their work areas. User reference groups involved many coalface admin staff. Website, emails, information sessions and newsletters done by University Y staff. Meetings with academic directors. Training poor initially. A clear communication plan was devised.</td>
</tr>
<tr>
<td>Academics</td>
<td>Rumblings of discontent.</td>
</tr>
<tr>
<td>Technical staff</td>
<td></td>
</tr>
<tr>
<td>Project staff</td>
<td>Good communication – depended on people to do it. Admitted that the implementation would be a struggle— realistic communication. Kept expectations low. Had a change management team of University Y staff.</td>
</tr>
</tbody>
</table>

An interesting aspect about the conduct of training at University Y was that because of a delay in the timing of the go-live date the training was delivered twice – once prior to the original date and in preparation for the second date at a later time. This second round of training was perceived positively by staff to assist ensuring that the staff were especially well trained at go-live. One administrative staff member commented that they had training prior and post go-live and “there were lots of debriefs afterwards in terms of how people handle that sort of thing and just to share information”.

Table 4.20 presents interviewees’ perceptions in relation to change management issues at University Z. The overall perception by staff interviewed at University Z was that the institution did not undertake formal change management strategies to the extent that they would have liked. Comments from staff about lots of talking to
staff and problem solving in relation to the system implementation appeared to compensate for the apparent lack of formal change management strategies. As the University also delayed their go-live date, two periods of training were conducted for staff similar to the situation described at University Y and this was viewed positively by staff from the data collected. A project staff member described how the second round of training helped staff overcome “the scare of I don’t know whether I like this product” and “second time round they seemed more comfortable and relaxed as soon as we turned her on”. This approach was different from University X where the change management team was attached to the project team which was viewed negatively by most staff. From the limited amount of data about change management obtained in this research it appears that change management was not an issue of concern for staff at University Z.

Table 4.20 Change management - interview data (University Z)

<table>
<thead>
<tr>
<th>Grouping</th>
<th>Interviewee’s comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Senior managers</td>
<td>Had to create ownership of the thing across the institution including with the academics.</td>
</tr>
<tr>
<td>Managers</td>
<td>Had to do change from bottom up. Finance and HR well accepted. Two periods of training. Lots of talking to staff and emails.</td>
</tr>
<tr>
<td>Administrative staff</td>
<td>Information with some payslips – lacking in change management.</td>
</tr>
<tr>
<td>Academics</td>
<td>Training conducted for academics – most attended — needed for uploading results. Reference group members reporting back.</td>
</tr>
<tr>
<td>Technical staff</td>
<td>Did informal work in change management.</td>
</tr>
<tr>
<td>Project staff</td>
<td>A lot of meetings with staff re the project – a lot of ownership. Lots of training was good — less support needed after go-live. Be honest about the product.</td>
</tr>
</tbody>
</table>

As discussed in Chapter 2, obtaining staff commitment to accept changes that accompany an ERP implementation is an issue that needs to be planned for in terms of the particular organisational context (Kanter, 1985; Hall, 1999; Kotter, 1996; Aladwani, 2001; Skok & Legge, 2002). The foregoing results have shown the impact that different change management strategies can have on the staff perceptions of the ERP implementations. These results are consistent with that of Amoako-Gyampah and Salam (2004) who showed that the perceptions about the benefits of a new system can be changed through appropriate staff training and communication. In this research University Y and University Z both developed change management
strategies that were appropriate for their particular context which were reported to mostly work well. Both universities had delayed their go-live dates and, in conducting two phases of training for staff, appeared to discover additional benefits of an increase in staff confidence and a decrease in staff resistance with the use of the new system. However University X, that did not change its go-live date, and where the change management strategies were perceived negatively, experienced staff resistance to the new system implementation.

4.3.2.6 Other Issues
The data presented in Tables 4.21, 4.22 and 4.23 covers a range of other issues that did not naturally fall into the categories considered above.

Similar to the data presentation in Table 4.5 from the focus groups, the perceptions relating to poor management of relationships and conflicts between staff appeared again as shown in Table 4.21 for University X. The difficulty between the head of financial services and the project team was again noted. The head of financial services was perceived as ‘a difficult character’ and to be blocking the implementation by project staff of the new finance system. This perception was held despite other perceptions from staff that he had convinced the Vice-Chancellor to implement this finance system. Difficulties between the project director and the vendors of the software were also noted by one interviewee who perceived that this situation impacted negatively on the implementation. This situation was perceived to be a problem as the institution did not get timely solutions to technical problems with the software as there was not a productive relationship between the institution and the vendor.
### Table 4.21 Other issues - interview data (University X)

<table>
<thead>
<tr>
<th>Grouping</th>
<th>Interviewee’s comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Senior managers</td>
<td>Academics switch off to Americanisation – language got in the way. Consultants had tight deadlines set by University X itself. Politics of University X impeded projects.</td>
</tr>
<tr>
<td>Managers</td>
<td></td>
</tr>
<tr>
<td>Administrative staff</td>
<td>Staff cynical. Should have been a technical implementation. Have had to do our own databases and interfaces.</td>
</tr>
<tr>
<td>Academics</td>
<td>Ego of head of financial services. Relationship with vendor important and ours was impacted by project director’s ego — little support from vendor.</td>
</tr>
<tr>
<td></td>
<td>We had too many modifications – will make upgrades to future systems difficult.</td>
</tr>
<tr>
<td>Technical staff</td>
<td>Head of financial services worked against the finance system implementation.</td>
</tr>
<tr>
<td></td>
<td>Money being spent on the project not being spent on the university.</td>
</tr>
<tr>
<td>Project staff</td>
<td>We have a very vanilla system – except where we could not convince people to shift. Financial services director was a difficult character who would try to prevent things progressing</td>
</tr>
</tbody>
</table>

The resistance and cynicism of staff to the new system was noted by most staff at University X. A comment from a senior manager suggested that the academics did not like the Americanisation of the system and this impacted on their acceptance of the new system. The politics of University X itself was perceived as a factor making it difficult to progress the implementation of the new system by managers. This research identified that staff identified the negative impact of the one senior manager on the implementation and difficulties being experienced by staff in understanding why this was not dealt with by other senior staff. This issue appeared to highlight the perceived lack of senior leadership and planning deficiencies in relation to the implementation at University X. The apparent large amount of money being spent on the implementation project was noted by staff in the interviews as well as the focus groups.

The view expressed by a manager that the consultants were set tight deadlines by the university provides another view to the perception of the control of the implementation by the consultants. One staff member suggested that “the implementation should have been a technical implementation by the IT staff”. The project staff interviewees perceived that a vanilla system was implemented except where it
was not possible to convince staff that they needed to change their processes and the system had to be adjusted to accommodate. One academic staff member stated that “we had too many modifications – it will make upgrades to future systems difficult”. The data shows that the views of aspects of the ERP system implementation at University X were different according to which sub-group of staff the interviewees belonged.

The data in Table 4.22 covers a range of other issues findings for University Y.

<table>
<thead>
<tr>
<th>Grouping</th>
<th>Interviewee’s comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Senior managers</td>
<td>Only one module. Subjects called courses prior to imp.</td>
</tr>
<tr>
<td></td>
<td>Project manager — not a computer person or a project manager</td>
</tr>
<tr>
<td></td>
<td>prior to implementation — understanding university business, having ear of people.</td>
</tr>
<tr>
<td></td>
<td>Decision not to have a technical person running the project – wanted a functional person. Modify at your peril.</td>
</tr>
<tr>
<td>Managers</td>
<td>Unix users did not like the system. Enhancing the self esteem of the organisation through the implementation.</td>
</tr>
<tr>
<td>Administrative staff</td>
<td>Performance bonuses given for great performers. People don’t read anything. Debriefs after training to learn from each other. Showed up a number of staff that were not very computer literate.</td>
</tr>
<tr>
<td>Academics</td>
<td>Student implementation not of interest to most academics.</td>
</tr>
<tr>
<td>Technical staff</td>
<td>Staff member resisted the interview process.</td>
</tr>
<tr>
<td>Project staff</td>
<td>Got project staff to track risks relating to go-live on a spreadsheet.</td>
</tr>
<tr>
<td></td>
<td>People do not read things. Timelines for go-live pushed out. Outside people do not understand the culture. Have to have staff on projects that will and can do everything and be thick skinned.</td>
</tr>
</tbody>
</table>

An important point of distinction between the other two universities and University Y was that the implementation consisted of only one module for which the institution prepared by changing their academic processes and nomenclature during the previous year. Related to the one module issue was that this implementation was conducted after many other implementations had been undertaken at other universities with the same product. As well the project manager appointed to lead the implementation was not a technical specialist but was regarded as a good project manager with a good knowledge of university business and well regarded by staff. This manager viewed the project manager role as one that required “drawing on my long-term working relationships with people” to get things done for the project. Another comment from a project staff member suggested that staff on project teams need to
be willing to do anything and to be immune to criticism. A project staff member describes the requirement of being a project member as:

\[ \text{you have to have a thick skin, don’t get upset when they spit the dummy. You can’t have staff that are not prepared to jump in and do everything, you pour the tea if you need to pour the tea or you build data if that is needed, you have to mould yourself to whatever the situation required.} \]

The results from University Y show that a positive impact on the implementation at University Y was the delay in the timeframe for go-live of the system for a period of time when the project team realised that they were falling behind in their timelines. This delay provided a number of positives in terms of managing workloads, staff morale and the improved training as shown in Table 4.18. The perception that the implementation was good for self-esteem at University Y was one that could be seen in the pride in what had been achieved as displayed during most of the interviews with staff.

However, there were two staff members who were not as positive as the other staff interviewed at University Y. They were both staff who had been substituted participants because the nominated staff were absent. They both had some views of aspects of the implementation project which were different to those of the staff who had been allocated for the interview processes. The technical staff member stated that “the consultants were driving the implementation” and that “IT services were a thorn in their side”. He also stated that “the worship of methodology inside this kind of environment isn’t as high as for consultants and they clash a little bit with university staff”. An administrative staff member interviewed had found ways to ensure that more junior staff were the ones who used the system as she did not like using it. She was uncomfortable with this information about her not using the system being accessed by other staff at the institution.
Table 4.23 covers a range of other issues and comments in the analysis and findings from University Z which have not been explored previously in the tables of themes. It appears from comments made by a technical staff member that there were some “personality flare-ups but generally people worked things through”. It was reported by a senior manager that in the previous implementation at University Z “there were some personality issues in previous stages that cost the project quite significant delays” however they “they had learned from last time”. One of the senior project managers (a University Z staff member) was perceived to perform a role of assisting people to work together or mediating rather than “his role rather than a technical expert”. One senior manager in the implementation project (a University Z staff member) was described positively by other staff as “the one that held it together”. It was perceived by other interviewees that it was this manager’s people management capacities and problem solving skills that kept the project going as well as it did. One of the academic leaders was perceived to be a champion and problem solver for the implementation in a faculty which traditionally could have been resistant to a system implementation.

Table 4.23 Other issues - interview data (University Z)

<table>
<thead>
<tr>
<th>Grouping</th>
<th>Interviewee’s comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Senior managers</td>
<td>Good relationship with PeopleSoft by senior staff – PeopleSoft very attentive – fed kangaroo and good red wine. A cost effective implementation. Keeping personality issues under control was difficult. ERP implementation is not going to be done quickly.</td>
</tr>
<tr>
<td>Managers</td>
<td>Took 6 months longer than planned – campus breathed a sigh of relief – I cried. RMIT had ¾ staff were consultants. Student is a green product compared with HR and Finance. Did not manage relationship with PeopleSoft to best effect.</td>
</tr>
<tr>
<td>Administrative staff</td>
<td>Took a long time to go-live — a lot less problems by taking longer. A lot of modifications made.</td>
</tr>
<tr>
<td>Academics</td>
<td>HR, Finance and Student Administration implemented. Delayed implementation for 9 months. People retrained. Associate Dean of Science saw his role as a champion and problem solver with the implementation in the faculty.</td>
</tr>
<tr>
<td>Technical staff</td>
<td>Some personality flare-ups but generally people worked things through. IT head performed a mediator/negotiator role. Some troubled personalities and conflicts – had learned from last time.</td>
</tr>
<tr>
<td>Project staff</td>
<td>Project manager was the one that held it all together.</td>
</tr>
</tbody>
</table>
One issue was in relation to the longer than expected time that it took for the system to go-live. It was reported that the go-live date was delayed for six months by one interviewee and nine months by another. The perception at University Z was that “because there were lot of modifications made” there were much less problems created for the implementation by pushing out the timelines to go-live to ensure that the system and organisation were ready. A view expressed by a senior manager is that “an ERP implementation is not going to be done quickly” and this understanding of the nature of an ERP implementation was evident at this institution.

One senior manager perceived that a benefit for University Z was that they had developed a good relationship with PeopleSoft and this ensured that PeopleSoft were very attentive to their needs of the software. Apparently the PeopleSoft representatives were “fed kangaroo and good red wine”. However, another staff member perceived that the university did not manage the relationship with PeopleSoft to best effect.

A senior manager at University Z discussed the system implementation in terms of the existence of “pioneers and settlers in terms of software” and that we “need pioneers to get settlers”. This comment addresses the issue of early adopters versus late adopters’ experiences of implementations. This university had been an early adopter of an ERP system and had learned from this experience. The existence of lessons learned from the previous stage of the implementation created a different context for this implementation compared with the context of the other two universities in this investigation. The experience of staff at a range of levels who had lived through previous ERP module implementations provided a level of expertise for the implementation at University Z which did not exist in staff at the other two universities. From the data obtained at University Y managers were aware that an ERP system module would require detailed planning and preparation and, as observed by one senior manager, they were able to “capitalise on the best practice from elsewhere” prior to undertaking their implementation.
From the foregoing data, it can be inferred that either prior experience or being able to learn from other institution’s experience to influence the prior planning is an identified antecedent of an effective and efficacious implementation of an ERP system. Furthermore, the level of preparation and planning in turn affects the level of staff resistance to the new system. This data supports the research undertaken by Esteves and Pastor (2005) and Allen and Kern (2001) who showed the importance of considering the organisational context in the outcome of an ERP implementation in universities. An important aspect of the organisational context would appear to be that concerning prior experience or the capacity to learn from experience gained in other universities of an ERP system implementation.

4.3.2.7 Reflections of Participants about the Implementation

An additional question was asked of all staff participating in the interviews as a last question to complete the interview process in a light-hearted way. This question required the interviewees to think of a number from 1 to 10 that reflected their overall rating of their satisfaction for the implementation at their institution with 1 expressing dissatisfaction and 10 being very satisfied. Table 4.24 presents the mean scores of the ratings by staff for the three different universities. The staff ratings on a scale of 1 to 10 provided a numeric comparison of the staff perceptions both between the three universities and within universities.

**Table 4.24 An evaluation of implementation mean scores (University X, Y & Z)**

<table>
<thead>
<tr>
<th>University</th>
<th>Satisfaction level</th>
</tr>
</thead>
<tbody>
<tr>
<td>University X</td>
<td>4.5</td>
</tr>
<tr>
<td>University Y</td>
<td>8.5</td>
</tr>
<tr>
<td>University Z</td>
<td>7.5</td>
</tr>
</tbody>
</table>

Almost all participants stated that they found this question very difficult to answer as it required them to make a numeric value judgement of their ERP implementation as opposed to answering questions where they could qualify their responses:

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2 Satisfaction with implementation — 10 Dissatisfaction with implementation — 1.
However, the consistency of their ratings as shown in Table 4.24 belied this apparent difficulty. The data obtained from this question, in addition to the foregoing data obtained from both phases 1 and 2 of this study, demonstrates both the consistency of these staff perceptions and their value as an indicator of the overall efficacy of the ERP implementation at their university.

4.4 Discussion of Results at University X

The initial focus of this dissertation was on University X in phase 1, and as the study examined data from both phases of the study and at two different periods of time during the implementation of the ERP system, there is a greater depth of data from this university. It is useful to explore in more detail the implications of the findings from University X and particularly any variation in findings between the two phases of data collection.

It has been demonstrated in this Chapter that the diverse nature of the University X made the implementation of the ERP project particularly challenging. A university as complex in structure, operation and enterprise such as University X appeared not to readily integrate an ERP product into its organisation. It is perhaps understandable that a project of this size and complexity would be difficult to adequately plan for and incorporate with other university activities. An analysis of the results of the first phase of the ERP system implementation at University X, drawing on focus groups with a range of different groups of staff, revealed that the institution appeared to have difficulties in coping with the implementation and ensuing changes. In particular, the new ERP system appeared to have impacted negatively on the morale of administrative staff. The major issue cited by staff of increased workloads in the first stage of the implementation has been related to a number of issues including the new ERP system processes, partly due to the increased growth in the organisation, and a need to further change and improve its financial processes.
An aspect of the focus groups and interviews conducted at University X was that the data was collected at two different times in the ERP implementation. In general, the participants in the focus groups were much more forthcoming about the issues impacting negatively on the system implementation rather than benefits associated with the new system. In particular, the participants saw deficiencies in the management and coordination of the project by senior university staff as a major impediment. Overwhelmingly the unforeseen increase in staff workloads, as a result of the implementation of the new ERP system and other issues, was identified as the major impediment for many staff. Concurrently there were a number of other issues impacting on the increase in staff workloads in addition to the new ERP system implementation. These included an increase in demand for student places as a result of the growth in the organisation as evidenced by the number of new campuses, the introduction of the Goods and Services Tax (GST) in July 2000, and a need to further change the university’s financial processes. The GST implementation substantially increased workloads for all staff in finance related roles in 2000. Workload issues associated with finance related tasks took much longer within the new ERP system than under the previous system, particularly for data inputting and reporting processes. The amount of paperwork had not decreased and there were a number of shadow systems still in existence for reporting purposes. Participants reported that there was a period of some months in 2000 when no financial reports were available at all. Admission processes had become longer and more complex and required increased numbers of staff to be employed in faculties for student administration activities. Focus group participants identified increased workloads, less than adequate staff training, planning and management and communication issues as the major impediments to the success of the first stage of their implementation. This increase in workload for staff is cited by a number of the papers describing the management of change projects in the US higher education system (McCredie & Updegrove, 1999; Smith, 2000). The increase in workload appeared to be related to the less than effective planning within the organisation and cannot be fully attributed to the newness of the system.
Data was collected from the focus groups on the benefits of the system. Overall, the staff found this question a difficult one to answer and generally the responses were provided on what the systems did not do. The data also demonstrated that the difficulties staff had in answering this question related to their overall negativity to both the adoption and implementation of the new system at their university. This aspect of the implementation was also identified in the research undertaken by Amoako-Gyampah and Salam (2004) which showed that the perceived usefulness of the new system is related to the staff’s perception of the benefits to both themselves and the institution. Focus group data showed that the staff recognised the need for the implementation of the student administration system and that student system benefits included the improved quality of admission data and the streamlined capacity to make offers to offshore students. Another benefit staff identified was initiated as a result of the implementation of the new system by the concurrent necessity to substantially upgrade information technology related hardware across the institution. This process in turn precipitated the need for improved information technology planning across the university.

Interviews from University X, conducted in the second stage of the implementation with a different group of staff to those involved in the interviews, showed that the experience gained from the first stage had changed the staff perceptions about the implementation of the next stage of the ERP. Identified changes included more effective change management strategies including improved training processes and the use of implementation coordinators throughout the university. The identification of an alternate senior executive staff member as the champion of the ERP project had resulted in increased university control and coordination of the project. Senior staff and supervisors across the university were more positive about the proposed value of the next stage of the project. Consequently, staff morale appeared to be at a higher level during the second stage of the implementation. The project also resulted in more effective integration of information technology planning into the university’s strategic planning processes. Finally, there was recognition that HR needed to be more involved in the management of the change processes; it was considered that the
involvement of HR staff in change processes would continue to assist in planning and facilitating change in the organisation.

From this brief discussion of the variation in findings between the two phases of data collection at University X it can be seen that the staff perceptions were able to identify the important issues during the course of their ERP implementation. They were also able to differentiate the changes between the two implementation stages at University X and to identify improvements in both the management and the course of the implementation.

4.5 Discussion of Findings
This section discusses the findings from each of the universities in terms of an ERP system implementation in each of the universities and in relation to Research Question 1 underpinning this investigation.

4.5.1 Findings for Research Question 1
Research Question 1: How do the context, process and other issues, as perceived by staff, affect ERP system implementation processes in the Australian higher education sector?

This discussion brings together the findings of the research and the literature on ERP's considered in Chapter 2. The findings are discussed under the research question sub-headings of context, process and other issues affecting ERP implementations.

4.5.1.1 Contextual Issues
The foregoing findings from the three universities show implementations in differing organisational contexts and in differing stages of readiness for ERP implementations. These three differing contexts were shown in the data to include the particular history, culture and circumstances of the institutions. The contextual differences between universities appear to be an important factor in the readiness for the ERP implementation. The findings are supported by the work undertaken by Esteves and
Pastor (2001). These suggest that most problems in ERP implementation projects are not technological, but are attributable to organisational factors including the contextual influence. Their view is that a consideration of the organisational context of ERP implementations is particularly important in the higher education sector. The five themes from the findings in relation to context are: the level of organisational complexity; the prior experience of implementations at the institution and its particular culture; the approach to the management of changes accompanying the implementation; and the possibility of staff resistance to the new system and its implementation. These themes are considered in the remainder of this section.

Organisational Complexity
It was shown in Chapter 2 that the complexity of both the organisations themselves and the ERP implementation is an issue that needs considering. For instance the research undertaken by Markus, Axline, Petrie and Tanis (2000) suggests that implementing ERP systems increase in difficulty when organisations are structurally complex and geographically dispersed. Both University Y and Z fall into Markus et al.’s category of organisations that have relatively simple structures, operating in one or a few locations and where the implementations experience less difficulty. Additionally, Willcocks and Sykes indicate that effort required for implementation increases with the number of modules and sub-modules being implemented and also that the number of users increased costs (2000).

The three universities in this research had different organisational environments in relation to their ERP implementation. University X, at the time of the ERP implementation, was a multi-campus organisation rapidly increasing in complexity in both the size of its operations and its global and national geographical spread. It implemented three ERP modules (in reality stopping after two because of the difficulties encountered with the first two). University Y and Z were both universities which were in periods of sustained growth experienced by most Australian universities during the period of implementation though not at the same rapid rate as University X. They were not increasing the complexity of the
operations and increasing their size in the proportions of University X. Both universities operated from one main campus with University Z having two smaller campuses in the same state and an off-campus operation for distance students. University Y implemented one ERP module and University Z was implementing their third ERP module at the time the research was undertaken.

These findings show that the differing levels of complexity of the three universities in this research support the literature as discussed in Chapter 2. The implementation of ERP systems increases in difficulty and effort when the organisation is structurally complex and geographically dispersed. Additionally, the number of modules and users involved in the implementation increases the difficulty of the implementation.

**Organisational Experience**

The findings presented in this Chapter show that the context of all three universities, in terms of their experience in implementing an ERP system, is perceived to be a particular issue that differentiated the three universities. University X was an institution where there was a decision to implement ERP technology in an environment where there was no history and experience of having implemented an ERP system previously. Perceptions of respondents were that senior staff at the institution did not appear, from the comments in both the focus groups and the interviews, to have the necessary knowledge and experience of what they were undertaking. They were viewed as believing that an ERP system was just another piece of software similar to previous software enhancements. This was supported by the views of staff at University X that the appropriate planning and preparation in the institution were not undertaken prior to the implementation. This included the IT planning for required upgrading of the hardware and architecture and the re-engineering of university processes which will be discussed in the next sub-question.

University X was the second institution in Australia to implement an ERP system and for some activities in their implementation was the lead institution in Australia. It could be argued from the evidence presented that being an early adopter in the
Australian higher education environment did not allow for information from senior staff in other universities to have reached these senior staff as to the complexity of an ERP implementation. Being an early adopter of new technology which was not a tried and tested product in the Australian market (it had been specially adapted from the US product designed for US higher education institutions for the Australian market) was a courageous decision in the circumstances. As discussed in Chapter 3, the implementation of an ERP system at this institution was undertaken in a period of rapid growth and expansion in terms of student numbers and campuses. Installing two modules in this increasingly complex institution was a risk identified earlier in the literature.

By contrast, the other two universities implemented their ERP module at a later time and were able to learn about the ERP module under consideration from the experience gained in other universities. One project staff member at University Y stated that “the University of New South Wales was the one that hoed the rocky road for us”. The data indicated that contextually these universities were more prepared for an ERP implementation compared with University X. Both universities had taken steps to prepare their institutions for the implementation in terms of re-engineering their academic administration processes. This was evidenced by the following comment provided by a staff member at University Z:

> Preparation for the project and setting the climate for the implementation of the system is critical. You can have the best system to implement in the world and poor preparation negates any benefits when the preparation is not done adequately.

As well University Y, though not having a history of an ERP system implementation, had waited until various other universities had implemented a student module and understood what was needed to prepare for an implementation. A quote from a staff member from University Y illustrates the preparation for the implementation:
University Y was well prepared for the change and the implementation as they had been prepared for the change that needed to occur and that they had already implemented an in-house web enabled student system and academic structures had been changed in preparation and there was already a strong IT structure in place to support the PeopleSoft system.

This is different to University Z which had undertaken an implementation of two PeopleSoft modules previously and therefore had experience in undertaking an ERP implementation. They had staff at the university at a range of levels, including at the senior level, who had experience gained from previously implementing two ERP modules. In this respect, project staff in the interviews suggested that the system was changed to fit in with university processes as they could not get staff to change their processes. This is a somewhat different perception to most of the other interviewees who perceived that the re-engineering was not undertaken to the extent that it should have been and that the university had to change to fit the new system.

We also need to be proactive and look at our processes and question as to whether we keep doing them this way prior to any upgrade. We need to refine our rules in an academic sense before we do any changes to the system.

As identified by the Gartner Group (2001), early adopters of any new technology are more likely to experience greater implementation difficulties than organisations which wait until the technology has been implemented in other organisations. This finding is demonstrated by the evidence obtained from the three universities in this research. The prior experience of ERP implementations of the three universities, or the learning able to be gleaned from other universities in the case of University Y, was shown to impact on the level of planning and preparation undertaken in the three universities and therefore on the outcomes of the implementations in this research.
**Organisational Culture**

The literature in Chapter 2 suggested that the climate and morale of the environment where the implementation occurs impacts on the ERP system implementation processes and outcomes. Bancroft, Seip and Sprengel (1998) reported that an organisation must understand its culture if an ERP is to be implemented successfully. Allen and Kern (2001) found that the academic culture made it particularly difficult to implement in a large ERP system in a university because of the particular structures and decision-making processes which are different to those in the corporate world. In this research the particular culture of a university was an issue identified in the data by staff in each of the three universities. As well the differing organisational cultures of a university and a corporate institution were observed by staff from all three universities who implied that the difference between the two were in the degree of staff resistance to the ERP implementation, with university staff much more likely to resist a new system. This perception is reflected in this quote from a staff member at University Z that “a university is much more of a democracy than a corporation – there is no guy at the top saying this is what will happen and it happens” exemplifies this perception.

Sumner (1999), in her study describing and identifying risk factors associated with enterprise-wide/ERP projects, concluded that some of the unique challenges in managing enterprise-wide projects included the challenge of re-engineering business processes to “fit” the process in the organisation which the ERP software supports. In a university, this re-engineering of processes poses a challenge for its particular organisational culture. This research has found that, to ensure an effective and efficacious ERP system implementation, the university sector may have particular issues relating to their unique structures and organisational decision-making capacities.

**Change Management**

Chapter 2 suggested that the development of effective change management strategies, including communication and training strategies appropriate to the
particular culture of the organisation, is an important issue. The literature suggested that change management strategies determine, in large part, the staff perceptions of an implementation process. Because of the particular culture of the university environment, where staff routinely question management decisions as a matter of course, different strategies for managing change and gaining staff acceptance and involvement require particular emphasis.

This data from the three universities demonstrated that staff responded positively to regular communication about the process of the ERP implementation, in language which ‘undersells’ the new system and is understood by all levels of the organisation, so that all staff are informed and understand what is happening. Further, the rationale for the system implementation needs to be clear to all sectors of a university. It was shown in this Chapter that leaving academics out of the planning and implementation processes, as was perceived to have happened at University X, was associated with increased staff resistance to the new system. The rationale for the student system implementation at all three universities was understood by all participants in this study as they all had student systems which were not able to cope with the increasing demands on them. However, the issue of replacing the finance system at University X was an issue about which staff expressed strong views. They saw that this had been a decision made in haste and as a result there was a great deal of resistance shown to this system implementation in particular.

Participants at University X highlighted the importance of clear and unambiguous communication to the university community about the implementation project. Less than comprehensive information appeared to cause unnecessary concerns among the staff. As discussed earlier in the Chapter, feedback from the focus group participants and interviewees indicated that there was a genuine concern that there would be losses of existing jobs as a result of the purchase and implementation of the new ERP system. Such a response was understandable in the light of the following example of communication about the new system benefits, expressed by the then most senior
executive staff member of the university, just prior to the initial ERP implementation, and cited by participants in the majority of focus groups and interviews:

_The system as presented to the university has the potential to make great cost savings for the university. The university will probably save 200 jobs and have a 48% return on investment._

A discussion paper by the implementation consultants, which became public concurrently to the view expressed above, proposed cost savings for the university of almost five million dollars. This figure, proposed as the long-term result of ERP implementation including the process being re-engineered, provided a rationale for the project. However, participants interpreted these cost savings as potential further job losses which subsequently lowered morale and increased resistance among staff to the implementation. In reality, implementation of the new ERP system and the changes that occurred in the same timeframe required increased rather than decreased staff levels.

The provision of timely and comprehensive training for staff has been shown to be an important change management strategy in this research. In particular, the additional training provided to staff at two of the universities in this study, as a result of the delay in the timing of go-live dates, was perceived to be very beneficial for training of staff and acceptance of the new system. Inadequate training and training support for the first stage of the project was identified by numbers of participants in all focus groups at University X. Training was limited to ‘too few’ staff, and there appeared to be no provision for relief staff to be employed while regular staff attended training. The timing of training was an issue identified by staff. Staff reported that access to the new system was delayed until a number of months after the training was conducted. The conduct of training too early in the implementation at University X was cited as a reason why staff were not comfortable with the new system in the go-live stage. In addition, staff were not given the opportunity to attend other relevant training in software packages (such as Excel and
basic accounting procedures) which would have assisted in more efficient usage of the new ERP system. The effects of this lack of training were compounded by a high staff turnover which resulted in trained or expert users being lost to the organisation and a difficulty in finding the time to train new staff adequately.

In summary, the findings in this Chapter show that the change management strategies at Universities Y and Z were perceived positively by staff at both universities. Comments related to the need for more change management resources at both universities by an observation were exemplified from a manager at University Y that even though they had a dedicated change management team “we underestimated the need for change management”. On the other hand, participants reported that staff were 'change weary' at University X and that, overall, appropriate change management strategies for the first stage had been ineffective. The university had been through a period of intense change in the years preceding the implementation, including the rapid growth of student and campus numbers. The administrative area primarily impacted by the first stage of the project had a history of particularly poor morale and a turnover in senior leadership that was not addressed by the organisation during the period of implementation. Participants also cited negativity and the failure to include academics in the change process as further critical issues which were neither identified nor addressed at all in the first stage. This research shows that the particular context of an institution, such as the one at University X at the time of the ERP implementation, may require more attention to be paid to planning and managing appropriate change management strategies than at other institutions. That participants in the other two universities in this study reported an underestimation of resourcing and time needed for change management in their institutions suggests that this is an aspect that requires an increased emphasis in a university ERP implementation.

**Resistance to Change**

The research on ERP systems in universities discussed in Chapter 2 supports the contention that there is some evidence of staff resistance to information systems
implementations. Moreover, the foregoing data shows that managing the resistance to an ERP system was an issue to some extent in the contexts of all three universities in this investigation.

One aspect of the particular context of an implementation of an ERP system was that it was likely to affect the perception of power redistribution in an organisation, whether or not this was real or otherwise, according to Randolph and Main (2005). Randolph and Main (1995) reported that the typical reaction to the perceived power redistribution was likely to be some sort of resistant behaviour in the form of unconstructive political behaviour or the development of shadow systems. Markus (1983) described a number of activities indicative of resistance to new systems in organisations such as frequent complaints about the new system, parallel operation of both the new and old systems, poor cooperation in dealing with problems and avoidance of the system.

Staff in all three universities indicated that they were aware of staff who resisted using the “cumbersome new system”. For instance, a staff member at University Y, where the implementation was generally reported to be well received by the staff, indicated that she did not use the new system at all and arranged for a more junior staff member to use it on her behalf. A recurring theme showing the level of resistance by staff at University X, in both the focus groups and interviews, was that shadow systems were in constant use by staff in many areas of the university as an alternative to using the new system. Numbers of staff at University X reported that the new system could not provide the data and reports that they needed to be able to do their job. This was exacerbated by the reported situation of not being able to access the finance system for a substantial period of a year during and after the implementation at University X.

All three universities investigated showed forms of resistance to change in varying degrees. The staff member at University Y, cited above, reported how she was able to avoid using the system and a staff member at University X described how she had
two computers on her desk – one displaying the old system and the other the new system. Further, the evidence of personality conflicts and resistance by staff to the ERP system at two of the universities impacted to varying degrees on the outcomes achieved at their institutions. It was perceived that the personality conflicts at University X impacted considerably on the implementation. The resistance to using the new finance system was partly attributable to the absence of a perceived rationale for the finance system being replaced. Two staff interviewed at University Z reported some personality issues which had caused some difficulties in the earlier implementations of modules at their university. Staff at University Z described one senior staff member’s current role in the implementation as doing considerable mediating and negotiating between staff rather than his technical role. At University X, personality conflicts were commented on by nearly all focus groups and interviewees. The existence of shadow systems across the organisation was reported by many staff. However, the evidence of staff resistance was most pronounced in University X.

The staff perceptions in this study show the existence of staff resistance to the changes accompanying their ERP system implementation. These resistant behaviours, as previously identified by Markus (1983), were displayed to some extent by the staff involved in all three university contexts in this study.

4.5.1.2 Process Issues

As discussed in the ERP and CSF literature in Chapter 2, there are a number of issues that underpin an effective and efficacious ERP implementation process in any organisation. The themes identified from both the findings from this Chapter and the literature on ERP implementation processes include leadership of the implementation, effective project management and the appropriate management of external consultants. As the influence of the context underpins all other aspects of an organisation there is also a discernable impact of the context on the process of ERP implementations in all three universities.
Leadership

As revealed in the literature in Chapter 2, senior managers need to have a high level of responsibility in an ERP implementation to ensure that the particular context is considered and that the implementation is supported by the appointment of an identified sponsor and an effective project manager and team. The responsibility of senior managers includes the appropriate management of consultants and ensuring appropriate planning and monitoring across the organisation (Somers & Nelson, 2001; Livingstone et al., 2002; Skok & Legge, 2002). Furthermore, the literature review demonstrated that leaders are responsible for ensuring that change is effectively managed. This includes the re-engineering of processes prior to the implementation and the development of appropriate staff consultation and communication strategies, including the training of staff and the effective management of staff workloads (Kotter, 1996; Aladwani, 2001; Skok & Legge, 2002). It was also shown in Chapter 2 that top management support is a critical factor in the outcome of an ERP implementation. If support is low then the ERP implementation is considered a failure and if it is high then the implementation is generally considered a success (Akkermans & van Helden, 2002). In this chapter it was shown that the perceptions of the staff at the three universities about the quality of leadership of implementations at their institutions appeared to impact directly on the course and efficacy of their implementations.

In this Chapter it was shown in the findings from the focus groups and interviews with staff at University X that the institution appeared to have difficulties in coping with the new system implementation and ensuing changes. There was a widely held view expressed by participants that leadership and planning issues were a major impediment to the success of the ERP implementation. It was viewed that senior management had not sanctioned the ERP project unequivocally and neither did they fully understand the magnitude of the consequent changes to the organisation. Participants also cited related impediments which were perceived as being derived from senior management’s neglect of high level coordination and planning processes, in a range of key strategic priorities for the organisation. Most
participants expressed difficulty in understanding the rationale for implementing the finance module prior to the student administration module, which held the place of perceived highest priority.

Furthermore, senior management was viewed as lacking both an understanding of the scope of the project and the capacity to manage the potential and real risk factors impeding the progress of the implementation. The data presented in the chapter alluded to a lack of a clear ‘champion’ for the project, as was evidenced by the number of changes to the structures of committees and staff responsible for the project. Participants commonly cited the poor relationship between two senior staff, in areas critical to the project, as a risk factor that impacted negatively on the outcome of the first stage of the implementation. Staff commented that they were aware that there were tensions between the senior staff and failed to understand why the senior executive of the university did not address this problematic relationship and the ensuing consequences. As well, communication from the senior managers was an issue affecting the leadership of the implementation. Focus group and interviewee data both indicated that there was a genuine concern about losses of existing jobs as a result of the purchase and implementation of the new ERP system. Participants interpreted the cost savings as potential job losses and this subsequently lowered morale and encouraged resistance. In reality, as discussed previously, implementation of the new ERP system required increased rather than decreased staff levels as reported by staff at University X.

By contrast, staff at University Y and Z had very different perceptions of the leadership of their implementations. At both universities there appeared to be good support from senior leaders and, consequently, adequate preparation and planning undertaken for the implementation. The reason for the differences between the three universities may be related in part to the difference in experience of prior ERP implementations and the early adoption by University X. Interview data from University Z indicated that there was a need to explain to the Vice-Chancellor about why the project was not precisely costed. However, the rest of the staff at the
university appeared to perceive that there was senior support for the project. This support is reflected in the positive perceptions generally for the implementation efficacy.

**Project Management**

The literature in Chapter 2 demonstrated that senior management support underpins a number of other factors associated with the effectiveness of the implementations of technological changes. The responsibility for initial planning and development of the scope of a system implementation usually rests with senior management initially, and is then delegated to project managers. Davenport (1998) and Frantz (2001) warned against the delegation of the implementation project to technologists and additionally Milford and Stewart (2000), reported that project managers who are appointed from technical staff and who employ technological project managers are associated with ineffective implementations. Milford further reported that ERP implementations were “likely to have difficulties due to technical issues being given more importance than the people issues”.

Data presented in this chapter suggests a relationship between the involvement of project managers from within the organisation, chosen for their people management skills rather than technical expertise, leading to the greater satisfaction of staff with the university implementations. For their implementation projects University Y and University Z apparently both chose managers who were highly regarded people managers. Both managers commented that they had very little technical knowledge when they started in the roles. Yet, the staff perceptions of both these managers were extremely positive. Staff at both University Y and University Z described the managers’ capacity for problem solving and people management skills in addition to their capacities for motivating staff across the universities to support the implementation project. Both these project managers were involved in the decision-making process to delay the timeframe for go-live dates on these projects. These decisions were perceived very favourably by staff at both universities.
On the other hand, the project manager appointed for the implementation project at University X was an external appointment who had been involved in a large public sector implementation. This project manager had a track record of previously working with the consultants engaged in the implementation at University X. The staff perceptions of this project manager were very different in nature to the perceptions of the managers at the other two universities. While the project staff interviewed at University X viewed this project manager as having a great deal of technical knowledge about the system, the other university staff mostly perceived the project manager to be aligned with the consultants and did not speak positively about his capacities. The go-live dates at University X also were not changed as in the other two universities and were viewed by staff to be very tight. In addition, the composition of the project implementation team included the careful use of consultants and ensuring that work conditions were similar to the rest of the organisation was important. The interview data revealed that the impact on University X of not ensuring equity of working conditions created a morale issue for all staff involved.

The management of the issue of increased staff workloads surfaced as an important issue at University X and the tight timeframes for the implementation project were viewed as a factor impacting on the workloads. Overwhelmingly, the unforeseen increase in staff workloads as a result of the implementation of the new ERP system was identified as the major impediment for many staff. This increase in workloads for staff is cited by a number of the papers describing the management of change projects in the US higher education system. The workload increase appeared to be related to the less than effective planning in the organisation for both the ERP implementation and other activities, as discussed in Chapter 3, impacting on the context of the university at the time.

The results of the foregoing are supported by the literature in Chapter 2, which found that in both US and Australian universities and colleges, workloads for staff tend to be underestimated when implementing ERP systems. Ensuring that the
resultant workload issues are managed for staff is also necessary in any planning of an implementation project. It appears that the increase in the workloads for administrative staff was shown at all three universities and this is related in part to the increased complexity and capacity of the new information system which involves a greater number of keystrokes to enter data. However, it is in the consequent management of workloads of staff where the differences between universities occur. University Y and University Z appeared to have better understood these consequent workload issues, possibly related to some of the issues discussed in the context section where they were able to learn from previous implementations, and attempted to ensure that there were strategies in place to deal with it. The project managers at both University Y and University Z, chosen for their people skills and university knowledge, in addition to the more effective planning strategies, may have also contributed to the better management of staff workloads at these universities.

**Management of Consultants**

In Chapter 2 the literature based on university implementations reveals that external consultants need careful management to ensure that the organisation obtains value for money and skills transfer to the organisation (McCredie & Updegrove, 1999; Smith, 2000; Sumner, 2000). Additionally, consultant-driven ERP implementations can be a factor leading to failure (Marsh, 2000). This chapter has shown that staff perceptions at the three universities differed in relation to the three universities’ management of consultants involved in their implementations and the ensuing outcomes. University Y, which had implemented ERP modules previously, was perceived to manage their consultants effectively and benefited from their involvement. University Z staff were viewed as being on a learning curve in relation to their management of consultants. They had a few issues in relation to the management of consultants at the start of the project and then were perceived to manage their consultants positively with comments about the benefits of the consultants’ involvement. Neither university’s implementation was viewed by staff to be controlled by their consultants.
Perceptions regarding the use of consultants at University X were that most participants expressed concern that senior executive assumed a subordinate position in relation to the corporate partners and considered that the ERP project preferably should have been managed by senior university staff. Staff believed that the corporate partners clearly managed the implementation. Staff perceived that there did not appear to be workable links between user groups of staff and senior management. The external corporate partners were perceived to control the user group processes and committees responsible for the project. A number of the focus group participants articulated concern about the negative impact engendered by perception of close relationships between particular senior university staff and corporate partner staff. Comments suggested that cultural differences, between the university as a whole and the implementation partners, impacted on the relationship between the two. The project staff at University X recognised the “them and us” culture of the project and the university staff. They commented that the consultants and project staff “were hated” by university staff. This was not a positive situation for a group of university staff (or for the consultants) who were working very long hours to implement a new system on behalf of an institution. Further, participants at University X expressed the view that their suggestions were not valued in the scoping of the new system and that an accompanying re-engineering of university processes was not undertaken to any appropriate extent. Staff at University X perceived that consultants’ control of the project was the reason for this situation.

Staff perceptions regarding the role of consultants in the three universities showed different experiences in each institution. The difference in the experience of the processes undertaken in their implementations is partly attributable to the difference in each of the contexts of the universities researched. The project staff at University Z perceived that the consultants appeared to control the implementation project in the first stage and then it was equally shared between the university and the consultants. They did recognise that this was not a positive state of affairs and ensured that the management of the consultants was changed. University Y had previous experience with consultants and was able to obtain value from their use.
The experience at University X is supported by the literature on consultant-driven implementations leading to difficulties in ERP implementations. This finding is consistent with that of McCredie and Updegrove’s (1999) who found that it is important to manage the role of the consultant in a university, a finding particularly relevant to the staff perceptions obtained from this study.

4.5.1.3 Other Issues
A number of additional issues which may have particular relevance for university implementations emerged from the data and these are now briefly considered. As discussed in Chapter 2, the literature from US higher education institutions alludes to the positive benefits from both delayed go-live time frames for universities and the value of developing and maintaining positive vendor relationships. These two issues were also identified in the data from the focus groups and interviews in this research. One other issue identified in this data concerned the connection between ERP implementation outcomes and vanilla ERP implementations. The CSF literature and the higher education literature report better outcomes with vanilla implementations. This section will discuss these issues identified from the data on the three university implementations.

Delayed Go-live Timeframes
Perceptions towards change and the adoption of new technology became more positive following a delay in timeframes in the implementations at Y and Z universities in this research. This positive attitude towards the delayed timeframe for university implementations is contrary to the view in the literature from the corporate sector which values keeping to specified timeframes for a successful implementation (Livingstone et al., 2002). If more time is needed for an implementation this was shown to have positive consequences in a range of areas for both implementations and may be a strategy that works well for the higher education sector (Livingstone et al., 2002). The additional training provided to staff because of the delay in timeframes had a positive effect on staff. There were comments from the staff that this decision had a positive effect on staff morale as the
pressure was perceived to be lifted from staff on the project and in areas of the university involved in using the new system. The manager of one of the projects said that she burst into tears after the decision was made to extend the timelines as she felt the pressure had been lifted from her. Managing timeframes and workloads and minimal changing of the software system are additional issues for close attention in universities.

Vendor Relationships
Vendor relationships are particularly important for the higher education sector in relation to the PeopleSoft product that was originally developed for the US market (as discussed in Chapter 1). The PeopleSoft student module was the common module implemented by all three universities. This module had to be modified for the Australian context with particular elements being required for inclusion by the federal government. An effective relationship with the vendor was necessary to be able to influence the necessary changes made to the PeopleSoft product. It was reported that, generally, the relationships between senior staff at University Y and Z were very positive and productive. The senior managers at both universities perceived that they were able to raise issues with PeopleSoft when they needed to and have those issues responded to promptly. At University X, some of the interviewees perceived that the project manager had a less than satisfactory relationship with the software vendors. As University X was an early adopter of the ERP module it needed assistance from the vendor to iron out any problems. As the student system was a new product the software required considerable work to be done in a few areas of the software so it would work in Australian conditions. It was perceived that this relationship could have been better managed in the circumstances and that vendor relationships are important to foster and maintain, particularly as the university sector is not the core business focus for the particular products.

Vanilla Implementations
From the literature on ERP implementations in US and Australian universities discussed in Chapter 2, it appears that institutions where the software was not
greatly customised or was implemented as a vanilla version had more successful outcomes (Feemster, 2000). Implementing vanilla versions of the software presupposes that the re-engineering of university administrative processes had been undertaken prior to the implementation. The undertaking of re-engineering is in turn dependent on appropriate planning for the implementation prior to the start of an implementation. Process re-engineering needs to be undertaken prior to the implementation rather than during the implementation, as was attempted at University X. This is necessary to enable a vanilla version of the ERP to be upgraded more easily later. The vanilla implementation at University Y was able to be undertaken because of the re-engineering of university processes undertaken prior to the adoption of the ERP system. The implementations at University X and University Z were less vanilla versions than intended. However, all three universities were attempting to support a vanilla implementation with the aim of obtaining more positive outcomes for their institutions.

The foregoing discussion of the other issues identified in this data showed that even though both the corporate and university environments aimed for a specific go-live date, universities might benefit from delaying the go-live date. This was shown to have beneficial outcomes for two of the universities in this study. The discussion also showed the value of developing good vendor relationships in universities in order to maintain the ERP vendors’ responsiveness and support. It is a recommended strategy for all organisations to implement a vanilla ERP system, and this is particularly so for universities which are particularly complex and diverse corporate structures.

4.6 Conclusions
This chapter has presented the results of the research carried out to investigate the issues impacting on ERP implementations in three universities in relation to research Question 1. The evidence has shown that staff in different universities reported varying experiences of the implementation of Enterprise Resource Planning systems. The varying experiences perceived by staff highlighted the significance of the
particular context of universities and of preparedness for an ERP implementation underpinning the planning undertaken prior to an ERP adoption.

Further, the staff at the three universities, in both the focus groups and interviews, identified the important CSF from the ERP literature as impacting on their ERP implementation. They recognised the importance of senior management responsibilities in relation to ERP implementations that is acknowledged in all the ERP literature. Further, they identified the need for careful planning, BPR and appropriate change management strategies as responsibilities of senior management.

In addition, there were some other issues identified that can be discerned as particularly important for consideration in university ERP implementations as opposed to corporate implementations. These were the management of consultants, project management capacities, vendor relationships and possible benefits from delaying go-live dates. It can be concluded from the research that, according to these staff perceptions of ERP system implementations, though there are many similarities in approach for an ERP system implementation in all industries, there are particular issues that impact on universities. These need more careful consideration than in other industries to achieve an effective and efficacious implementation.

The findings from the data analysis coupled with the synthesis from the literature have been summarised and are presented in Table 4.25.
Table 4.25 Summary of ERP implementation findings

1. The readiness and preparation of the institution is an issue that needs to be considered prior to the adoption and implementation. From this research, it appears that the careful consideration of the contextual influences underpins all other findings. There may be a time and place for an ERP system implementation.

2. There was evidence that demonstrated senior management support, commitment and sponsorship is related to the outcomes of the ERP project. Without this aspect of the implementation being in place, the literature and this research show that there is a direct relationship to the success or otherwise of this aspect.

3. The conduct of a detailed planning process underpinning the effective management and control appears to affect the effectiveness of an implementation project. Results show that an ERP implementation is more than a technology implementation as it requires planning to be undertaken for the whole organisation.

4. Managing staff perceptions and ensuring user involvement appear to be central to the success of an ERP implementation as this can minimise the resistance of staff to the new system.

5. The re-engineering of university processes needs to be addressed prior to the implementation of the system and involvement of staff in the change processes.

6. Workloads for many staff are affected by the ERP implementation and if not addressed appear to affect the process of the implementation and the new system.

7. A clear rationale for the ERP implementation will enhance the level of staff acceptance and minimise staff resistance.

8. Management of the resultant impact of the resistance to change in the organisation accompanying the system implementation including difficult personalities, egos and politics which can affect an implementation.

9. Selecting project managers from within the organisation, for their people management skills and problem solving capacities rather than technical expertise, was shown to lead to greater satisfaction of staff with their university’s implementation.

10. Delayed go-live timeframes and implementation of vanilla software enhanced staff satisfaction with the implementations.

11. The composition of the project implementation team is an important consideration.

12. This study found that the careful use of consultants and ensuring that work conditions are similar to the rest of the organisation were important.

13. Vendor relationships can affect the ERP implementation. It was found that vendor relationships need to be fostered and maintained as the higher education sector is not the core business focus for these vendors.

14. The provision of change management strategies appropriate to the organisation’s culture and context including communication strategies and training for staff on the new system are necessary.

15. This includes managing expectations including being honest about and “underselling” the benefits of the new system and the progress of the implementation.

16. Appropriate management of the role of the consultant in a university implementation project.

17. The conduct of a project review to learn lessons from the experience of the implementation is important to learn for future implementations.

18. Planning to be undertaken for post implementation system support early in the planning phase.
In conclusion, it has been demonstrated in this study that senior managers have a responsibility to ensure that the particular context of the institution is considered in planning for the adoption and implementation of the ERP system. Staff from the three universities perceived that the quality of leadership of implementations at their institution appeared to impact directly upon the course and efficacy of their implementations. Managing the organisational culture and change in organisations is critical to the outcome of the implementation. Senior managers also need to ensure that an ERP system implementation is demonstrably supported by the appointment of an identified sponsor. Managers also need to ensure effective project management, which includes the consultants and project manager and team choice and that appropriate planning and monitoring occurs across the organisation. Staff consultation, communication, managing the potential staff resistance to change and re-engineering of processes prior to implementation are also necessary responsibilities of senior management. Additionally, managing timeframes, workloads, training and minimal customisation of the software system are additional issues for close attention in universities.

The data presented in this chapter clearly shows that the environment or context in which the implementation occurs impacts on the process and outcomes of the project. This context includes the institution’s structure and processes, its experience of ERP implementations, readiness for change, and its culture and leadership capacity. An assessment of the particular context underpins the planning needed in preparation for an ERP adoption and implementation. The results intimate that the process of the ERP implementation is impacted upon by the quality and appropriateness of the planning processes and by the capacities of the leadership of the implementation. Furthermore, it has been shown that both the planning processes and leadership affect the way an ERP implementation progresses, its acceptance by staff and whether the ERP delivers the planned outcomes for the institution. The literature and findings from this data show that staff resistance to change is a further feature of university ERP implementations (Allen & Kern, 2001). In this respect, staff perceptions have been shown in this study to be an accurate
barometer of the progress and outcomes of ERP implementations in their universities and therefore can be used to monitor the course and outcome of other ERP system implementation in other universities.

The foregoing discussions have been used as a basis to generate a framework for the development of a set of guidelines for implementing an ERP system in an organisation and in particular in a university. The issues identified in this study provide a preliminary outline for the development of a set of guidelines for the management of ERP implementations based on the foregoing results as specified in Research Question 2. Further analysis of the findings should allow this research to refine these requirements in the next Chapter. The next Chapter provides the conclusions and consideration of the implications of these results. It articulates where this investigation sits in the context of the ERP system implementation literature and considers future directions for ERP system research in the higher education sector.
Chapter 5

CONCLUSIONS AND RECOMMENDATIONS

5.1 Introduction

This chapter presents the conclusions and implications arising out of an examination of the staff perceptions of the issues impacting on the implementation of Enterprise Resource Planning systems in three Australian universities. The previous chapters have provided background information on this two phase investigation and examined the literature and methods used to investigate the issues impacting on the efficacy of the implementation of Enterprise Resource Planning (ERP) systems in Australian universities. The data from both phases of the investigation have been compiled and analysed and the results described in detail in Chapter 4.

In this chapter the discussion turns to the implications of the findings presented in Chapter 4. These research findings, in combination with the synthesised literature presented in Chapter 2, have been used in the development of a set of guidelines for the effective and efficacious implementation of an ERP system in an Australian university. The contribution of this investigation to the knowledge and practice of the management of ERP system implementations in the higher education sector is highlighted. It also considers the research design and study limitations as part of the conclusion. Finally, suggestions for further research and concluding remarks are presented.

5.2 Research Question Findings

This section presents the conclusions from the findings described in Chapter 4. Each research question presented in Chapter 1 is considered by drawing together the findings from the literature in Chapter 2 with the analysis undertaken in Chapter 4.
5.2.1 Research Question 1

Research Question 1: How do the context, process and other issues, as perceived by staff, affect ERP system implementation processes in the Australian higher education sector?

5.2.1.1 Context

How does the context, as perceived by staff, affect ERP system implementation processes in the Australian higher education sector?

The findings from the three universities presented in Chapter 4 demonstrate how different organisational contexts and stages of preparedness can influence the process and outcomes of ERP implementations in the higher education sector. As discussed in Chapter 2, Esteves and Pastor (2005) and Allen and Kern (2001) reinforced the importance of the impact of the particular organisational context and culture in implementations in both Spanish and UK universities. The examination of ERP system implementations in varying contexts at various stages of preparation and readiness for ERP implementation has demonstrated the importance of the context of the three universities in this research. The three universities show similarities and differences between their implementations and the impact of their particular institutional contexts on the course of an ERP implementation as is now briefly considered.

The findings from University X showed that staff perceived that senior management did not appear to understand the ramifications of implementing an ERP system. Further, staff also perceived that the ERP technology was implemented in an environment where there had not been adequate preparation and planning. University X was an early adopter of an ERP system, one of the first universities in Australia to undertake an implementation of PeopleSoft. For this organisation, the additional complexity of early adoption of a product in the emergent stages of its development for the Australian market added an extra layer of difficulty and this has been previously alluded to by Gartner (2001). Concurrently with the implementation of an ERP system, this institution was increasing in complexity as a result of rapid
growth of student numbers and campuses. It was shown, both in the literature and the findings from this research, that the number of modules and the complexity of the institution are other issues that impact on the efficacy of an ERP implementation. By contrast with University X, the other two universities implemented their ERP modules at a later time and thus were not early adopters of this technology; nor were these universities as complex in operations as University X.

As reported by McConachie (2002) in Chapter 2, staff at University X had experienced a great deal of change associated with a period of expansion and staff were “change weary” and unsupportive of further changes at that time in the development of the institution. On the other hand, University Y and University Z appeared to be in an improved state of readiness compared with University X. This is evidenced by the acknowledgement by staff involved in this study at these universities that steps had been undertaken to prepare their institutions by re-engineering their academic and administrative processes prior to the implementation. The staff at University Y reported the institution had undertaken an extensive review of their academic processes in the year prior to the choice and adoption of the ERP system (Table 4.10). Some of the staff at University Z had experienced the previous implementation of two PeopleSoft modules and, though they realised that it put extra pressure on the staff at the institution, they were supportive of the student system being replaced. As one senior manager reported at University Z, they had been ‘pioneers’ previously and now they were the ‘settlers’ in relation to the implementation of the new student system. The findings from this research showed that the three universities were in different states of preparedness for an ERP implementation and that this impacted on the course and outcome for the implementation in each institution.

Further, the data from University Z cited in Chapter 4 (Table 4.11) showed that the staff were clear about the rationale for its replacement. Staff at University Y were also clear about the rationale for the replacement of the student system, whereas the staff at University X were ambivalent about the replacement of both systems. As
discussed in Chapter 4, most staff were supportive of the student system being replaced; however, some staff did not understand the rationale for replacing the finance system (Tables 4.2 and 4.9). Additionally, also discussed in Chapter 4, a negative climate for support for the ERP was engendered by the Vice –Chancellor’s comments about what the new system would deliver to the institution and this did not appear to enhance staff engagement with the implementation. The foregoing results provide evidence that staff perceptions of the rationale, and therefore the need for the new system, is to be clear to staff so that they are supportive, rather than resistant, to the implementation from the start of the process. This issue is related to the issues of leadership and appropriate change management strategies.

The above findings from this research show that the climate and morale of the environment where the implementation occurs can impact on the ERP system implementation processes and outcomes. The staff perceptions in this study show that staff resistance to change was evidenced to some extent in each of the universities. The concurrent personality conflicts and resistance by staff to the new ERP system reported at two of the universities were found to be related to resistance to changes occurring as a result of the ERP implementation. In this respect it was shown in Chapter 2 and in this study that the existence of a number of the indicators of resistance to new systems are likely in ERP implementations in universities in particular. Indicators of resistance that were identified in this study included complaints about the new system, poor cooperation in dealing with problems and avoidance of the system or using shadow systems. The significance of these findings is that the particular culture and personality conflicts of a university are not easily resolved and can impact on the ERP system outcomes. For instance, the staff at University X perceived that there were substantial impacts on the process and progress of the implementation as a result of unresolved personality conflicts. As was shown in Chapter 2 the culture of universities is one where staff routinely question management decisions. Finding appropriate strategies for managing change and gaining staff acceptance and involvement requires particular emphasis. The significance of these findings is that, depending upon the particular culture of a
university, personality conflicts may be a feature of an implementation and if not managed they can impact on the outcomes achieved at their institutions.

Because of the particular environment, culture and context of a university the outcomes of this research suggest that more attention by senior managers and project managers needs to be given to the issues of front end planning and organisational preparation for ERP implementation. This includes preparing the staff for the change associated with the ERP implementation. In this respect the rationale for the system implementation needs to be clear to all sectors of the organisation including academics. Furthermore universities are very different in nature to businesses; more attention needs to be paid to the change management issues required to prepare staff for the accompanying changes to the organisation and its processes. This suggestion is supported by the researchers such as Pollock and Cornford (2004) who found an ERP implementation is based on a core set of business processes which do not easily translate into a university environment. Therefore more careful management of the adoption and implementation of an ERP system, in addition to the planning processes, is required in a university context in order to achieve an effective and efficacious ERP implementation.

5.2.1.2 Process

*How does the process, as perceived by staff, affect ERP system implementation processes in the Australian higher education sector?*

As considered in Chapter 4 and in the previous section, staff in different universities report varying experiences of the implementation of ERP systems depending on their particular organisational experience of an implementation. In this research, University Z had implemented two ERP modules previously and had experience of what was required to implement another module. University Y had not had prior experience of an implementation, similar to University X; however, the senior managers were aware of the difficulties experienced by other universities implementing ERP modules and chose to delay their implementation.
It was found in this research that leadership is one of the most critical issues impacting on the efficacy of an ERP system implementation and is consistent with that reported in the literature. As discussed in Chapter 2, top management support has been shown as a critical factor in the outcomes of information systems implementations in the corporate sector (Cooper et al., 1990; Davenport, 1998, 2000; Hall, 1999; Whittaker, 1999; Butler, 2000; Milford & Stewart, 2000; Cotteleer, 2001; Somers & Nelson, 2001; Akkermans & van Helden, 2002; Skok & Legge, 2002). Similarly in this study, it has been shown that senior management’s role in an ERP implementation is particularly vital to the outcome of the implementation in the university sector.

A conclusion is that for a successful ERP implementation to occur, senior managers need to ensure that the ERP system implementation is supported by the appointment of identified sponsors and to use effective project management strategies and processes. These include the appropriate management of consultants and project manager choice, and appropriate planning and monitoring across the organisation. Managers also should ensure that change is effectively managed including the re-engineering of business processes prior to the implementation, appropriate training of staff and the effective management of staff workloads. It follows that developing strategies which address staff consultation and communication are also the responsibility of senior management. Managing timeframes and minimal changing of the software system may be additional issues for close attention in universities as reported in Chapter 4.

The findings of this research also provide further evidence, as previously reported in the literature by Milford and Stewart (2000), that the choice of project managers from within the organisation, chosen for their people management skills rather than technical expertise, leads to greater staff satisfaction with university implementations. There is also evidence from these findings of a relationship between the degree of staff involvement with the projects and their degree of satisfaction with implementations. As discussed in Chapter 4, at University Y and
University Z, where both managers were chosen from within the organisation, staff perceived many benefits at all levels of the organisation from this choice. At University X, where a project manager was employed from outside the organisation, staff perceived this as a less than satisfactory appointment. This contributed to the internal conflicts between staff which impacted negatively on the implementation outcomes. More attention needs to be paid to this aspect of an implementation in a university by senior management.

Thus the foregoing intimates that the development of appropriate change management strategies, including communication strategies, appropriate to the particular culture of the organisation is important. Furthermore a need for regular communication about the changes was demonstrated. This needs to be done in language understood at all levels of the organisation, so that all staff understand what is happening. A particular issue relevant to the higher education sector, as shown in the data in this study (Table 4.19), is to ensure that communication strategies are honest with staff to “undersell” rather than “oversell” the benefits of the new system and the progress of the implementation. Finally the provision of timely and comprehensive training for staff at all levels of the organisation was shown in this research as an important issue for ERP implementations. This was reflected in the results presented in Chapter 4 which showed that the additional training provided to staff at two of the universities was perceived to be beneficial for their implementation. However, as discussed in both the literature and the findings in this study, the provision of appropriate change management strategies is dependent on the level of demonstrated support and planning undertaken by the leadership of an ERP system implementation.

5.2.1.3 Other Issues

How do other issues, as perceived by staff, affect ERP system implementation processes in the Australian higher education sector?
The additional issues, identified in Chapter 4 from the data and analysis, which can impact on ERP implementations in universities, are briefly considered below.

It was evidenced in two of the universities in this study that staff attitudes towards change and the adoption of new technology became more positive following a delay in timeframes in a large university implementation in contrast to the literature from the corporate sector which values keeping to specified timeframes. This has some support from the literature as discussed in Chapter 2; however, more research needs to be undertaken in this area for the higher education sector as the literature from the corporate sector supports keeping to specified timeframes (Livingstone et al., 2002). In this research, the delay of timelines in two of the universities was shown to be a beneficial strategy for the higher education sector. The additional training provided to staff because of the delay in timeframes had a positive effect on staff. This appears to be supported by this study where, in two of the universities, the delay in time frames resulted in positive outcomes for the implementation.

From reports on ERP implementations in US and Australian universities, it appears that universities which did not greatly customise the software or had implemented a vanilla version of the software had more successful outcomes (Feemster, 2000; Pollock & Cornford, 2004; Esteves & Pastor, 2005). This research supports the view that a vanilla implementation leads to more positive implications for the universities. Implementing vanilla version of the software presupposes that business process re-engineering (BPR) has been undertaken prior to the adoption of the ERP, as was the case at University Y. The undertaking of BPR is in turn dependent on appropriate planning for the ERP implementation prior to its commencement. A number of changes were apparently made to university processes prior to the implementation at University Z but staff perceptions revealed that they “had to customise the system to fit the organisation”. BPR needs to be undertaken prior to, rather than during, the implementation as was attempted at University X. Staff perceptions revealed that one of the difficulties for the implementation at University X was the inability to undertake process re-engineering during the process of the implementation and thus
the system required modification to cater for the university’s processes. If BPR is not undertaken prior to an implementation this results in less beneficial outcomes from the implementation of the new system in an institution (Esteves & Pastor, 2005). A further benefit of a vanilla version of the implementation of an ERP is the capacity to be able to upgrade the system more easily at a later stage.

The literature in Chapter 2, for example Romm Livermore (2005), suggests it is important that the project implementation team comprises the ‘best’ business and information technology people, and that consultants are managed carefully to ensure that work conditions in the project are similar to the rest of the organisation. This research has shown that the management of consultants by the institution is an issue that needs to be done carefully (McCredie & Updegrove, 1999; Smith, 2000). It appears that in both US and Australian universities and colleges workloads for staff were greatly underestimated, which resulted in increased workloads and resultant workplace issues from the implementation of ERP systems (McCredie & Updegrove, 1999; Smith, 2000; Van Dyke & Sinclair, 2003). It follows that ensuring that the resultant workload issues are managed for staff is also necessary in planning and managing an implementation.

As discussed in Chapter 2, vendor relationships need to be nurtured and maintained by senior managers in universities, especially when the sector is not the core business focus for the particular products being implemented. This issue is particularly important for the universities in relation to the student ERP module which was commonly implemented by all three universities in this study. This module required modification for use in the Australian higher education context with particular elements being requested for inclusion by the federal government. A supportive relationship with the vendor was necessary to be able to influence the required modifications to the PeopleSoft product. As the Australian higher education sector is a comparatively small section of the global PeopleSoft market, a great deal of advocacy from customers in the Australian segment was required to achieve necessary changes made to the high education product. This was reported by staff in
all three of the universities as an issue affecting the outcome of their implementation. Staff perceptions revealed that fostering a positive relationship with representatives of vendors of the software by senior managers was a priority, particularly at University Z, and to a lesser extent at University Y. There were comments from staff that the less than adequate relationship between particular staff at University X and the vendor, impacted on the institution’s capacity to obtain timely modifications to the software.

5.2.2 Research Question 2

Research Question 2: What do these staff perceptions of ERP implementations reveal about an efficient and efficacious ERP system implementation in universities?

The foregoing conclusions based on Research Question 1 findings provide foundations for the development of the guidelines for ERP system implementations in universities. Specifically context and the level of preparedness of a university to implement an ERP system influence the process and outcomes of that implementation. It has been shown in Chapters 2 and 4 that satisfaction with the implementations increased commensurately with the level of staff involvement with the implementation projects leading to more positive outcomes for the ERP implementation. Characteristics that contributed to this were perceived senior staff commitment, a clear project brief, university management of the projects rather than the perception of external consultants managing the project, re-engineering of university processes prior to the implementation of the system and involvement of staff in the change processes. Furthermore it has been argued in this study that the involvement of project managers from within the organisation, chosen for their people management skills rather than technical expertise, leads to increased satisfaction of staff with university implementations. The universities which delayed their go-live timeframes and did not greatly customise their software had enhanced staff satisfaction with the implementations.
The identified issues, based on findings from this study in relation to Research Question 1, have been used as a foundation for the guidelines for ERP system implementations in universities, to address Question 2 of this investigation. In the development of an initial set of guidelines for the effective and efficacious implementation of ERPs the synthesis of conclusions from Chapters 2 and 4 provided the foundation of such guidelines and these are presented in Table 5.1. It can be seen from this table that a total of eighteen guidelines were generated.

Table 5.1 Guidelines for ERP Implementations in Universities

<table>
<thead>
<tr>
<th>Guidelines</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Readiness and preparation of the institution needs to be considered prior to the adoption and implementation.</td>
</tr>
<tr>
<td>2. The level of demonstrated senior management support, commitment and sponsorship provided for the implementation are related to the outcomes of the ERP implementation.</td>
</tr>
<tr>
<td>3. The conduct of a detailed planning process underpinning the effective management and control appears to affect the effectiveness of an implementation project.</td>
</tr>
<tr>
<td>4. Managing and monitoring staff perceptions and ensuring user involvement appear to be central to minimise staff resistance and enhance user acceptance of a new system.</td>
</tr>
<tr>
<td>5. BPR of university processes needs to be addressed prior to the implementation of the system.</td>
</tr>
<tr>
<td>6. Workloads for many staff are affected by the ERP implementation and if not addressed may affect the process of the implementation and acceptance of the new system.</td>
</tr>
<tr>
<td>7. A clear rationale for the ERP implementation will enhance the level of staff acceptance and minimise staff resistance.</td>
</tr>
<tr>
<td>8. Management of resistance to change, including difficult personalities, egos and politics which can affect implementations in universities.</td>
</tr>
<tr>
<td>9. Selecting project managers from within the organisation, for their people management skills and problem solving capacities rather than technical expertise.</td>
</tr>
<tr>
<td>10. The selection of a project implementation team comprised of a mix of IT and business staff.</td>
</tr>
<tr>
<td>11. Delayed go-live timeframes may be an option for university implementations to enhance staff satisfaction.</td>
</tr>
<tr>
<td>12. Appropriate management of the role of the consultant in a university implementation project and ensuring that work conditions for the project team are similar to the rest of the organisation.</td>
</tr>
<tr>
<td>13. Vendor relationships need to be fostered and maintained as the higher education sector is not their core business.</td>
</tr>
<tr>
<td>14. The provision of change management strategies appropriate to the organisation’s culture and context including communication strategies and training for staff on the new system.</td>
</tr>
<tr>
<td>15. Managing staff expectations including being honest about and “underselling” the benefits of the new system and the progress of the implementation.</td>
</tr>
<tr>
<td>16. Conduct of a project review to learn lessons from the experience of the implementation to learn for future implementations.</td>
</tr>
<tr>
<td>17. Minimal customisation of the software with vanilla implementations preferable.</td>
</tr>
<tr>
<td>18. Planning for post implementation support essential prior to go-live.</td>
</tr>
</tbody>
</table>
These guidelines, presented in Table 5.1, have been generated from the identified issues in the literature and findings from this investigation. If the staff at the three universities report a common issue or aspect affecting their ERP system implementations, either negatively or positively, this suggests that could serve as a basis for use in preparing the guidelines and considered to be a step in the guidelines. The way these guidelines can be utilised to facilitate effective and efficacious implementations of an ERP system is considered in the following sections.

5.3 Key components of an Effective and Efficacious ERP System Implementation in Universities

The literature and the findings from this study show that implementations of ERPs need to take into consideration a number of key issues that require particular focus in the university sector. These key issues have been identified as the context, planning, leadership, and management of the process and monitoring of staff perceptions and are briefly summarised below.

Firstly, the findings from this study show that for universities, there appears to be a time and a place to implement an ERP depending on the particular context of the organisation and its readiness to adopt an ERP. For example, University Y, after prior planning of its requirements, waited for an optimum time to implement a new system. It implemented a system that was appropriate to the organisation after undertaking a restructure of the academic year and associated processes. Process re-engineering needs to be undertaken prior to the start of the software implementation rather than during the implementation, as attempted at University X. This is necessary to be able to implement a vanilla version of the ERP which may be upgraded more easily later. Effectiveness of corporate information systems projects involves achieving planned outcomes in particular timeframes and within allocated budgets and this aspect was shown to be a possible point of difference in the process for ERP implementations in universities. Allowing more time if needed than had been originally planned for the implementation, was shown to be a strategy that
worked well for the higher education sector. Early adopters of new systems in a particular sector such as in a university context need to be especially prepared for the impact of undertaking an implementation in these circumstances.

Secondly, it was shown in Chapter 2 that the process of the ERP implementation is impacted by the quality and appropriateness of this planning and by the quality of leadership of the implementation. This research found that both the planning processes and leadership affect the way an ERP implementation progresses, its acceptance by staff and whether the ERP delivers the planned benefits to the institution. The other important issue to be addressed, that can influence an ERP system implementation, linked to senior management support, is the planning and preparation conducted by the organisation prior to the commencement of adoption and implementation of an ERP system.

Thirdly, the results from this study, supported by the literature, suggest that planning is an important component for an ERP implementation. A detailed planning process underpinning the effective management and control of the project requires planning to be undertaken for the whole organisation as “an ERP will effect the whole organisation” (Milford & Stewart, 2000, p.952). Because the whole organisation is affected, planning is critical to the outcome of the implementation and is therefore identified as a key component of the guidelines for ERP system implementations.

Fourthly, it was shown that demonstrated leadership by senior management was a pivotal component in an ERP implementation. This concerned the matter of support and sponsorship and the identification of a “champion” for the implementation. Without demonstrated senior management support staff perceptions revealed a direct relationship to the success or otherwise of an implementation. Specifically the role of senior management proved to be important in the three implementations in this investigation. This outcome is supported by the literature. For instance Akkermans and van Helden (2002) found that top management support is a critical
factor in the outcome of an ERP implementation. If support was low then the ERP implementation was considered a failure; however, if the support was high then the implementation was generally considered a success. Identified activities in Chapter 4 also associated with demonstrated senior staff commitment to the ERP implementation include the existence of a clear project rationale and brief, university management of the project rather than the perception of external consultants managing the project and involvement of staff in the change processes.

Finally, staff perceptions of issues contributing to an effective and efficacious ERP system implementation were identified as a barometer to monitor and manage ERP system implementations. The development of effective change and communication strategies for the particular culture of the organisation, in language understood by all levels of the organisation, is an important strategy to gain staff involvement and minimise potential resistance to an ERP system implementation. This is necessary to maximise staff acceptance and understanding of the rationale and benefits of the new system implementation and requires more attention in a university rather than a corporate organisation. Providing timely and comprehensive training for all levels of the organisation assists in enhanced staff acceptance and utilisation of the new system. Other possible steps in the guidelines, with particular relevance for university implementations, include managing the consequent increase in workloads for staff. Resultant workplace issues require this aspect to be taken into account in management of workloads. Staff perceptions appear to confirm this resultant underestimation of workloads for administrative staff across universities. Staff perceptions are therefore an important component of the guidelines for managing and monitoring the implementations of ERPs in universities.

From the discussion above, based on an overall synthesis of findings in Chapters 2 and 4, four prevailing components of an ERP implementation can be identified, which would make it both effective and efficacious and these can be associated with the guidelines in Table 5.1 above. Considered holistically the foregoing alludes to the existence of four key components that essentially underpin the efficacious and
efficacious of an ERP implementation. These key components are in order of importance and are as follows.

- **Context** underpins the other three components and requires a detailed consideration of the particular context of the ERP implementation
- **Leadership** which requires that the implementation has demonstrated senior leadership support
- **Planning** underpins the process and management of an implementation
- **Management** and **Monitoring** of implementation processes including the staff perceptions during the process of the implementation.

It is contended, based on this research that these key components are interdependent of each other and underpin every ERP implementation. Furthermore, Figure 5.1 shows the relationship between the four components. This diagram reveals that the particular context affects the planning of an ERP implementation. As the literature indicates, this is more noticeable in a university setting than in a corporate setting. Consequently the senior managers (leadership) of a university ERP implementation are responsible for and need to consider the impact of the context on planning, management and monitoring the implementation process. This diagram also indicates that for an ERP implementation, the leaders influence the planning, management and monitoring of the implementation process in relation to the particular context of the institution.

The four components considered above have been used as a framework to augment the guidelines for effective and efficacious ERP implementations. This has been done by the diagram. Further this investigation provided evidence and insight to the fact that these four components not only operate independently but also synergistically as shown in Figure 5.1.
Staff perceptions throughout the implementation provide leaders with another means to monitor its progress. This investigation has shown that staff perceptions of the ongoing implementation process provide an instrument for monitoring and assessing the process of the ERP implementation. This has been accomplished in this research which has shown that the staff perceptions can be used to identify potential and real problems for each of these four components. The staff perceptions have enabled the researcher to identify the five components of an ERP implementation. It is the quality of the interactions between these components that produces the level of effectiveness and efficacy of the implementation. The results from this investigation suggest that the higher the quality of the interaction and responsiveness between these four components in Figure 5.1 enhances the potential greater level of effectiveness and efficacy of an ERP implementation.

5.4 Guidelines and Key Components for ERP System Implementations in Universities

The four key components in Figure 5.1 have been used as a framework to further augment the guidelines for effective and efficacious ERP implementations as presented in Table 5.1. Each of the key components is able to be associated with each of the guidelines. It is recognised that there can be overlap between the four key components and their associated steps. This is as a result of the four components being mutually interdependent. Table 5.2 presents the matching of each of guidelines by component with the guidelines listed in Table 5.1.
Table 5.2 Guidelines and key components for ERP implementations in universities

<table>
<thead>
<tr>
<th>Key Component</th>
<th>Guidelines</th>
</tr>
</thead>
<tbody>
<tr>
<td>Context</td>
<td>1. Readiness and preparation of the particular institutional context needs to be considered and analysed in detail prior to the adoption and implementation of the ERP</td>
</tr>
<tr>
<td>Planning</td>
<td>2. The conduct of a detailed planning process underpinning the effective management and control of all aspects of the implementation process.</td>
</tr>
<tr>
<td></td>
<td>3. Business reengineering of university processes needs to be addressed prior to the implementation of the system.</td>
</tr>
<tr>
<td></td>
<td>4. Minimal customisation of the software with vanilla implementations preferable.</td>
</tr>
<tr>
<td></td>
<td>5. Selecting project managers from within the organisation, for their people management skills and problem solving capacities rather than technical expertise.</td>
</tr>
<tr>
<td></td>
<td>6. The selection of the project implementation team to be staffed with a mix of IT and business staff ensuring that their work conditions are similar to the rest of the organisation.</td>
</tr>
<tr>
<td></td>
<td>7. The development of change management strategies appropriate to the organisation’s culture and context including communication and training for staff (academic and administrative staff) on the new system.</td>
</tr>
<tr>
<td></td>
<td>8. Conduct of a project review to learn lessons from the experience of the implementation to learn for future implementations.</td>
</tr>
<tr>
<td></td>
<td>9. Planning for post implementation support.</td>
</tr>
<tr>
<td>Leadership</td>
<td>10. Demonstrated senior management support, commitment and sponsorship and instigation of the planning and management processes and includes a clear rationale for the ERP implementation.</td>
</tr>
<tr>
<td></td>
<td>11. Appropriate management of the role of the consultants in a university implementation project.</td>
</tr>
<tr>
<td></td>
<td>12. Vendor relationships need to be fostered and maintained.</td>
</tr>
<tr>
<td></td>
<td>13. The provision of the management of change throughout the implementation including the management of staff perceptions and possible resistant behaviours among staffs.</td>
</tr>
<tr>
<td></td>
<td>14. Responsibility for the overall management of the resultant impact of the resistance to change including difficult personalities, egos and politics.</td>
</tr>
<tr>
<td></td>
<td>15. Workloads for some staff are increased by the ERP implementation and need to be managed.</td>
</tr>
<tr>
<td>Monitoring and</td>
<td>16. Managing staff perceptions and ensuring user involvement as this can minimise the resistance of staff to the new system.</td>
</tr>
<tr>
<td>Managing</td>
<td>17. Management of the resultant impact of the resistance to change including difficult personalities, egos and politics that can negatively affect implementations in universities.</td>
</tr>
<tr>
<td></td>
<td>18. Delayed go-live timeframes an option for university implementations.</td>
</tr>
<tr>
<td></td>
<td>19. Managing staff expectations including being honest about and “underselling” the benefits of the new system and the progress of the implementation.</td>
</tr>
<tr>
<td></td>
<td>20. Monitoring staff perceptions as an indicator of the course, process and progress of the implementation.</td>
</tr>
</tbody>
</table>
5.5 Implementation Strategy for the Guidelines

This above set of guidelines is a tangible outcome and benefit from this study and provides a useful resource for managers of ERP system implementations in universities. Consideration of each aspect of the components and the guidelines when planning and managing the process of ERP adoption and implementation can provide the basis of an effective and efficacious implementation for a university.

These guidelines are able to be further organised into ERP implementation stages to create an implementation strategy to guide the process in more detail. Such a contention is supported by the literature and from the results in Chapter 4. For instance Somers and Nelson’s (2001) organised the critical steps of an implementation process according to which steps were associated with the implementation stages of an ERP implementation. Further Parr and Shanks (2000) suggested a three stage model for successful ERP implementation. This approach has been used to organise these guidelines to enable their use as an implementation strategy. The “life” of an ERP implementation can be considered as three distinct stages, namely:

- the pre-implementation stage which consists of steps to be considered prior to the ERP system implementation
- the implementation stage which consists of issues to be considered during the course of the implementation process
- the post implementation stage which consists of issues to be considered after the system has reached the go-live point and the system has been implemented.

This approach has been used as an implementation strategy for ERP implementation as presented in Table 5.3.
Table 5.3 ERP implementation by stage

<table>
<thead>
<tr>
<th>Pre-Implementation</th>
<th>Implementation</th>
<th>Post Implementation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Assessment of institutional preparation and organisational readiness</td>
<td>Possible delay of go-live time</td>
<td>Evaluation and review of the project process and outcomes</td>
</tr>
<tr>
<td>Planning including hardware requirements</td>
<td>Senior management support and commitment including the management of potential staff resistance including personalities and conflicts</td>
<td>Post project implementation support</td>
</tr>
<tr>
<td>Senior management support and commitment with a clear implementation project rationale</td>
<td>Vanilla implementation</td>
<td>Senior management support</td>
</tr>
<tr>
<td>Business process reengineering</td>
<td>Increased administrative staff workloads are managed</td>
<td></td>
</tr>
<tr>
<td>Managing consultants</td>
<td>Managing consultants</td>
<td></td>
</tr>
<tr>
<td>Choice of project manager</td>
<td>Project work team and conditions</td>
<td></td>
</tr>
<tr>
<td>Change management strategies developed including honest communication</td>
<td>Managing staff perceptions</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Communication and training conducted</td>
<td>Training conducted.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>User (admin &amp; academic) involvement</td>
<td></td>
</tr>
</tbody>
</table>

The first stage of the implementation strategy consists of pre-planning steps that need to be undertaken prior to the adoption and implementation of an ERP system and they are:

- Prior planning includes an assessment of the institutional context, culture and experience and its readiness for an ERP adoption. It also includes conducting a range of planning processes including for the hardware requirements.
- Planning should also encompass the use of external consultants, if they are required, and how they will be used. It is critical that consultants are subordinate to the university manager.
- Senior management support for the project is essential prior to commencing the adoption. This includes an allocated budget (including an allocation for continuing system support post implementation) and participation in high level committees.
- Senior management signalling a clear rationale and brief for the ERP implementation project.
- Re-engineering business and or academic processes of the institution.
- The choice of a project manager with skills and experience appropriate for the ERP implementation. Good people skill management and creative problem solving combined with knowledge of the university are essential criteria rather than knowledge of the technology.
- Monitoring the staff perceptions of the proposed ERP system.

The second stage is the implementation stage consists of issues to be considered during the course of the implementation process. These issues are:

- Senior management support and commitment continues to be demonstrated for the implementation process.
- After appropriate BPR has been undertaken minimal customisation of the system and preferably vanilla implementations undertaken.
- Managing increased workloads for some administrative staff resulting from the impact of the implementation process.
- Ensuring that a balanced work team composed of business and technology staff, with work conditions reflecting other university staff, is operating effectively.
- Developing and implementing change management strategies that are appropriate for both the culture of the institution and the required changes to institutional processes as a result of the new system. Communication strategies need to suit the institutional culture. A greater amount of training conducted rather than minimal training for staff has shown benefits.
- Managing expectations of the new system through “underselling” as opposed to “overselling”.
- Ensure that user (admin & academic) involvement occurs as much as is practical in both BPR and the implementation and training.
- Continue to manage the role of external consultants to ensure that there is a transfer of skills to university staff.
• Managers to ensure that staff resistance in terms of particular difficult personalities and personal conflicts do not impact on the course of the implementation.
• Possible delay of go-live time if the implementation is not going according to schedule. ERP implementation timeframes are a good “guestimate” at the time they are planned. Because the culture of universities is one where decisions are not made quickly there may be benefits from extending the timeframes.
• Planning for post project implementation support to be.
• Monitoring of staff perceptions of the implementation process and altering the strategies of the above steps if required.

The third stage is post implementation phase which consists of issues to be considered after the system has reached the go-live point and the system has been implemented. These issues are:

• Senior management support and commitment to continue to be demonstrated for the implementation.
• Post project implementation support team/ staffing and resourcing established.
• Training to be conducted after the system is implemented.
• An evaluation and review of the project to be undertaken and lessons learned promulgated for future projects and upgrades of the system.

5.6 Contribution to Knowledge and Practice

As discussed in Chapter 2, ERP implementations have been beset by numerous problems and, as identified by Amoako-Gyampah and Salam (2004, p.17), “there is a need to conduct more work to provide guidance to practitioners on how to achieve implementation success”. This study, grounded in the literature on ERP implementations and the findings from the analysis of staff perceptions of three different Australian universities, provides a practical framework and set of guidelines for managers of universities. The guidelines resulting from this study can
be used in the higher education sector by senior administrators, at a steering committee level, to plan and evaluate their ERP implementation and ongoing upgrade projects. In this respect if the consequent change to the institution accompanying an ERP implementation can be managed more effectively, considerable savings for university administrators and other organisations may be achieved, in addition to an improved experience of large-scale change for employees.

### 5.7 Suggestions for Further Research

Four limitations were identified in Chapter 1 and these are considered below as a basis of recommendations for further research.

The first limitation of this investigation was that this research focused on the human and organisational factors of an ERP system implementation. The choice and costs of hardware and software, contractual arrangements and technical risk factors were outside the scope of this study and have not been considered as part of this investigation. For example, one of the possible issues related to difficulties with an ERP implementation has been associated with the failure to adequately test the system prior to going live (Al-Mashari, 2003). This issue has not been discussed in relation to this study and these guidelines. It can be considered a technical issue which needs to be included in the overall planning and implementation of ERP processes. It may be that these issues may have an impact on ERP implementation and they could be considered in future research in this area.

The second limitation identified for this study was the size of the sample of universities and number of participants interviewed. It would have been beneficial to examine a larger sample of staff and Australian universities implementing ERPs and perhaps future research may use using larger samples of staff and universities. The investigation was conducted at three research sites at a particular point in time and this limits the generalisability of the conclusions. However, there were similarities and differences in the three universities and these were reflected in the case study results. The universities which participated were limited to those where
senior management were comfortable with the success of their implementation. This may have created a bias in the findings of the research project and is taken into account in the generalisability and conclusions of the study. There were different sets of ERP modules implemented at the three different universities. However, a common module (student) was implemented by all three universities which assisted the comparability of the three cases. It is argued that the findings of the research are not particularly generalisable. Nevertheless, the results from this research have contributed to the knowledge about the nature of ERP implementation research in the higher education sector.

The third limitation is that the researcher was a member of staff at one of the universities and had been involved in the ERP as a participant researcher, which was managed through a number of strategies. In phase 1 of the research, the use of an external facilitator for the focus groups, and accessing the data analysis of another independent researcher, were two of the strategies. For phase 2, the use of interviews at two other universities, where the researcher’s position in the university was not a factor relevant to the participants, was a further strategy to alleviate possible bias from the researcher’s role in the project. Nevertheless, the role of the researcher allowed access to data which may not have been accessible to an outsider.

The fourth limitation of the study is that it relies primarily on the two data collection methods, the use of focus groups and interviews, to obtain data. The selection of interviewees was a further limitation as the researcher was restricted to those interviewees and universities prepared to participate. The researcher also was restricted to interviewees who were identified by specific contacts at the particular universities. However, the use of semi-structured interviews provided an understanding of the issues and complexity of data that a quantitative method could not provide. Future research could focus on using a larger number of staff through a survey, though the detailed and open evaluations obtained by the in-depth interviews in this investigation would not be a feature of this style of research. In
addition this research can serve as a platform to further explore other ERP implementations, using the data collection methods employed in this investigation, with a diverse samples and participants.

Based on the foregoing, it is recommended that any future research seeks to analyse staff perceptions from various levels of an organisation and from a larger number of institutions in the higher education sector. There were only three sites included in this research and a wider examination of other institutions would be useful to determine the wider applicability of this research. However, it is to be noted that the findings from this study showed that there were few differences in the perceptions between the different levels and groupings of staff at the three universities. It was expected that higher levels of staff would have different perceptions of the impact of the ERP on their work area than staff at lower levels in the organisation. It was outside the scope of this study to examine this in detail but this would be a useful recommendation for further research.

5.8 Concluding Remarks
This dissertation has documented that ERP system implementations are complex matters, fraught with difficulty and consuming considerable resources for the corporate and higher education sector. It has also been established in this thesis that universities will need to put in place systems and practices to avoid some of the well publicised failings of ERP implementations and upgrades. In this respect the mooted further control of the higher education sector by the federal government will require that universities continue to upgrade and implement newer centralised information systems to increase the efficiency of their operations while making an increasing amount of centralised data available for government access. Consequently there will be pressure to continue to implement ERP systems in universities. This dissertation has contributed to a greater understanding of ERP knowledge and practice in higher education and has addressed some of the complexity and difficulties associated with an ERP implementation. The findings have provided guidance for university
managers to minimise the potential problems associated with ERP implementations and maximise the benefits from implementing them.

Chapter 2 demonstrated that, despite problems and issues faced by universities in the implementation of ERPs, limited research has been undertaken to examine the issues relating to this sector. While there is evidence that ERP implementations in higher education are somewhat different in nature to those in the corporate sector there are plenty of lessons to be learned by examining the research from these ERP implementations.

From the onset, a major aim of this thesis was to examine effective and efficacious implementations of ERP systems in Australian universities through the staff perceptions. As presented in the previous section of this Chapter an outcome of this examination has been the development of a set of guidelines and a framework for implementing ERP systems in universities. Furthermore the findings from this study have provided a valuable insight into the issues impacting on an ERP system implementation in a university. All three universities in this study were on a learning curve as to how to implement an ERP system. The methodology employed in this investigation provided insights into staff perceptions of each of the learning processes at the three universities during the course of their ERP system implementation. It allowed for comparisons and contrasts to be made between their ERP implementations and conclusions to be drawn based on these perceptions. Nevertheless, as indicated in the previous section, more research needs to be done.

This dissertation has proposed that effective and efficacious implementations in Australian universities require particular consideration of the organisational influences related to their context and the perceptions of the users of the systems. It has been argued that senior managers in universities have a particular responsibility to ensure that an ERP system implementation is demonstrably supported, planned and managed. This includes the appropriate management of consultants, project manager choice, planning, including the re-engineering of processes prior to the
implementation, and monitoring across the organisation. Ensuring the associated change is effectively managed with appropriate training of staff and the management of the accompanying increase in staff workloads is also a senior management responsibility. Furthermore, the perceptions of staff in the university culture need careful monitoring and management as these have been shown to be accurate indicators of the effectiveness and efficacy of an ERP system implementation in this study.

This research focused on examining ERP implementation issues from the perceptions of a range of staff in a variety of roles in three different universities. Future implementations and upgrades of ERP systems will need to carefully manage both the prevailing contextual issues and the staff perceptions associated with these implementations and should draw upon the findings of this research, and hopefully new research, to ensure that benefits are obtained from ERP implementations. Finally what this dissertation has provided is a set of guidelines to ensure that future ERP implementations and upgrades are implemented effectively and efficaciously in Australian universities. As indicated above further investigation is warranted to ensure that these guidelines can be followed in an ever complex and more demanding environment in universities, this thesis provides a solid framework from which to venture forth.
References


Al-Sehali, S. (2000). The factors that affect the implementation of Enterprise Resource Planning (ERP) in the International Arab Gulf States and United States companies with special emphasis on SAP software. University of Northern Iowa.


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Guthrie, J., & Neumann, R. (2001). *Symposium 21 on the corporatisation of research in Australian higher education.* Paper presented at the University in the New Corporate World, City East Campus, University of South Australia.


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Taylor, W. J. (2002). *Factors Affecting the Adoption of Internet Technologies for Community Practice in a Regional Area.* Unpublished doctoral thesis. Central Queensland University, Rockhampton, Qld, Australia.


Appendix A

Focus Group Information

University X Project Renaissance Evaluation
Project Renaissance commenced at University X in June 1999. The Project has been implemented in two stages. Stage 1 and 2 of the Project has been completed and it is proposed to conduct an evaluation of the implementation of both stages. This evaluation will focus on the qualitative benefits achieved across the University from the implementation of Stage 1 and Stage 2 of Project Renaissance until the present time.

The evaluation will be conducted during March 2002 and will present a report of its findings to the participants of the focus groups and to the senior executive of University X. The evaluation data will be collected using focus group methodology.

This is an invitation to you as Deans and Heads of Divisions requesting your assistance with this evaluation. I am requesting that an appropriate staff member in your area attend a focus group lasting for an hour and a half to be conducted on a date in March to discuss the outcomes of Stage 1 and Stage 2 of Project Renaissance. A series of questions has been included to allow the staff member to be able to give prior consideration to their responses in the focus group. The focus groups will be facilitated by Dr. Pat Klink and she will pose the questions included with this email. Notes will be taken during the focus group and care will be taken to ensure that any responses are anonymously written up in the report. The comments obtained from the focus groups will be compiled into a report by myself and emailed to you and the participants for your information.

Could you please consider who would be an appropriate person to attend the focus group from your area and email me their name and contact details by COB on March --. Please forward on this email to them. I will contact them as well after I have been notified of their participation.

Project Evaluation Focus Group Questions

- Why and how did University X decide to implement PeopleSoft?
- What were the tangible benefits achieved from the implementation of PeopleSoft?
- What were the intangible benefits achieved from Stage 2 of the implementation of PeopleSoft?
- What more can be done now that could not be done previously both as a result of the implementation of PeopleSoft and the business process re-engineering?
- What savings or efficiencies that have been achieved?
- What other potential benefits that could be achieved in relation to Project Renaissance Stage 1 or Stage 2 through continuous improvement?
- If the workloads have increased, is this due to:
(1) a short-term learning curve,
(2) a need to further change processes to better conform to PeopleSoft,
(3) due to increased growth or
(4) other factors

- How has your job changed since PeopleSoft has been implemented – describe these changes.
- How successfully has the implementation been in your opinion? What would be different if you could wave a magic wand?
- What do we need to learn as an organisation from the implementation of PeopleSoft?
Appendix B

Information Sheet for Interviews

Information Sheet for research conducted by Marilyn Fisher:
Investigation of ERP Implementations

1.1 Purpose of the Study
I am conducting this research as part of my doctoral studies in the Faculty of Education at University X. The aim of the project is to conduct an investigation of the implementation of a number of Enterprise Resource Planning systems in Australian universities. It is proposing to develop a greater understanding of key management issues in universities that are implementing complex technological systems such as an Enterprise Resource Planning system.

The evaluation project will undertake a number of semi-structured interviews at a number of Australian universities. The research project aims to explore the proposition that employing successful implementation management strategies will lead to more productive and successful outcomes and benefits for an organisation in the implementation of major change.

1.2 Process
The data will be collected using semi-structured interviews. The researcher will conduct the interviews with individual participants. Each interview will take approximately one hour to complete. I would like to tape the interviews to ensure that I obtain an accurate transcript. However, you may prefer not to have the interviews or parts of the interviews taped. The taped interviews (or if you prefer my notes) will be transcribed after the interviews and will be completed by a research assistant.

Confidentiality
I understand any information disclosed, reported, or published will be kept strictly confidential, with my anonymity protected at all times. I also understand the research process will be conducted in a way that will ensure I do not incur any personal or financial loss, or damage to my reputation or for the organisation or the individual.

Consent and Feedback
The notes of the interview will not be shared with anyone besides the researcher, the research assistant and my supervisors. Care will be taken to ensure that individuals are not identifiable in the writing up of the research and that details of the universities are not easily identifiable.

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**Participation**
I understand participation in the study is on a purely voluntary basis. I am aware that I may withdraw from participation in this research at any time. I understand that withdrawing from this study will not affect or impact on my employment in any way.

**Involvement**
I have had the opportunity to discuss the nature of my involvement in the study with Marilyn and my workplace line supervisor. I understand that I am to participate in an individual interview. I also understand that I will be sent a copy of the Interview Research Questions prior to participating in an interview.

**Analysis**
I understand that I will be able to read and comment on Marilyn’s transcript of the interview and that I am able to change or amend the transcript in consultation with Marilyn. Transcripts of interviews in which staff participate will be emailed to individuals after the interview.

Please feel free to contact me at any time about any aspect of this research.

Yours sincerely,

Marilyn Fisher

"Please contact University X's Research Services Office should there be any concerns about the nature and/or conduct of this research project."
Appendix C

Consent Form for Interviews

Consent Form for research conducted by Marilyn Fisher:
An investigation of ERP Implementations in universities

Thank you for your taking the time to consider being a participant in this research project.

Consent: I hereby give my consent to be sent the Interview Research Questions and for the material from the interviews to be used as described in the Consent Form and in the thesis and in papers that may be published in the future. An executive summary of the research outcomes will be sent or emailed to participants if you choose. Please list any further requirements for participation in the research project.

Further requirements: ..................................................................................................................................................

..............................................................................................................................................................................

..............................................................................................................................................................................

Participant’s consent details

Name……………………………

Signature…………………………… Date……………………………

Email……………………………

If you would like to be sent a plain English version summary of the outcomes of the project please fill out the following:

Name:………………………………..
Email address:……………………………….
Mailing address………………………………..
Appendix D

Ethical Clearance Application

Request for Ethical Clearance
(to conduct research involving human participants and/or access to personal information)

The attention of researchers is invited to the University’s R2.1 Code of Conduct for Research and related documentation including the National Statement on Ethical Conduct in Research Involving Humans (2001) available on the Internet at:


This proforma, completed in black type, is to be submitted to the Research Services Office. Where a response is not intended, insert “NOT APPLICABLE.” Please do not fix with staples.

RESEARCH TEAM

<table>
<thead>
<tr>
<th>Principal Researcher</th>
<th>Watts, Dr Vivienne, Faculty of Education and Creative Arts, University X.</th>
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<tbody>
<tr>
<td>(Where Principal Researcher is a Postgraduate Researcher or Honours Researcher, include contact details and name of degree)</td>
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<tr>
<td>Fisher, Mrs. Marilyn D, a candidate for an Ed D, working in the Division of Personnel Services at University X.</td>
<td></td>
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<tr>
<td>(Family Name, Title, Given Name)</td>
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<tr>
<td>Other Investigators</td>
<td>Sinclair, Dr. Mark, Faculty of Education and Creative Arts, University X.</td>
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DECLARATION BY FIRST- NAMED INVESTIGATOR

1. The information contained herein is, to the best of my knowledge and belief, accurate. I accept responsibility for the conduct of the proposed research and agree to abide by the University’s Code of Conduct for Research and any other provision as determined by the Human Ethics Research Review Panel.

2. I undertake to ensure that data is collected and maintained in accord with University requirements.

3. I, together with my co-investigators and any support staff, have the appropriate qualifications, experience and access to facilities to conduct the research as described in the
attached documentation, and will be able to deal with any emergencies and/or contingencies that may arise during or as a result of the conduct of the proposed research.

Signature of Principal Researcher: Date:

Signature of Principal Supervisor of Postgraduate Researcher Date:

1. PROJECT DETAILS

1.1 Project Title

Successful change management strategies for the implementation of Enterprise Resource Planning systems in Australian universities.

Proposed commencement date of involvement with human participants: 10/6/03.
Proposed duration of the data collection from human participants: from 10/6/03 to 30/10/03.

Please note that the project may not begin until clearance is granted by the Human Ethics Research Review Panel

1.2 Briefly describe the research purpose, techniques and procedures to be adopted and/or implemented for the conduct of the proposed research.

This research will be undertaken to both investigate the implementation of the Enterprise Resource Planning system (known as an ERP) and secondly to gain a more detailed understanding of successful management strategies in universities during the implementation of ERPs. It is hoped that the study will be able to provide insights and understanding of the nature of these implementations and subsequently how the management of change associated with the management of ERP implementations may be more effective in universities.

The introduction of commercial integrated administrative software systems in large organisations such as universities, and the subsequent process of re-engineering existing internal structures and processes, has been impacting substantially on the management of staff in these organisations. In the current higher education environment, with many universities implementing Enterprise Resource Planning systems simultaneously with new quality assurance processes, it is necessary to have successful management strategies in place or otherwise risk resources being wasted and a competitive edge being lost.

As a number of universities are completing the implementation of their ERPs, it is an ideal time to evaluate the success of the methodologies in place to manage the resultant change arising from the current ERP implementations across a number of Australian universities. Outcomes of the research are proposed to be the development of strategies and guidelines that will be recommended for the management of future implementations of ERPs in universities and other large organisations.
The research will involve the use of a series of individual interviews with key staff at three universities implementing ERP systems. The universities proposed to be included in the research include University X, University Y and University Z. Questions will be developed with a view to gaining an understanding of change management strategies utilised within different university environments. The participants will be invited to identify their perceptions of the implementation of the ERP system, and to provide their perceptions of the change management process utilised by the University.

A transcript of the interviews will be produced and analysis will be undertaken using NVivo software. In compiling the comments obtained from the interviews, care will be taken to ensure that any responses are anonymously cited to protect the identity of individual participants and individual universities in the reporting of views and comments.

1.3 How will stakeholders obtain details of outcomes from the proposed research?

(Stakeholders may include participants, project sponsors and/or other interested parties)

Transcripts of interviews in which staff participate will be emailed to individuals. A Plain English executive summary of the research outcomes will be sent or emailed to participants if they choose.

*The Consent Form should include a separate tear off section for participants to fill in if they wish to receive a plain English version of the outcomes of the project.*

2. PROPOSED PARTICIPANTS

2.1 Who are the proposed participants and how will they be selected/recruited

The case study will be conducted using a series of interviews with staff at three Australian universities. A selected sample of interview participants will be selected on the basis of their experience of the implementation of an ERP system, together with their position in the university so that they represent a section of staff throughout the University. The staff interviewed at each university will consist of six to eight staff members drawn from the following categories: senior managers, managers, administrative staff, academic staff, technical staff and staff employed within the ERP project.

*Please indicate the sample size (approximate if necessary).*

The sample size will be approximately 20 staff.

2.2 What mechanisms will be adopted to protect the rights of those unable to provide informed consent? (e.g., children, mentally ill, aged and infirm)

Not applicable or required.

2.3 What are the processes or steps involved in obtaining informed consent?

All participants will be provided with an information email about the nature of the study prior to their agreeing to participate in the study. Participants will be provided with a written information sheet and consent form when they agree to be a participant in the Focus groups or in an individual interview. Prior to the start of the focus group and interviews participants will be asked to complete the consent form (see attached).
2.4 How will the participants be informed of their right to withdraw from the study?

Participants will be informed both in writing and verbally of their right to withdraw from the study for whatever reasons without prejudice.

2.5 In the consent form specify how the results will be used and what the participant is consenting to. If necessary indicate how the Principal Researcher will seek consent to use the results should this change from the original consent given.

(Example – consent was only sought to publish results in a thesis and supply a plain English copy of results to participants. The Principal Researcher now wishes to publish a paper or do a national radio broadcast and therefore needs to seek further consent.)

(Please attach a copy of the proposed Information Sheet(s) and Consent Form(s) to be used for the project. Please note that any project proposing to use participants under the age of 18 years must obtain consent from parent/guardians as well as from the participants.) Exemplar Consent Forms and Information Sheets are available at http://www.cqu.edu.au/research/research_services/ethical%20clearance.htm

Any written information provided to a participant or subject must contain the statement, "Please contact University X's Research Office should there be any concerns about the nature and/or conduct of this research project."

3. CONFIDENTIALITY/ANONYMITY

3.1 Where this project involves the use of personal information obtained from a Commonwealth Department or Agency, detail how it is proposed to meet provisions of the Privacy Act 1988.

No personal information will be collected involving information obtained from a Commonwealth Department or agency. Names of participants will be kept for administrative purposes only and will be kept separately from the interview transcripts and will not be used in the writing up of the research in any way.

3.2 How is it proposed to maintain confidentiality and/or anonymity in respect of collected data/information? Particular attention to detail is necessary in the case of research involving any of the following:

- structured questionnaires
- participant observation
- audio or video-taping of participants and/or events
- access to personal information (including student, patient or client details)

A transcript of the discussion will be produced from audio-tapes of the interviews. Participant observations will be undertaken by the researcher recording her observations of interviews and meetings. Original audio-tapes and the administrative information concerning the organisation of the interviews will be stored in a locked filing cabinet for a minimum period of five years. In compiling the transcripts of the interviews, care will be taken to ensure that any responses are anonymously cited to protect the identity of
individual participants and individual universities in the reporting of views and comments. All transcripts will be coded to ensure that the identity of the individuals’ involved and specific university is protected. In any subsequent articles published any reporting from the interviews care will be taken to ensure that comments from individual participants are not cited and that the individual universities are not identified.

Please note that all original data arising from the project must be stored in a secure location for a minimum period of five years (This includes audio cassettes that are later transcribed and data relating to identification of participants).

4. RISK MANAGEMENT

4.1 Identify, as far as possible, any negative sequelae which might arise during or as a consequence of the proposed research. Particular attention to detail is necessary where the proposed research involves any of the following:

- administration of any stimuli, tasks, investigations or procedures which participants might experience as physically or mentally painful, stressful or unpleasant;
- performance of any acts which might diminish the self esteem of participants or cause them to experience depression, embarrassment or regret;
- deception of participants;
- collection of body tissues or fluid samples.

Detail proposed support for participants who experience negative sequelae.

It is not envisaged that participants will experience negative sequelae, however participants will be able to request that any comments that they have made during the interview, which they may be uncomfortable with when they receive a copy of the transcripts, may be withdrawn.

For monitoring purposes (see National Statement 2001, page 20) the Principal Researcher is required to lodge documentation to the Research Services Office as necessary upon completion of the project or annually whichever is sooner, the progress to date or outcome in the case of completed work, maintenance and security of records, compliance with the approved protocol and compliance with any conditions of approval. This may also include immediate reports from researchers in the event of serious or unexpected adverse effects on participants, proposed changes in the protocol, any unforeseeable events or if the project is discontinued before the expected date of completion.

Office Use Only

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☐ Cleared (if required, further documents to be lodged at RSO)
☐ Cleared Subject to provision of further detail to the satisfaction of the Chair
☐ Clearance Not Granted

Period of Approval

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Appendix E

Interview Questions

1. What is your current role and how long have you been a staff member at this institution?
2. Why was an ERP adopted in your university? Which modules have been implemented and in which order?
3. How did your university go about implementing the ERP? Describe the role of any implementation partners?
4. How would you say the ERP project was managed?
5. Would you say that you had senior executive support and sponsorship for the implementation and how was it demonstrated to staff?
6. What difficulties were encountered during the implementation and how were these addressed?
7. How did the staff respond to the implementation?
8. How would you evaluate the training of staff (academic and general) in relation to PeopleSoft? Was it appropriate and effective?
9. What communication mechanisms were in place in relation to the implementation project?
10. How were the potential risks associated with the implementation identified and managed across the institution?
11. What tangible and intangible benefits were achieved?
12. Has an evaluation of the implementation been undertaken? What form did it take and what were the results?
13. What lessons have been learned to date?
14. If you were to implement another project such as this one, what would you do differently? What advice would you give to other universities planning to implement an ERP?
15. On a scale of 1 to 10, with 10 being extremely satisfied and 0 being extremely dissatisfied, how would you rate your overall satisfaction with the ERP implementation at your university? Would your rating change depending on different modules being implemented?