UNIVERSITY OF KWAZULU-NATAL

A study into the user satisfaction with the Enterprise Resource Planning system at the University of KwaZulu-Natal

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Abstract

A study into the user satisfaction with the Enterprise Resource Planning system at the University of KwaZulu-Natal. This research study sought to establish if the administrative support staff using the back-office component of the enterprise resource planning system at the University of KwaZulu-Natal are satisfied with the functionality of the enterprise resource planning system. The research approach was a qualitative explorative study. The research instrument used was a face-to-face structured interview schedule with nine participants, of which all nine of them responded and agreed to participate. The support staff in the human resources, finance and student academic administration sections were targeted due to their interaction with the enterprise resource planning system for conducting business operations of the university. It was established that the administrative staff are marginally satisfied with the enterprise resource planning system. There were several critical business issues identified with the system; the reporting services of the system gave the users the most dissatisfaction. The reporting component has to be updated and provide benefit to the organisation so that efficiencies can be realised. It materialised as a theme in each of the categories.

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CHAPTER ONE
Introduction

1.1 Introduction

The study evaluated the end-user satisfaction at the University of KwaZulu-Natal with the functionality of the present enterprise resource planning system. Higher education institutions spend millions of Rands on purchasing and maintaining their enterprise resource planning system. These systems dictate how the institution manages its business operations. It is clear that in today's global higher education sector, securing funding and student enrollment are the primary goals of most institutions. The enterprise resource planning system helps institutions realise their goals. The hands behind the wheel of the enterprise resource planning system are the support staff in the institutions spanning across the multiple business units within the university. Their satisfaction with the functionality of the system has an impact on the use of the system and the organisation as a whole.

Enterprise resource planning systems drive the organisation productivity level, and in higher education institutions, more research output equates to more funding and in turn, makes the university an institution of choice to attend. The enterprise resource planning system can only perform if the administrators on the system utilise the system to its maximum potential. The system is designed to provide integration and smooth data flow within the organisation.

1.2 Motivation for the Study

The researcher identified the particulars of the enterprise resource planning system that the administrative support staff of the University of KwaZulu-Natal are not satisfied with. This highlighted areas that require attention to resolve issues that are causing inefficiencies and dissatisfaction.

1.3 Focus of the Study

The focus of the study was to establish if the administrative support staff are satisfied with the enterprise resource planning system and to identify any aspects within the enterprise resource planning system that they are not satisfied with. The operational business departments in the university rely extensively on the enterprise resource planning system to

conduct operations. These areas are human resources, finance and student academic administration. The enterprise resource planning system is the key driver of the university's operations.

1.4 Problem Statement

User satisfaction with enterprise resource planning systems has proven to be a measure of the successful use of such systems (Seddon & Kiew, 1994). The absence of user satisfaction with the enterprise resource planning system would lead to poor adoption and use, further to this organisational efficiencies and business process enhancement might become unachievable (Guimares et al., 1995). The satisfaction of the enterprise resource planning system's users' is the primary determinant of the use and adoption of the system (Abdinnour-Helm et al., 2003).

The reduction in government financial support facing the higher education sector as seen globally is evident and requires higher education institutions to streamline business and management processes (Allen & Kern, 2001). Monetary gains are realised with an increase in efficiency and are amongst the advantages of implementing enterprise resource planning systems in higher educational institutions (Zornada & Velkavrh, 2005).

An enterprise resource planning system is an expensive investment, and if used correctly can reduce costs, but this is dependent on the support staff being sufficiently satisfied with the system and thereby using it effectively and efficiently. Establishing if the users are satisfied with the enterprise resource planning system at the University of KwaZulu-Natal could highlight aspects of the system that could be enhanced to achieve efficiency.

1.5 Objectives

The primary objective of the study was to establish the satisfaction of the administrative support staff of the University of KwaZulu-Natal with the enterprise resource planning system evaluated against these three categories:

- Ease of use
    - To establish if the administrative support staff believe that the system is easy to use.

- Format
    - To identify if the format the data that was presented to the administrative support staff is in the required format.
- Timeliness
    - To determine if the required data in the form of reports are available to the administrative support staff rapidly.

1.6 Methodology

The methodology employed in this study was a qualitative research study targeting the population of the back-office administrators of the enterprise resource planning system. The research instrument selected was face-face-interviews to obtain the required data. The context of the user satisfaction was modelled around the end-user computing model of (Doll & Torkzadeh, 1988) but adapted to measure three factors only, namely ease of use, timeliness and format.

1.7 Chapter outline

- Chapter one introduces the study briefly, identifies objectives, motivation and methodology of the study.
- Chapter two delves into the research literature concerning user satisfaction, satisfaction models and enterprise resource planning systems.
- Chapter three describes in detail the research design and elaborates on the research process.
- Chapter four is the presentation of the results and the discussion of the findings.
- Chapter five is the conclusions reached with the study and recommendations for future study and recommendations to the stakeholders.

1.8 Summary

The study undertook to investigate the user satisfaction of that the administrative support staff of the University of KwaZulu-Natal with the enterprise resource planning system implemented. The three critical business units, human resources, finance and student

academic administration were identified to participate in the study due to them representing a significant quantity of administrative support staff. User satisfaction with the enterprise resource planning system is a crucial driver in achieving effective and efficient business and management processes. The research intends to establish user satisfaction with the enterprise planning system and identify aspects of the system that users deem inefficient and ineffective. The subsequent chapter will interrogate the available research on this topic and investigating each aspect that was applied to this study.

CHAPTER TWO

Literature Review

2.1 Introduction

The 21st century heralds the availability of unparalleled access to information, without a doubt if a moment is taken to look up from the smartphone, tablet or laptop screen a quick realisation would be evident about our connection to a vast store of information that is called the internet. The aggregation of all that information, available at the touch of a button clearly defines the information age. Complex systems are developed to help us manage the vast amount of data accumulated; the management and analysis of this data enable organisations to become efficient and streamline processes.

Enterprise resource planning systems aggregate organisational data and make it available for the various departments within the organisation. Universities have adopted and implemented enterprise resource planning systems to integrate the various support sections and manage the organisations daily operations. The management and administrative users of these enterprise resource planning systems are hugely reliant on these systems.

The mere use of the enterprise resource planning systems does not indicate that the end-users are satisfied with the enterprise resource planning system. This chapter will interrogate the available literature on enterprise resource planning systems, demystifying what they are, elaborating on their purpose. Since the study occurred within a university, therefore it is imperative that the relevant literature pertaining to higher education institutions be examined to gain insight and understand the activities of institutions in the higher education sector, this will then lead to how enterprise resource planning systems fit into higher education institutions and the role they assume. The chapter will terminate with identifying the various end-user satisfaction models available in the literature, and the most suitable model for this research study will become evident. Adapting the model to suit the study parameters might occur.

2.2 What is an Enterprise Resource Planning System?

Enterprise resource planning systems are fundamentally commercial software that contains operational specific modules integrated to form a complete software package; this package seamlessly integrates information from human resources, finance, accounting, supply chain

and customers (Davenport, 1998). Enterprise resource planning systems are complex and comprehensive information system packages that integrate the functions of the business and processes (Haddara, 2014). According to (Haddara, 2014), enterprise resource planning systems were an evolutionary development from both requirements planning and manufacturing resource planning systems. Enterprise resource planning systems contain lengthy complex, interrelated programming code that defines and executes standard processes (Haddara & Elragal, 2013).

The ideology that management sometimes delude themselves with is that enterprise resource planning packages are the "silver bullet" to all their operational woes, but this is far from what happens in reality. According to (Davenport, 1998), there are numerous examples of the failed implementation of enterprise resource planning systems that have cost companies hundreds of millions of dollars and in some instances, bankruptcy. The notion that an off-the-shelf software solution is going to rectify all of the organisation's operations hurdles and seamlessly cater for any business model and process flow is a fallacy, Mobil and Dell can attest to this (Davenport, 1998). An accepted definition of an enterprise resource planning system can be identified using the three primary characteristics associated with enterprise resource planning systems, and we can characterise enterprise resource planning systems as follows:

- A collection or grouping of modules packaged to form an integrated architecture to form a complete system which can be used in the businesses as the primary engine for integrating all business activities with information technology and available in real-time extending beyond the boundaries of the organisation into external supply and value chains.
- They are bundled with an enormous amount of wealth in business knowledge gathered from business practices that the vendors have adopted in the system. This system will now alter the way the organisation conducts its business processes.
- Comes in a generic undifferentiated product that vendors, along with clients, have to spend a fair amount of time configuring and customising to suit the organisation.

Enterprise resource planning systems were designed initially for use within an organisation, but in the recent past, it has seen considerable change and has evolved to now include and link external resources as part of the integrated business processes incorporating customer

relationship and supply chain management. Playing roles in business to business, business to customer and e-commerce arenas.

Enterprise resource planning systems are poised on the verge of integrating the whole supply chain, taking the business into the future. This stance appears as though this is the next step in the evolutionary chain of the enterprise resource planning systems existence, but for now the focus of the enterprise resource planning systems is integrating all business units under a single central application to drive the entire business forward in the same direction.

Enterprise resource planning systems can extend to using technology to accomplish various business processes incorporating planning, supply, warehouse inventory and packing by using radio frequency identification coupled with drones and automation on every level. It is not difficult to imagine and extend the imagination that enterprise resource planning systems are a vast collection of enterprise systems and not just one single massive enterprise resource planning solution. It is a system that continually seeks out integration to improve business functions throughout the entire organisation and to streamline its processes. With the correct implementation of an integrated and functional enterprise resource planning system, it is adept at delivering streamlined enterprise-wide business processes coupled with data management and information management. There are numerous vendors of enterprise resource planning systems, and some of the most popular ones are SAP, PeopleSoft, Oracle and BAAN.

The anatomy of an enterprise resource planning system depicted in Figure 2.1, according to (Davenport, 1998).

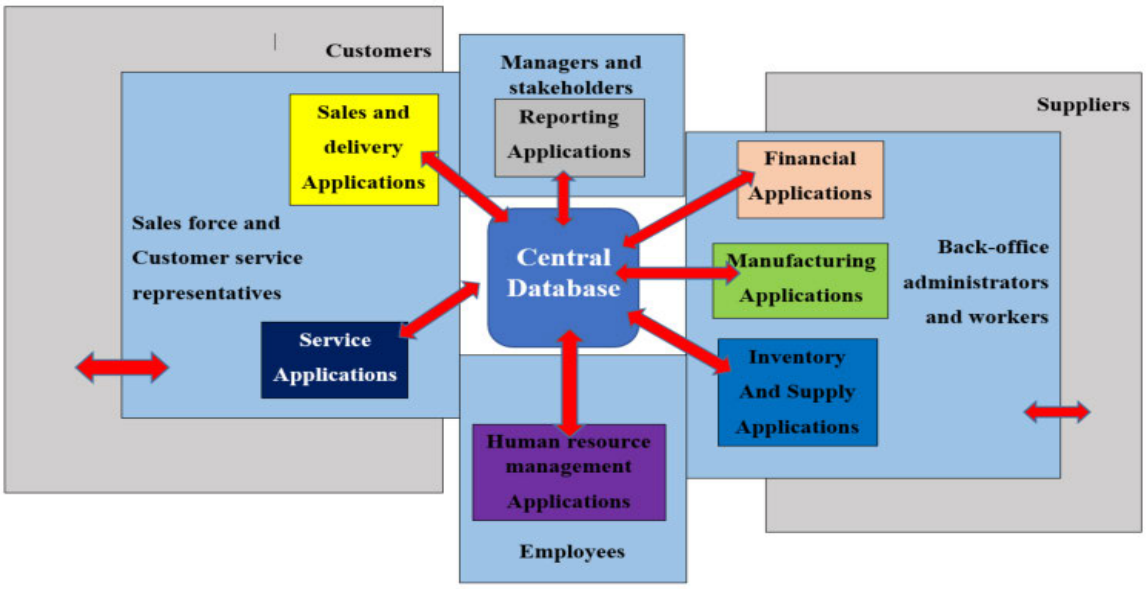

Figure 2.1 Enterprise Resource Planning Anatomy

Adapted from Davenport, H.T., 1998. **Putting the enterprise into the enterprise system**. Harvard Business Review, July. p124.

According to (Davenport, 1998), the anatomy of an enterprise resource planning system comprises of the core database that drives the entire application housing the data and metadata. The various operational specific modules of the enterprise resource planning system utilise the shared data stored in the central database. These modules or applications are:

- Human resources management
- Financial
- Manufacturing
- Inventory and supply
- Service
- Sales and delivery
- Reporting

The enterprise resource planning system accommodates interaction and access from internal and external users. Internal users consist of:

- Sales force and customer service representatives
- Managers and stakeholders
- Back-office administrators and workers
- Employees

External users comprise of:

- Customers
- Suppliers

Although enterprise resource planning systems have been around for decades, there are still high rates of failed implementations, and the implementation projects usually exceed budget and timelines according to (Klaus et al., 2000). Enterprise resource planning systems have been typically designed with the best practices in conjunction with the most influential customers of the enterprise resource planning software, so many organisations have to realign and redesign their business processes to utilise and see benefits from the enterprise resource planning system (Klaus et al., 2000).

2.3 Characteristics of Enterprise Resource Planning Software

Enterprise resource planning software is a commercial product and is customisable and configurable to suit the various and diverse needs across various businesses in the economy. Enterprise resource planning software exists in three variants (Klaus et al., 2000):

- Generic
  - This version is the most comprehensive complete version as it targets industries in all sectors and being generic, the configuration has to occur before use.
- Pre-configured
  - This version provides pre-configured templates derived for the generic variant of the software. The templates designed are for specific industries.
- Installed
  - This variant is the most commonly chosen option for most businesses; this option follows either a generic or a pre-configured package after that it is adapted to the specific requirements of the organisation on-site.

The generic variant of the enterprise resource planning software is the only version that can customised explicitly according to the required purpose because any configuration that causes a change in either a reduction or an addition of any component of the software application will render that instance non-standard or non-generic in nature (Klaus et al., 2000).

An analysis was undertaken of the currently available standard enterprise resource planning solutions assisted in the derivation of criteria used to identify the characteristics of an enterprise resource planning solution (Klaus et al., 2000). Enterprise resource planning software is generic software packages and is unintended for a specific market, but targeting businesses from any market, the differentiation for a particular business occurs during the system installation and configuration process.

This process of customisation relates to other software as well, but enterprise resource planning software has been designed with more depth of customisation available. This degree of customisation might be interpreted as a negative characteristic, but it is this feature of customisation that allows for individualised implementations and unique configurations for enterprises (Klaus et al., 2000). Enterprise resource planning software is application software and is distinguishable from other software such as database, middleware or

operating system software. This uniqueness in the depth and quantity of customisable options, along with numerous pre-configured alternatives establishes the characteristics of enterprise resource planning software (Klaus et al., 2000).

The modularised enterprise resource planning software is integrated to accommodate business processes and the corresponding data across the entire organisation. The core of the enterprise resource planning software is the central data store, and this datastore houses all data from the various modules centrally (Klaus et al., 2000). The datastore managed by a database engine ensures consistency, controlled redundancy and transactional protection. The integrated modules provide business solutions that provide administrative functionality and support for core business processes.

The high level of functionality is amongst the main differentiators of enterprise resource planning systems as it claims to support all the various standard business functions such as procurement, logistics, material and quality management, production, maintenance, sales, distribution, financial accounting, asset and cash management, controlling, strategic planning. These form part of the standard business functions, enterprise resource planning systems also contain industry-specific business processes for hospitals, student administration in higher education institutions and warehouses with high transaction volume (Klaus et al., 2000).

Due to enterprise resource planning software being highly functional, it can be distinguished qualitatively from other application software. The enterprise resource planning software is modularly designed at the top level based on the various functions such as sales or procurement but adhere to a process-orientated view of the business. Standard business functions are seamlessly supported across the integrated modules in the application, and the user is often oblivious to the actual module they are working within. Enterprise resource planning systems are extraordinarily complex and require the availability of comprehensive documentation, and this documentation must cover the typical software documentation but also include detailed documentation concerning the industry-specific implementation for the enterprise resource planning software. The documentation should indicate the relationships between the structure of the data and objects. Accessing this documentation should be quick and easy (Klaus et al., 2000).

Enterprise resource planning systems cannot be classified by merely observing their functions because their footprint spans various industries and thereby giving varying characteristics amongst the varied implementations. Enterprise resource planning systems comprise of two variants, the one supports the coexistence of two different industries in one

solution, the other is a pre-configured, single business function and individualised enterprise solution. An example of this is PeopleSoft that provides industry-specific solutions to communication sectors, the federal government, healthcare, financial services, higher education, manufacturing, public sector, retail service industries, transportation and utilities. (Klaus et al., 2000).

Enterprise resource planning solutions are designed to operate in companies that span globally with businesses across varying timezones, currencies, legislature, and therefore a prerequisite for an enterprise resource planning system is the ability to function across different regions globally but still providing preconfigured country-specific modules and business functions and transacting in a multitude of currencies is a compulsory feature. A distinguishing feature of an enterprise resource planning solution is processing structured repetitious transactions accurately and expertly and performing the task well. Technical characteristics or features help determine the potential and functional features of this software. The technical aspect of displaying a consistent graphical user interface across all the integrated modules of the system creates an impression for the user that they are working on a single software platform solution even though they are alternating between different functional areas within the application (Klaus et al., 2000).

Existing enterprise resource planning solutions are modelled on a three-tier client-server architecture where there are three independent logical segments; they are the database, the applications and the presentation. Since enterprise resource planning software has a vast and diverse target market, the application has to scale according and be able to process vast volumes of data, and this is a significant technical characteristic of enterprise resource planning systems. Enterprise resource planning systems are typically hardware and operating system agnostic. Enterprise resource planning systems are incredibly complicated, and this complexity requires sufficient administration to function at efficient and practical levels, the software provides various system monitoring tools, performance management tools, general and user administration interfaces (Klaus et al., 2000).

2.4 Uses and Benefits of Enterprise Resource Planning Systems

The cross-sectional involvement of enterprise resource planning systems is used to improve pivotal operational process-driven functions in the human resource, finance, procurement, accounting, sales and manufacturing sections (Haddara & Moen, 2017). According to (Olson et al., 2012), enterprise resource planning systems are used to manage the available

resources of the organisation effectively, thereby achieving efficiencies by integrating all the information-processing requirements of the organisation. The use of enterprise resource planning systems is to implement reduction of costs, permeate data sharing within the organisation and identify business processes that can be enhanced (Elragal & Haddara, 2013). Enterprise resource planning systems in their design span across multiple sections within an organisation, therefore they cater for centralised control and management of business workflow processes throughout the entire organisation. (Shang & Seddon, 2000), have designed a comprehensive framework for the usage and benefits of enterprise resource planning systems, their design consists of numerous organisational, strategic, managerial, operational and information technology infrastructure benefits and uses.

2.5 Evolution of Enterprise Resource Planning Systems

Enterprise resource planning systems did not just come into existence as we know them today but evolved from other management information systems. According to (Watson & Schneider, 1999), in the last five decades, the initial concept of enterprise resource planning systems developed from materials requirements planning systems (MRP).

The evolution of the enterprise resource planning system in Figure 2.2, as indicated by (Watson & Schneider, 1999).

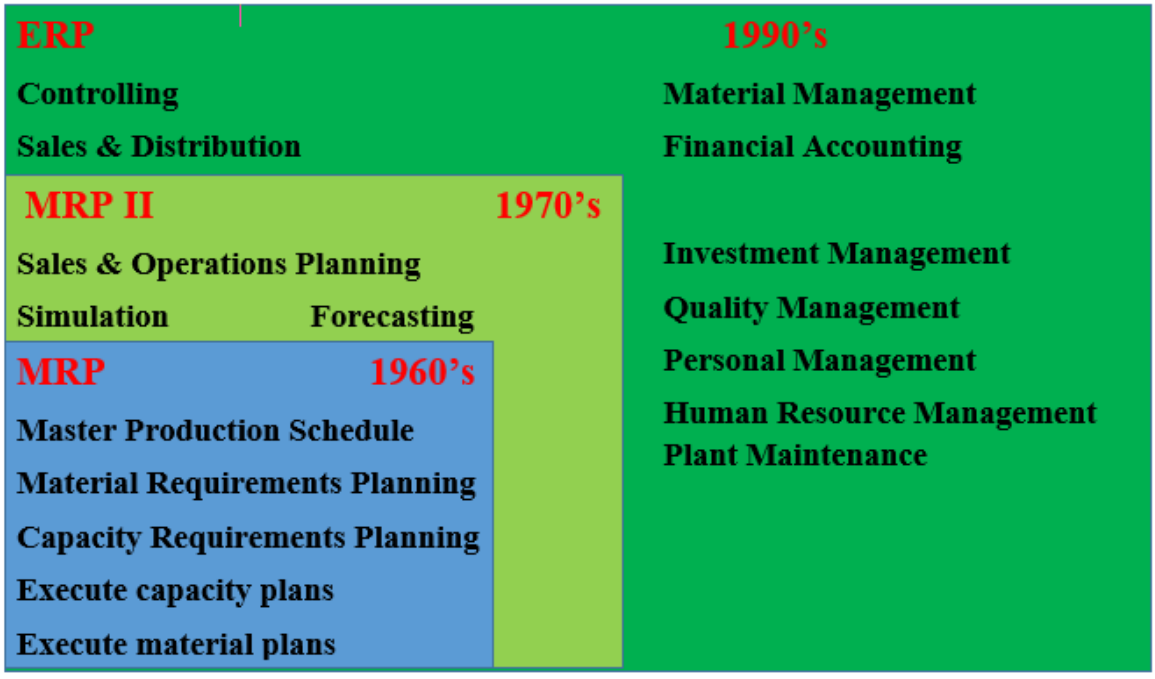

Figure 2.2 Evolution of Enterprise Resource Planning Systems

Adapted from Watson, E.E. & Schneider, H. (1999) Using enterprise resource planning Systems in Education. Communications of the Association for Information Systems, I(9). p7.

According to (Watson & Schneider, 1999), the gradual evolution of enterprise resource planning systems originated with MRP systems, but as business demands increased and with technological advancements, the inclusion of additional modules to MRP systems lead to the materialisation of MRP II systems. The pressure from business demands and the rapid advancements in technology especially in the information technology area saw another evolutionary leap for enterprise resource planning systems from MRP II systems to the structure we observe in enterprise resource planning systems (Watson & Schneider, 1999).

2.6 Understanding the Higher Education Institutions

The advancement of technology and the explosion of the internet has compelled higher education institutions to review their strategies and redesign their goals, vision and mission in the rapidly changing global higher education environment and interrogate their business activities ensuring alignment with their mission, vision and goals.

2.6.1 Goals of Higher Educational Institutions

The core foundational goals that higher education institutions have adopted are research, education and cooperation. The academic and support staff ensure that the institution's goals and strategy through lecturing, researching and information technology support materialise (Kyvik & Lepori, 2010). The reaching of the institutional goals and fulfilling its strategic direction maintains a substantial level of attractiveness for research funding opportunities and various discipline accreditation (Kyvik & Lepori, 2010).

2.6.2 Business Activities of Higher Educational Institutions

The global trend is that higher educational institutions are viewed more like businesses in the present economic climate, knowledge and research are the traded commodities, and in return external entities, government funding and incentives are the rewards. In interrogating the business activities of higher education institutions, two primary activities form the core, and these are education and research, the administrative support within the institution is the

secondary activity (Zornada & Velkavrh, 2005). The strategic components of higher education institutions from research excellence, development and output have in the 21st century compelled higher education institutions to discover ways to improve and expand their primary activities, seek business excellence and find efficiencies in current business operations ensuring alignment with their vision and mission strategy (Zornada & Velkavrh, 2005).

Suggestions by (Pollock & Cornford, 2004) elude to higher education institutions have similar processes to manufacturing organisations but identify that higher education institutions have uniquely distinct administrative activities. Traditional manufacturing organisations employ essential business administrative functions such as human resources, finance, operations & logistics, sales & marketing activities whereas the higher education sector has distinctive activities such as student and curriculum administration and timetabling (Rabaa'i, 2009). According to (Awad, 2014), higher education institutions of today have the following primary activities human resource, procurement, financial, warehouse, library and student management.

According to (Zornada & Velkavrh, 2005), Figure 2.3 depicts the crucial business activities for higher education institutions in the current environment.

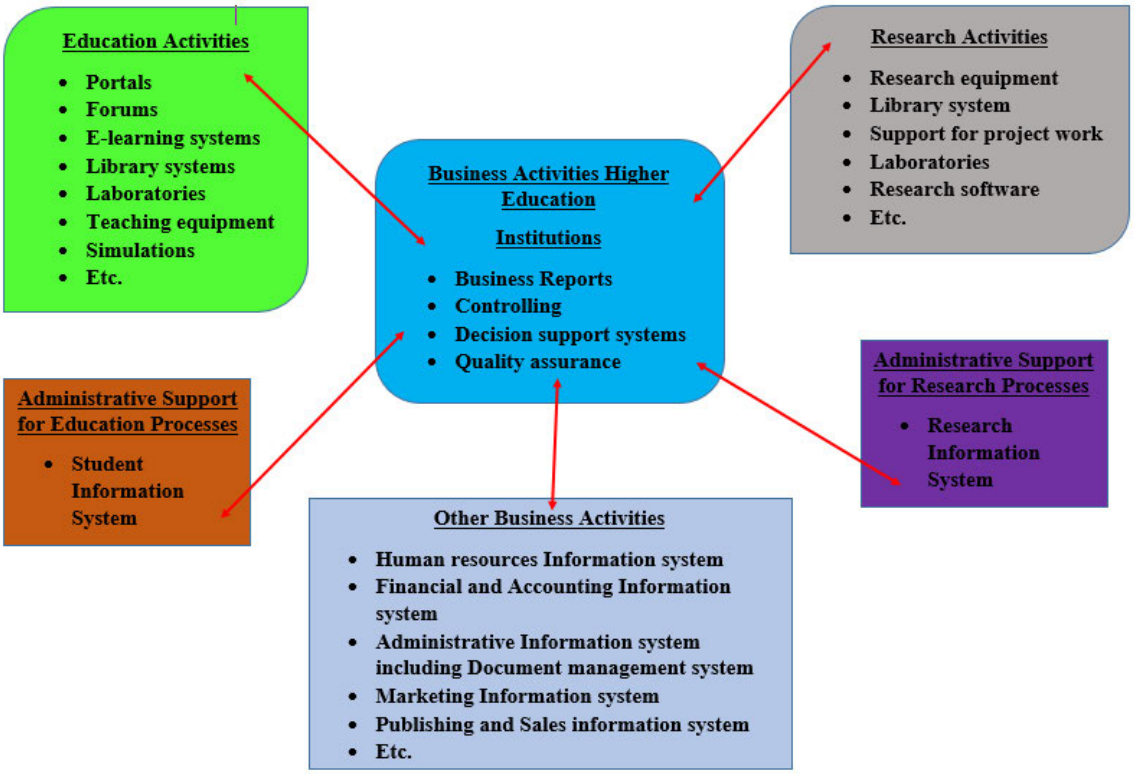

Figure 2.3 Higher Education Institutions' Business Activities

Adapted from Zornada, L. & Velkavrh, T.B. (2005) **Implementing ERP Systems in Higher Education Institutions.** In Information Technology Interfaces ITI 2005. Cavtat, 2005.p5.

According to (Zornada & Velkavrh, 2005), there are three primary groups of business processes in higher education institutions, and these are educational, research and non-academic, within these groups there are numerous activities that exist and vary between institutions. Each of these business groups requires support from administrative systems and support personnel to execute the daily operations and achieve the higher education institute's goals and strategic plans.

2.6.3 University of KwaZulu-Natal Business Activities

The University of Kwazulu-Natal's business activity structure is similar to the business activities identified by (Zornada & Velkavrh, 2005), where the two primary activities are academic and non-academic, the non-academic is administrative support, and the academic is education and research.

Figure 2.4 depicts the two primary activities undertaken by UKZN and elaborates on the composition of these two activities.

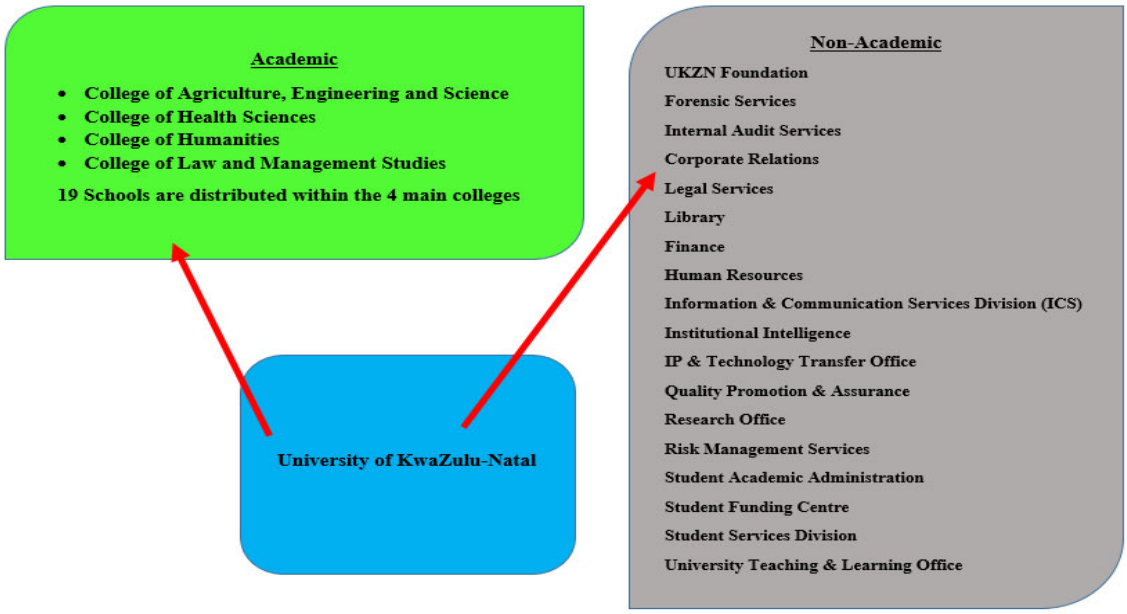

Figure 2.4 UKZN's Primary Activities

Adapted from Govender, Leanne. (2019).

The academic activities of UKZN occur within the four colleges containing nineteen different schools, the non-academic component of the university comprises of seventeen support orientated sections. The library is a member of the non-academic component of the university. The four colleges within their respective areas of focus have pockets of administrative support personnel available to them (Govender, Leanne, 2019)

2.7 Enterprise Resource Planning in Higher Education Institutions

During the past decade, the worldwide adoption of enterprise resource planning systems in the Higher Education Institutions has seen tremendous growth and as the demand increases the vendors of enterprise resource planning systems have identified higher education institutions as their new target market (Soliman & Karia, 2015).

The business activities of higher education institutions are continually changing, and the enterprise resource planning systems are expected to keep pace with the changes and requirements in the higher education sector (Soliman & Karia, 2015). There is a developing need for higher education institutions to visualise improvements in their operations by ensuring more transparency and manageability (Zornada & Velkavrh, 2005).

According (Soliman & Karia, 2015), enterprise resource planning systems in higher education institutions offer departments with the automation of numerous tasks and a key component in managing the organisations' resources along with providing real-time data access to support decision-making requirements.

The higher education institutions have realised that to gain a competitive advantage, and differentiate, and information technology must be embraced and used as a crucial tool in the research market, just as the business, manufacturing and finance sectors (Karande et al., 2012).

(Ghuman & Chaudhary, 2012) have identified higher education institutions are seeking constant automation and integration from their business processes, including services provided by human resources, student administration, finance and academic sectors within the institution.

According to (Ram et al., 2013), the ideology of enterprise resource planning involves acquiring knowledge about the most effective and efficient business practices, after that utilise this knowledge to re-engineer or redesign antiquated processes.

It is imperative to take cognisance that enterprise resource planning systems should be configurable to suit organisations' business processes, to ensure end-to-end integration with all sections within the organisation and higher education institutions are no exception to this (Kwahk, 2006).

According to (Abugabah et al., 2015), although the implementation of enterprise resource planning systems in higher education institutions are regularly portrayed as being highly complex and challenging.

The risks and expenses are usually enormous and occasionally the implementation is a failure or is detrimental to the institution; the return on investment does not ever materialise in the short-term but more long-term to medium-term.

2.7.1 Role of Enterprise Resource Planning in Higher Education Institutions

Enterprise resource planning systems in the higher education sector have seen tremendous pressure exerted by global trends to adopt advancing technologies, higher education institutions have to embrace changes in the technological landscape to remain current and competitive, governments globally have requested higher education institutions to raise their levels of efficiency and performance (Allen & Kern, 2001).

According to (Fisher & Walker-Gibbs, 2006), higher education institutions are forced to change strategies to increase their performance levels due to being faced with numerous challenges such as student and government increasing expectations, being competitive in the higher education institutions sector, maintaining quality and performance requirements and decreasing government funding and support.

Enterprise resource planning systems are being utilised to respond to the numerous challenges that higher education institutions face remaining sustainable in the volatile higher education environment (Mcredie & Updegrove, 1999), enterprise resource planning systems are replacing antiquated administration and management information systems in higher education institutions (Pollock & Cornford, 2004).

The higher education institution would find an improvement in teaching and learning services with the use of enhanced managerial tools (Kvavik et al., 2002) and this would usher increases in effectiveness and organisation change (Fisher & Walker-Gibbs, 2006).

Enterprise resource planning systems in higher education institutions are capable of delivering applications that would benefit teaching and research, and this will have an organisation-wide impact (Watson & Schneider, 1999). With the implementation of enterprise resource planning systems in higher education institutions, access to organisational data is improved.

This will enhance management of the institution enabling staff to access students' information with ease and resolve issues and queries rapidly (Davis & Huang, 2007) and this brings about an increase in service delivery, response time and overall enhancement in business processes (Kvavik et al., 2002).

The global phenomenon overtaking higher education institutions to become more business orientated across first, second and third world countries, in Australia, governmental pressures to become more business orientated, declining funding from government, constant growth in student numbers, structural changes in academia, inter-institutional competition have driven higher education institutions's to improve management processes (Allen & Kern, 2001).

Amongst this changing landscape of higher education institutions, the higher education sector in Australia has replaced their legacy administrative systems with an enterprise resource planning system (Beekhuyzen et al., 2001). There are significant similarities between large corporations and higher education institutions where both replace their legacy administrative systems with enterprise resource planning applications (Allen & Kern, 2001).

The higher education institutions across the world implemented enterprise resource planning systems to achieve enhanced management for their increasingly complex operations (Rabaa'i et al., 2009). The global competition in the higher education institutions sector has driven these institutions to re-evaluate their student management systems and investigate customizable enterprise resource planning solutions in the cloud and on-premise (Petrides, 2004). (Abugabah & Sanzogni, 2010) identified that the higher education sector is trailing behind other industries in the adoption of enterprise resource planning systems in their organisations and in doing so are depriving themselves of business enhancement.

2.7.2 Advantages and benefits of Enterprise Resource Planning Systems in Higher Education Institutions

Enterprise resource planning systems in higher education institutions provide numerous benefits and advantages such as the reduction of backup costs, and the enterprise resource planning system would enable user-friendly services via a common portal for the administration of all business activities of the institution in real-time.

The cost savings of the backup process occurs by reducing the number of servers since the enterprise resource planning system would replace several separate management information systems (Alshaer, 2016). According to (Sabau et al., 2009), the introduction of a single secured system where users from the educational institution have access to services and confidential data quickly due to the integration of educational activities and technology.

Internal communication for any organisation is a critical business process; enterprise resource planning systems using business process workflows improve communication in the process enhance self-service and quicker response time for all users of the system.

The system caters for the generation of various reports utilised by management to make business decisions and reduces paper footprint since reports do not have to be printed but are available centrally (Sabau et al., 2009).

Further to these benefits, an enterprise resource planning system integrates the various support sections within the university and establishes a common central platform for administration (Sabau et al., 2009).

According to the research by (Zornada & Velkavrh, 2005), some of the main advantages of enterprise resource planning systems in higher educational institutions are:

- Enhanced management due to improved information access
- Improved service delivery for academics, support staff and students
- The reduction of risk associated with business processes
- Monetary gains due to increased efficiency
- Integration of business functions such as student administration, human resource and financial management

Research by (Baweja, 2015) suggests that benefits from an enterprise resource planning system in a higher education institution affects four primary stakeholders; these are:

- Academic staff
    - enterprise resource planning system manages all student-related administration
    - Focus more time on teaching than administrative processes
    - Efficient access to human resource processes
- Students
    - Provides a single web-based portal for all the administrative needs
    - Online teaching and learning platform.
    - Communication with the institution.

- Parents
    - Communication with the institution
    - View their child's progress and test/exam scores
    - Obtain their child's financial data

- Management
    - Administrative processes become accurate and consistent
    - Automation reduces time wastage
    - Institutional wise reporting
    - Cost savings
    - Management of all support sectors.

Enterprise resource planning systems are software packages that have several modules incorporated in the application to provide a holistic solution (Davenport, 1998), according to (Baweja, 2015) eleven enterprise resource planning modules would provide benefits to the educational institution.

(Baweja, 2015) suggests that there are eleven modules in an enterprise resource planning system that would provide benefit to the higher education institution tabulated in Table 2.1

ERP Module	Business Activity Benefit
1. Admission	Admission and registration difficulties can be reduced and simplified with online registration mechanisms, provides the capabilities for document management. Automates processes during the registration periods and provides feedback.
2. Transportation	Provides information about the institution's transport infrastructure such as routes, fares, schedule and online notifications.
3. Time Table	Automate time-tabling processes, thereby reducing time spent by administrative staff and available online in real-time.
4. Library	Integrates as part of the student's record and provides for a portal to utilise and manage library resources by students and administrative staff.
5. Attendance	Monitor the attendance of staff and students, provide attendance registers for compulsory lectures and trend patterns of attendance so preemptive measures can be engaged.
6. Exam Management	Automate exam schedule creations for students and staff, capture student marks and process results and automate result emailing.
7. Fee Management	Maintaining full financial records of student fees and providing automated reports.
8. Hostel Management	Provide complete management of residences and provide a facility to log faults and queries. Manage services in the hostel.
9. Inventory	Maintains the life cycle of all assets in the institution, including funding aspects of asset management.
10. Communication	Provide real-time communication with staff and students via email or SMS. Used for general and emergency notifications.
11. Enquiry management	Provide via a central portal where students can make enquiries or request, and administrative staff will respond, allowing for online resolutions and reduced queues.

Table 2.1 Enterprise Resource Planning Module Benefits

Adapted from Baweja, S.K. (2015) **Uses of Educational Enterprise Resource planning**. International Journal of Engineering Research and General Science, III(1), p716.

Research by (Baweja, 2015) highlights eleven enterprise resource planning modules designed to improve performance in the higher education institution. Table 2.1 depicts the enterprise resource planning module and the corresponding business activity benefit.

(Kalema et al., 2014) research indicates eleven benefits of an enterprise resource planning implementation in higher education institutions tabulated in Table 2.2.

Benefit	Business Activity
1. Integration	Provide simple, seamless protocols for third party application integration
2. Teaching and Learning	Provide a learning management system as an integrated component.
3. Efficient workflow	Ensure timeous accurate workflow processes for student registration
4. Multiple data source access	Enable efficient access to external data sources.
5. Central data storage	Data is stored and managed by a central database engine.
6. Infrastructure	Reduce infrastructure footprint by reducing hardware quantity
7. Management reporting	Ensure timeliness in providing reports
8. Data sharing	Provide the ability to share data quickly and collaborate thereby reducing paper usage
9. Communication	Provide access and integration to various messaging platforms
10. Portal	Enable an adaptive integrated portal for all administrative processes.
11. Customisation	Flexibility in the system to quickly implement new features.

Table 2.2 Benefits of enterprise resource planning in HEIs

Adapted from Kalema, B.M., Olugbara, O. & Kekwaletswe, R.M. (2014) **Identifying Critical Success Factors: the case of ERP Systems in Higher Education**. The African Journal of Information Systems, VI(3), p67.

According to (Kalema et al., 2014), with the implementation of an enterprise resource planning system in a higher education institution, there would be eleven benefits achieved. Table 2.2 depicts the attainted benefit and the corresponding business activity derived from the benefit.

2.7.3 UKZN's Enterprise Resource Planning Implementation

The University of KwaZulu-Natal identified the need to integrate various information systems that were separate in the university. According to (Davenport, 1998), the anatomy of an enterprise resource planning system, as depicted in Figure 2.1 indicates a central database with the various operational specific applications connected to the central data store. UKZN's enterprise resource planning system has similar architecture.

Depicted in Figure 2.5 is the architecture of UKZN's enterprise resource planning system, indicating the components of the enterprise resource planning system that exist at the time of conducting this research.

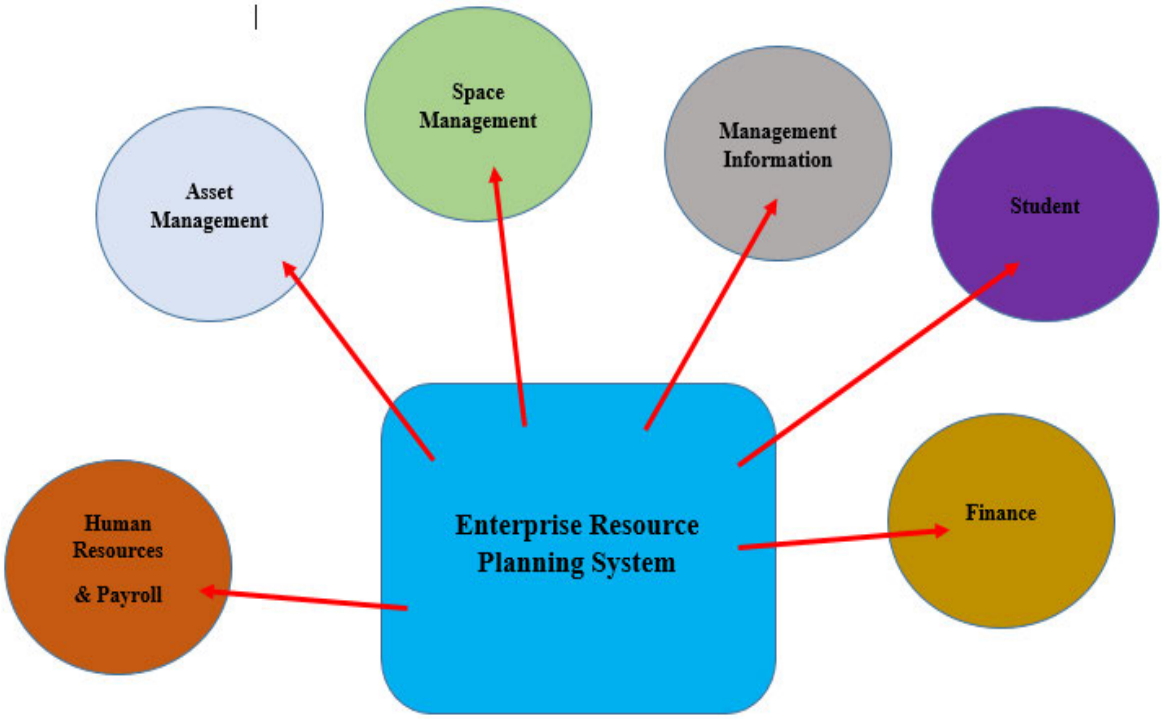

Figure 2.5 UKZN's Enterprise Resource Planning System Implementation

Adapted from Govender, Leanne. (2019)

According to (Govender, Leanne, 2019), the University of KwaZulu-Natal's enterprise resource planning application is Integrated Tertiary Software (ITS) and is a customisable enterprise resource planning solution specifically designed for higher education institutions.

The system comprises of six core modules and one secondary module:

The six core modules:

- Student management
- Finance
- Human resources and Payroll
- Asset management
- Space management
- Management information and

The one secondary module is a web interface module for administration of the student, finance, and human resources & payroll systems.

2.8 User Satisfaction with the enterprise resource planning system

The primary determinants of a successful implementation of an enterprise resource planning system are the attitudes of the enterprise resource planning system's users' (Abdinnour-Helm et al., 2003). The user's satisfaction with the enterprise resource planning system is influenced by either direct or indirect behavioural factors (Amoako-Gyampah, 2007).

There has been significant research regarding the user satisfaction with information systems, and one of the most cited models to measure user satisfaction is the DeLone and McLean model which maps the effect of using the information system against the user's satisfaction (Lowry et al., 2007).

The model assumes that the information system and the information quality has an indirect effect on the user and therefore on the organisation via a reciprocal relationship between user satisfaction and use (Delone & Mclean, 1992). About ten years after designing the Delone and Mclean Model for end-user computer satisfaction, the authors included new constructs into the model (Costa et al., 2016)

The Bailey and Pearson model listed numerous factors that are used to determine user satisfaction, the Bailey and Pearson instruments and the derivatives are a reliable base benchmark tool for measuring satisfaction in studies (Mohamed et al., 2006).

End-user computer satisfaction frequently measures the success of information systems (Doll et al., 1995). Using the end-user computer satisfaction model developed by previous researchers, it provides tremendous validity because it was developed using reliable instruments but also the various other methods to measure user satisfaction are complicated to validate, or they are weak, (Doll et al., 1995).

(Doll & Torkzadeh, 1988) developed a model which consisted of five factors, namely ease of use, format, timeliness, content and accuracy. The instrument was designed to work in the end-user computing environment and insisted the model be interpreted better.

2.8.1 The DeLone and McLean End-User Satisfaction Model

The new Delone and Mclean model's effectiveness level is based on the effect the information impacts the receiver (Delone & Mclearn, 2003); the explanation of the model is as follows:

System quality – focuses on measuring technical success.

Information quality – based on the semantic success

Service quality – is based on reliability, assurance, responsiveness and empathy

Use – deals with user satisfaction

User satisfaction – effectiveness of success is measured

Net benefits – are based on the use and the user satisfaction result

Intention to use – leads from increased user satisfaction.

Use and user satisfaction are closely related, but use precedes user satisfaction purely in a process sense. The positive relationship with use will lead to an increase in user satisfaction topically. From the increases in user satisfaction, an increase in the intention to use and use will increase. Usually, net benefits occur after the increase in use and user satisfaction (Delone & Mclearn, 2003).

Figure 2.6 indicates the new updated model (Delone & Mclearn, 2003).

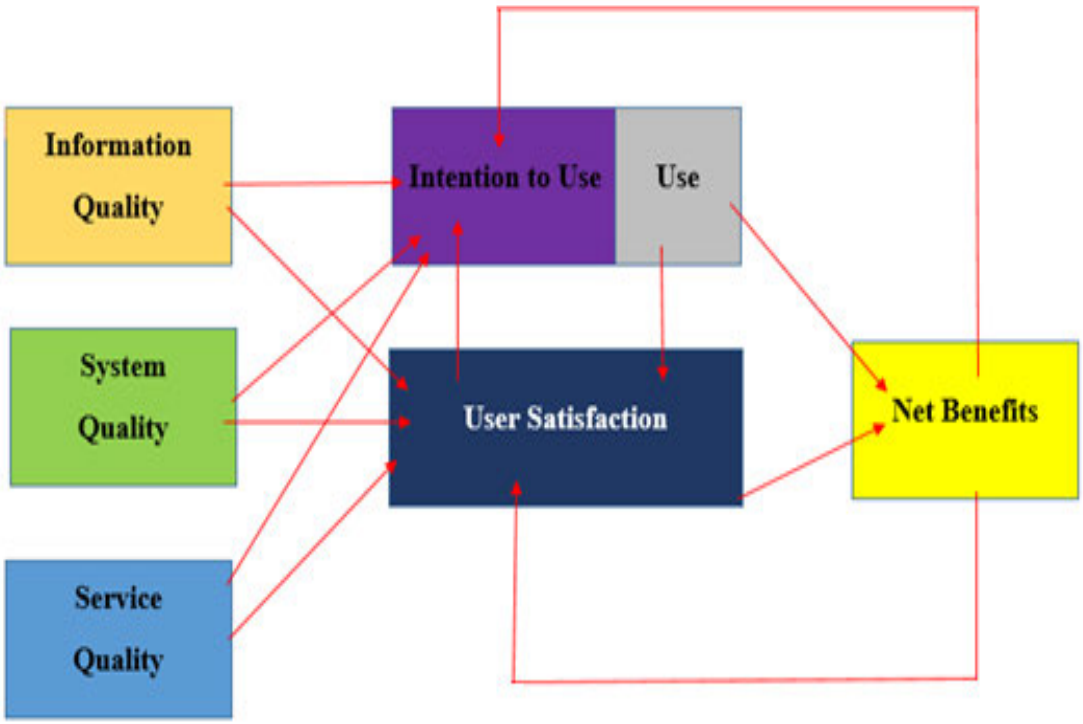

Figure 2.6 Updated DeLone and McLean EUCS Model

Adapted from Delone, W.H. & Mclearn, E.R. (2003) **The DeLone and McLean model of Information systems success: a ten-year update**. Journal of Management Information Systems, XIX(4),p.24

According to (Delone & Mclearn, 2003) there are interrelations between the seven constructs in the model, the red arrows indicate consequence or process flow.

2.8.2 Bailey and Pearson End-User Satisfaction Model

The end-user computing satisfaction model (EUCS) that has been utilised the most in research to evaluate information systems is the instrument model developed by Bailey & Pearson in their research paper titled "Development of a Tool for Measuring and Analyzing Computer User Satisfaction" (Aggelidis & Chatzoglou, 2012). Bailey and Pearson designed a model that contained thirty-nine factors to evaluate an information system on (Bailey & Pearson, 1983).

The model by Bailey and Pearson containing the thirty-nine factors depicted in Table 2.3 (Ives et al., 1963).

Factors
1. Relationship with the Electronic Data Processing (EDP) staff
2. Processing of requests for changes to existing systems
3. Means of input/output with the EDP centre
4. Interdepartmental competition with the EDP unit
5. Confidence in systems
6. Timeliness of output information
7. Chargeback method of payment for services
8. Perceived utility (worth versus cost)
9. Vendor support of hardware and software
10. Computer language used to interact with systems
11. Expectation (expected versus actual level of computer based support)
12. Correction of errors
13. Security of data
14. Degree of EDP training provided to users
15. Users understanding of systems
16. Users feeling of participation
17. Currency (up-to-datedness) of the output information
18. Attitude of the EDP staff
19. Reliability of output information
20. Top management involvement in EDP activities
21. Format of output
22. Response / turnaround time
23. Determination of priorities for allocation of EDP resources
24. Convenience of access (to utilise the computer capability
25. Relevancy of output information (to intended function
26. Volume of output information
27. Personal job effects resulting from the computer-based support
28. Accuracy of output information
29. Precision of output information
30. Communication with the EDP staff
31. Organisational position of the EDP function
32. Time required for new systems development
33. Personal control of EDP service received
34. Schedule of recurring output products and services
35. Documentation
36. Completeness of the output information
37. Technical competence of the EDP staff
38. Flexibility of systems
39. Integration (automated sharing of information) of system database

Table 2.3 Factors of the Pearson & Bailey EUCS Model

Adapted from Ives, B., Olson, M.H. & Baroudi, J.J. (1963) **The Measurement of User Information Satisfaction**. Communications of the ACM, XXVI(10), p.790.

The Bailey and Pearson model with the thirty-nine factors in Table 2.3 underwent assessment and modification initially by (Ives et al., 1963), and after that by (Baroudi & Orlikowski, 1988). As a result of the modifications to the model, a new concise model emerged consisting of only thirteen factors, and into three primary constructs with the

grouped factors therein (Aggelidis & Chatzoglou, 2012). These are as follows according to (Baroudi & Orlikowski, 1988),

"**Information product –** this is the respondent's self-reported assessment of the quality of output delivered by the information system."

"**Electronic Data Processing Staff and Services –** this is the respondent's self-reported assessment of the attitude and responsiveness of the EDP Staff as well as the quality of their relationship with the EDP staff."

"**User Knowledge and involvement –** this is the respondent's self-reported assessment of the quality of training provided, their understanding of the system and their participation in its development."

The thirteen factors that feature under each group are:

- Relationship with EDP Staff
- Processing of Requests for Changes
- Degree of EDP Training Provided
- Users' Understanding of System
- User's Sense of Participation
- Attitude of EDP Staff
- Reliability of Output
- Relevancy of Output
- Accuracy of Output
- Precision of output
- Communication with EDP Staff
- Time Required For New System Development
- Completeness of output.

2.8.3 The Doll and Torkzadeh End-User Satisfaction Model

The Doll and Torkzadeh model focuses on the current personal computer environment and end-user computing environment (Doll & Torkzadeh, 1988). Validation of the EUCS model is difficult to deny the success of a system when users are happy with the information system, so "satisfaction" has some face validity. Numerous validation tests occurred conducted on

the Doll and Torkzadeh model, and it proved very effective (Mohamed et al., 2006). According to (Doll et al., 1995), the model consists of five factors:

- Ease of use
- Format
- Timeliness
- Accuracy
- Content.

Figure 2.7 demonstrates the construction of the Doll and Torkzadeh model (Doll & Torkzadeh, 1988).

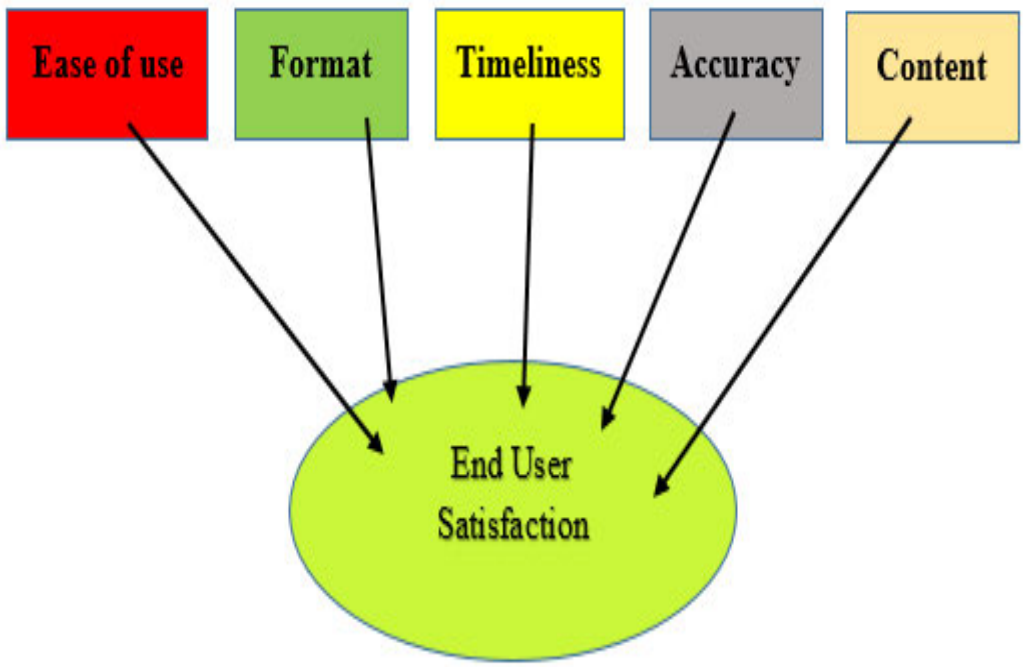

Figure 2.7 Doll and Torkzadeh EUCS Model

Adapted from Doll, W. & Torkzadeh, G. (1988) **The measurement of end-user computing satisfaction**. MIS Quart, XII(2), p.230.

(Doll & Torkzadeh, 1988) designed their instrument purely to measure end-user computing satisfaction with five factors; namely ease of use, format, timeliness and this instrument was geared only to function within the end-user computing environment.

The five factors:

- **Ease of Use**

  According to (Branscomb & Thomas, 1984), the ease of use in software development has integral importance in the design of the software. Evidence in mounting

indicating that effective functioning of an application is related to the ease of use (Goodwin, 1987). (Doll & Torkzadeh, 1988), suggest that if an application is easy to use, users become increasingly advanced in the operation of the application and are now able to make of all the capabilities of the application which in turn can increase productivity and provide more alternatives to decision makers (Doll & Torkzadeh, 1988). A system should follow ease of use guidelines and be based on the purpose of the application and the essential functions the application is designed to accomplish. There will be resistance in learning the system if it is complicated and challenging to use. Ease of use is expected to increase the overall level of EUCS, and if the system is not easy to use then, productivity is lost along with delays in business operations (Mohamed et al., 2006).

- **Format**

  (Bailey & Pearson, 1983)**,** classified the format of the information reported by the system as a descriptive measure whereas (Doll & Torkzadeh, 1988) used the format as a secondary factor in determining EUCS. The displayed format of request data affects the end user's satisfaction level if their expectations are not met (Mohamed et al., 2006).

- **Timeliness**

  According (Doll & Torkzadeh, 1988), timeliness is the measure of the speed of the system in responding to requests for data, delays in data or report generation cause dissatisfaction and a ripple effect across business operations of the organisation.

- **Content**

  Reporting is a crucial function in information systems of today, and the content is used regularly as a measure of an information system. The end-user perceives the content is vital, primarily when the content is used to make the business decisions. The use of information system reports is one of the most frequently reported measures of the success of an information system gauged on (Delone & Mclean, 1992).

- **Accuracy**

  The accuracy of the data is a fundamental measure of the quality of a system, and if uses cannot trust the data being received from a system then there is a lack of confidence in the results and reports, this can lead to substantial operational inefficiencies within the organisation and lead to devasting business issues.

2.9 Summary

The literature is vast with regards to enterprise resource planning systems, user satisfaction models and the latest global movement in the higher education sector and the move to adopt enterprise resource planning systems. This chapter interrogated the various components of this study elaborating on the definition of enterprise resource planning systems. Discussions occurred around the uses and benefits of enterprise resource planning systems and notwithstanding the failures of enterprise resource planning implementations with the consequences of a failed implementation. A bit of history on the evolution of enterprise resource planning systems displayed the changes over time that information system underwent to become enterprise resource planning systems. Understanding the higher education environment was crucial to understanding the need for enterprise resource planning systems in higher education institutions, the goals and business activities of higher education institutions were investigated, and the role of enterprise resource planning systems in higher education institutions is significant. Business advantages in higher education institutions were discussed around the implementation of enterprise resource planning solutions in the higher education sector. Various models of user satisfaction validation were researched, and there is clear evidence that user satisfaction has a direct relationship with enterprise resource planning usage and successful implementation. The following chapter covers the research design and the methodology undertaken during this study.

CHAPTER THREE

Research Methodology

3.1 Introduction

This chapter describes in detail the various components in the research methodology framework utilised in this research. The aim of the study will dictate the data that is required to be collected, thus ensuring the validity of the data accumulated. The researcher will discuss components of the framework, such as the research design and methods employed, thereafter the study setting, the population chosen and the sample size selected for data harvesting. The researcher will describe and discuss the sampling method chosen for the research study and elaborate on the construction of the research instrument.

The researcher will discuss the data collection process and the data analysis component of the research methodology framework and provide the relevant justifications for the data collection, and data analysis techniques utilised in the study.

A discussion concerning the aspect of validity and reliability of the research study and the bias component of the research methodology will ensue. The various ethical considerations that could influence the study were brought to the fore along with the processes to mitigate them. This chapter concludes with a summary that draws attention to the components of the research methodology framework discussed in detail.

3.2 Aim of the study

The research intends to establish if the users at the University of KwaZulu-Natal are at present satisfied with the administrative enterprise resource planning system. The study into user satisfaction with the enterprise resource planning system was restricted to the three dimensions or categories of the enterprise resource planning system, these being the ease of use, timeliness of data retrieval and the format relating to the presentation of the data and user interface.

3.3 Research design

The elements of the research design, as evidenced in Figure 3.1, according to (Sekaran & Bougie, 2013).

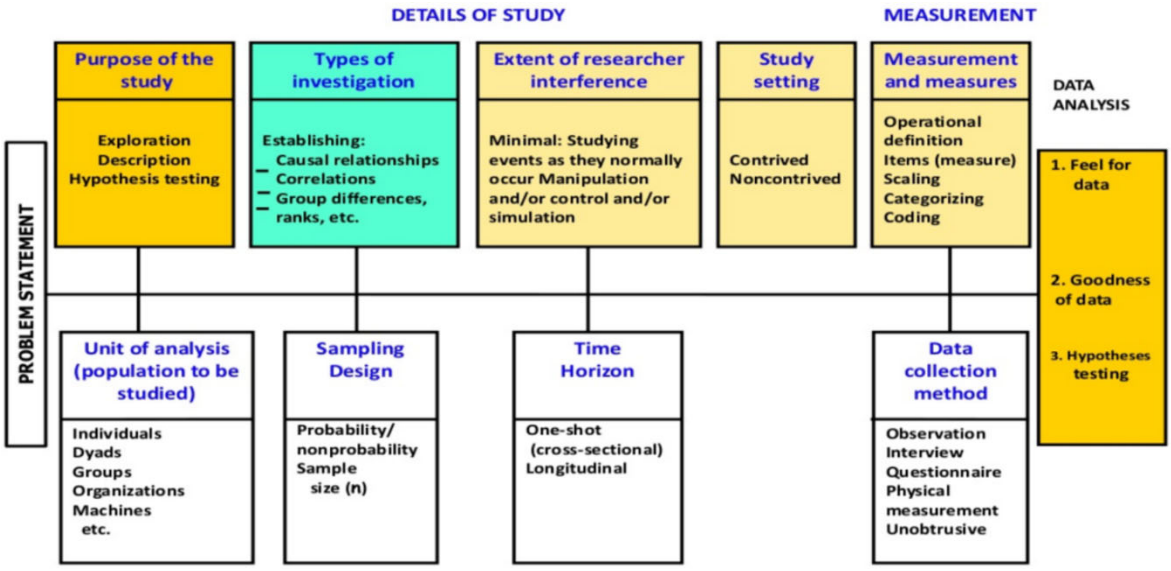

Figure 3.1 The Research Design

Source: Sekaran, U. & Bougie, R. (2013).

A research design allows for the creation of a planning document or blueprint that indicates the processes for data collection, measurement and analysis based on the research questions of the study. The research design elaborates on each step in the process undertaken, starting at the problem statement and concluding with the data analysis (Sekaran & Bougie, 2013).

The nature of the study was exploratory as the administrative enterprise resource planning system is crucial for administrative support staff at UKZN to accomplish multi-departmental operations of this higher education institution daily. The enterprise resource planning application drives operational management, and the administrative support staff have no option but to use this application to execute their employment functions. Their satisfaction concerning the enterprise resource planning system defined by the three categories mentioned earlier in this chapter is unknown.

The absence of knowledge about the users' satisfaction with the enterprise resource planning system presented the researcher with an opportunity to undertake a qualitative approach to the study as this approach to data collection provides a higher degree of richness in the data

obtained. A qualitative approach will yield comprehensive insights into user satisfaction with the enterprise resource planning system based on the three categories. This approach will bring to the fore critical aspects within the three groups that the users' use to determine their satisfaction and lead to identifying if the University of KwaZulu-Natal users are satisfied with the enterprise resource planning system.

3.4 Research methods

The qualitative approach directed the selection for the research strategy to be a survey. According to (Sekaran & Bougie, 2013), the survey strategy for business research allows the researcher to collect qualitative data and is a popular research strategy, further to this the survey strategy utilises in a business context research such as customer satisfaction and management information systems.

3.5 Study setting

The researcher is employed at the University of KwaZulu-Natal and holds a principal technical position in the information and communication services department. The researcher manages the team that is responsible for the operations of the enterprise resource planning application from an information technology perspective. The team is responsible for assisting and resolving enterprise resource planning system-related issues that the administrative support staff at the University of KwaZulu-Natal experience. Often in their interaction with the support staff, the support staff express their dissatisfaction with the enterprise resource planning application. The researcher identified that research was required to determine if the support staff are satisfied with the enterprise resource planning system within the three categories and identifying specific components in those categories.

3.6 Population

The population refers to an entire group of events, people or things of interest that the researcher wishes to investigate (Sekaran & Bougie, 2013). The University of KwaZulu-Natal staff complement comprises of both academic and support staff. The researcher identified that support staff from the three business-critical units being human resources,

finance and student academic administration within the support sector that use the back office component of the enterprise resource planning application would constitute the population for the research, these are the primary users of the enterprise resource planning system and utilise it regularly for their job functions.

3.7 Sample

The population of the enterprise resource planning back-office support staff spans primarily across three critical departments within the support sector. These utilise the enterprise resource planning system daily to conduct the university's operations. These are the finance, human resources and student academic administration departments. The researcher selected four participants from the human resources section, three from the finance section and two from the student academic administration section. The sample size consisted of nine participants across the three business units.

3.8 Sampling method

The nonprobability sampling designs are those where the elements in the population have no probabilities associated with them, rendering them as sample participants (Sekaran & Bougie, 2013). According to Sekaran & Bougie, (2013), purposive sampling targets specific types of people that can provide the data criteria set out by the researcher, within this type of sampling there are two major types, namely judgement and quota sampling. Purposive judgment sampling was selected as the nonprobability sampling method as it involves selecting candidates who can provide the researcher with the information that is required (Sekaran & Bougie, 2013).

3.9 Research instrument

The researcher based the research instrument on the objective of the study and in that way the data required had to be relevant to the three dimensions of user satisfaction identified, these being the ease of use, timeliness of data retrieval and the format relating to the presentation of the data and user interface. In light of the specifics of the research design in

the study, the researcher selected a face-to-face interview instrument, as this will yield the rich, in-depth specific data that is required by the researcher.

3.10 Data collection

The data collection process involved face-to-face interviews. Interviewing can be divided into two types, which are structured and unstructured. Unstructured interviews are such that the interviewer does not have a planned sequence of questions to ask the respondent whereas structured interviews the researcher is aware of the information needed from the outset of the interview and a list of predetermined questions are posed to the respondents soliciting responses (Sekaran & Bougie, 2013). The type of interview conducted was a structured one.

The researcher in this study prepared a list of questions that each respondent had to respond to; at times the interviewee would be guided to answering within the paradigm of the three categories or dimensions that are being researched to obtain relevant purposeful data. The researcher ensured that the structured interview concluded with collecting the required data. The interviewees on occasion would find difficulty in articulating their opinion on a particular aspect in respect to the enterprise resource planning system and the researcher had to rephrase or seek confirmation from the respondent.

3.11 Data analysis

The richness of qualitative data in the form of words from interview notes and interview transcripts, the quantity of the data collected are usually overwhelming, and analysis of the data is complicated. The reason for this is due to the lack of well-established guidelines and commonly accepted rules concerning the interpretation of qualitative data (Sekaran & Bougie, 2013). The analysis of qualitative data has three distinct processes; these processes are the reduction of data, the display of the reduced data and the drawing of conclusions according to (Miles & Huberman, 1994).

3.11.1 Data reduction

The inherent need for data reduction is due to the incidence of large amounts of data that qualitative data collection produces. The reduction of data is the first step in the data analysis process of qualitative studies (Sekaran & Bougie, 2013). (Sekaran & Bougie, 2013) identify that the method to reduce the data is through coding and categorisation.

The analytic process of coding takes the qualitative data gathered, reduces, rearranges and integrates it to form theory, and the purpose of coding is to arrive at meaningful conclusions relating to the data (Sekaran & Bougie, 2013). These codes are merely labels given to a unit of text that is subsequently aggregated into groups and become categories. The coding process begins with the identification and selection of the coding unit that takes the form of words, paragraphs, sentences and themes and categorisation is the process of taking the coding units and organising, arranging and classifying them (Sekaran & Bougie, 2013).

3.11.2 Data display

Miles & Huberman, (1994), state the data display is the second significant activity undertaken when analysing qualitative data. According to (Sekaran & Bougie, 2013), the data display component of qualitative data analysis involves taking your reduced data and rendering it in a concise and organised manner for display. There are various methods of displaying the reduced data; some of these are charts, diagrams, graphs and matrices and this is to organise the data and discover relationships and patterns that will facilitate conclusions.

3.11.3 Drawing conclusions

Conclusion drawing is the last analytical process that the analysis of the qualitative data is subjected to, this is achieved by answering the research questions and is the heart of data analysis (Sekaran & Bougie, 2013). Drawing conclusions are reached by explaining the relationships and patterns observed, making comparisons and contrasts and lastly determining what the identified themes stand for (Sekaran & Bougie, 2013).

3.12 Reliability and validity of the study

The validity of the study is achieved by careful selection of the departments in which the respondents employed in, and the chosen respondents would provide the researcher with valid data for the research. Majority of the respondents had numerous years of experience working with the enterprise resource planning application at UKZN. Their expertise provided for rich, accurate qualitative data that would be relevant to the objective of the study. The researcher in narrowing the responses from the participants by indicating the three dimensions or categories that the user satisfaction research is referring to, lead to the reliability of the data obtained. The reliability of the data collected enhanced by using structured face-to-face interviews, which ensured the respondents responded to the same

questions. The recorded interviews are referenced regularly to ensure reliability during comparison with the prevailing literature.

3.13 Bias

The researcher took careful consideration when designing the interview questions to prevent the respondents from being asked biased questions. The researcher assured the respondents that the interviews are informal, and the recording of the interview is purely for data collection purposes, as this would solicit unbiased responses from the participant.

3.14 Ethical considerations

A rigorous ethical process is followed to conduct the research and conduct the study at UKZN. The first ethical process is to obtain a Gatekeeper's letter. This letter provides the researcher with the authorisation to perform the research at UKZN. The following step is for the researcher to submit an application to the ethics committees for review of the intended study and to obtain approval for the research to be conducted. These committees ensure the researcher adheres to the necessary ethical protocols as dictated by the university.

3.15 Summary

This chapter chronicled in detail the research design of the study. The chosen approach to conduct the study is a qualitative research method, and the location was the University of KwaZulu-Natal. The study was confined to three dimensions or categories of user satisfaction with the enterprise resource planning system, these being the ease of use, timeliness of data retrieval and the format relating to the presentation of the data and user interface. The participants were selected based on their interaction with the enterprise resource planning system and from the three departments that extensively utilise the enterprise resource planning application. The chosen research instrument was face-to-face structured interviews as this provided for the researcher to channel the participants' responses and obtain useful, valid and reliable data. Before conducting the research, all the necessary ethical protocols were invoked. The research study is qualitative in design and will utilise a three-step analytical process to analyse the data. The three-step process involves reducing the data, displaying the data and then drawing conclusions. The forthcoming chapter will present the acquired data and discussions around the data will ensue.

CHAPTER FOUR

Presentation of Results and Discussion

4.1 Introduction

This chapter relates to the results of the study, and the researcher has analysed the data received from the interviews, the interviews were structured, which solicited specific data from the respondents. The data received from the respondents were confined to the three categories identified in the previous chapter. These categories were adapted from the end-user computing model by (Doll & Torkzadeh, 1988). The pre-categorising of the data allowed the researcher to obtain valid data about the user satisfaction with the enterprise resource planning system concerning the ease of use, format and timeliness of the system. The data is qualitative in design and the end-user computer model selected coupled with the face-to-face interviews allowed for the obtaining of face valid data, and this is because user satisfaction is attributed the emotional feeling of the respondents.

It was then easier to identify the themes evident in the data and categorise the data. The research methodology defined the categories that were investigated, relevant themes were extracted from the collated data, and it produced a complete understanding of the user's satisfaction level at the University of KwaZulu-Natal with the enterprise resource planning system. It is important to note that most of the research identified focuses on determining if the implementation of the enterprise resource planning system was successful using the various user satisfaction or end-user computing satisfaction models. It may become evident that some of the themes repeat themselves in each category; this was as a result of the theme playing a significant role in the category.

This study sought to determine if the users are satisfied with the enterprise resource planning system relating to the three categories. There is limited literature in regards to this type of study. Reference literature was difficult to locate except for one where only one category was used in evaluating the enterprise resource planning system, and that was "Effectiveness of an Integrated Tertiary Software Mobile Information System for Student Registration and Admission at a University in Gauteng" (Mashabela & Pillay, 2017).

4.2 Demographics of respondents

The respondents were carefully selected from the three sections at UKZN that primarily use the enterprise resource planning system daily conducting business operations at UKZN. The three departments that were selected are Human Resources, Finance and Student Academic Administration. The total number of interviews conducted was nine, and all of the staff members were from the support sector.

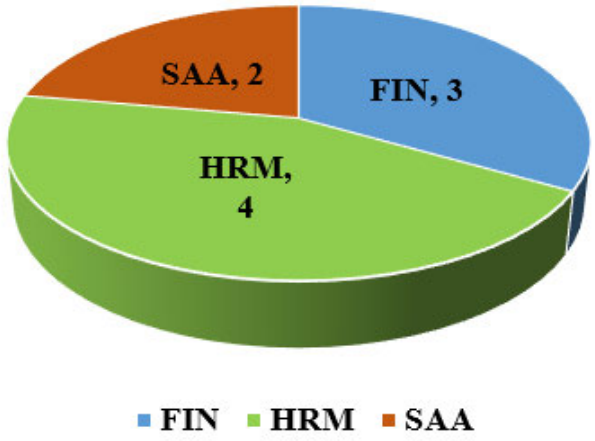

Figure 4.1 Sectional Breakdown of Respondents

Figure 4.1 displays the number of respondents per section chosen from Human resources four participated, three from Finance and two from Student Academic Administration. The interviews were conducted on two campuses, namely Howard College and the Westville campus. Figure 4.2 indicates the current number of years the respondents worked with the enterprise resource planning system at UKZN. The average number of years working with the enterprise resource planning system is thirteen and a half years (rounded to half a year).

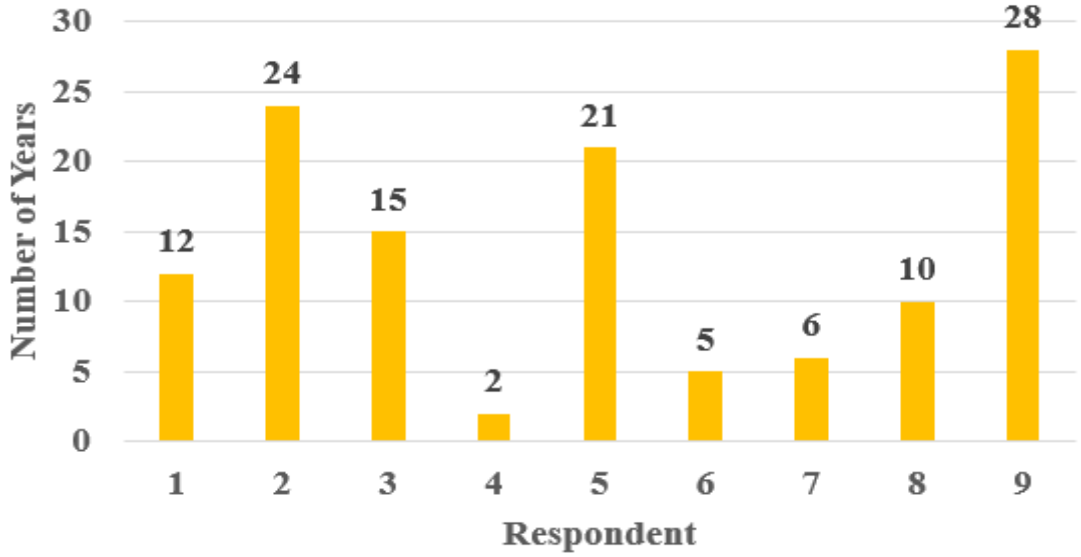

Figure 4.2 Years Worked with An Enterprise Resource Planning System

4.3 Categories

The researcher identified at the onset of the study that based on the user satisfaction model by (Doll & Torkzadeh, 1988), the three categories selected were ease of use, format and timeliness. Due to the environment at the University of KwaZulu-Natal, the researcher identified that the three factors in Figure 4.3 would be pertinent and would provide the required data for the study.

Figure 4.3 Categories of Data Analysis

The data was analysed in the context of the three categories in Figure 4.2 and the relevant themes pertaining to each category was identified and will be presented and discussed.

4.4 Themes Identified

The themes were identified from the raw data post; the data reduction process after that, they were then placed into one of the three pre-determined categories. The categories were pre-determined to ensure the validity of the data collected, and the respondents, if not directed, would provide unnecessary data for the study. The following themes were identified in the data and were coded to fall within the pre-defined categories.

4.4.1 Ease of Use Category

The themes identified to fall within the ambit of the ease of category are menu functionality, user interface, poor menu item descriptions and report generation process.

4.4.1.1 Menu functionality

The respondents unanimously voiced their dissatisfaction with the menu functionality of the enterprise resource planning system. The common consensus is that the menu prevents ease of use of the application. The opinion of the respondents' was that the menu is "clunky" to navigate through and causes delays in resolving queries. It does not provide a holistic view of the record that is actively being accessed. Querying a student or staff record requires the administrator to toggle between three and five menus and screens, this delays resolution of

the query and decreases service turn around time. The administrators indicated that this constant movement between menus to perform transactions on the system poses a risk of making mistakes either while capturing or processing requests. New employees find the system antiquated and complex to navigate because the menu setup is not intuitive and to perform a task it requires that you know the shortcode description for that menu and here again the risk of selecting the incorrect the option is increased. This makes the new staff member and present staff members apprehensive about utilising the system. The execute button and help interface are not clearly identifiable, and this further delays inexperienced users from performing their duties as they then seek assistance from their colleagues; this now, in turn, delays two employees from performing their duties.

4.4.1.2 User interface

The user interface theme was another component the respondents commented negatively about, and from the responses, it was identified that the user interface appearance and structure is aged and not in tune with the web style interface that the participants are confident and familiar in using. The appearance of the interface is being compared to that of an Android, Apple and laptop user interface. The user interface was described as being from the "DOS era", and this makes it difficult for new incumbents into the organisation to learn the system quickly, easily and become productive using the enterprise resource planning system to conducted daily operations.

4.4.1.3 Menu item descriptions

Inadequate menu item descriptions is a problem that plagues both the experienced and inexperienced users of the enterprise resource planning system. The respondents identified that the menu items do not have meaningful descriptions, and navigation is difficult within the menu if the option shortcode or full name is unknown furthermore the menus are not structured in any logical way. The ability to complete the task effectively and efficiently depends on your memory and experienced knowledge of how to navigate within the system.

4.4.1.4 Data validation

Data validation from within the system for data input or medication, critical vital fields are not protected nor is the content on those fields validated. The causes of administrative burden and unnecessary delays in executing tasks. The data from the enterprise resource planning system it out-dated for numerous records and this causes great frustration and

systems and services cannot depend on the data. Reporting is directly affected by incorrect data being captured. The enterprise resource planning system allows for free text to be typed in key field areas like identity number, student numbers and severely affect data validation and reporting. Student numbers that are allowed to be entered with spaces in them cause various issues with receipt printing, automated Active Directory account creation, parking disc systems. From a staffing point of view, crucial pieces of information can be left out like identity numbers, and the system does not automatically verify if the identity number exists, this has tremendous potential to duplicate record created for the same individual. This type of issue has already occurred a couple of times, and the enterprise resource planning application should be configured with more stringent data validation techniques.

4.4.1.5 Report generation process

The respondents identified the same theme in previous themes discussed above and were extremely dissatisfied with the report generation business process. It has become the most disliked process in the enterprise resource planning system. The report generation process in the ease of use category was confined to the enterprise resource planning system's standard report generation process, and this is utilising the system's preconfigured reporting functionality. The reason for discussing the report generation process theme last in the ease of use category is because the four themes discussed above contribute to the dissatisfaction of the report generation process theme. In addition to this, the respondents articulated that the report generation process is cumbersome, prone to errors being made, which could have negative consequences to the entire system performance. It was noted that during the generation of certain reports failures or issues with a record in the report will prevent the entire report from being generated. It was suggested that the enterprise resource planning system should allow the generation of the report to continue and complete listed any failures or errors.

4.4.2 Timeliness Category

The themes identified to fall within the realm of the timeliness category are responsiveness and report generation process.

4.4.2.1 Responsiveness

This theme identifies the user's perceived system responsiveness, and this was generally favourable, and the users were largely satisfied with the speed and response of the enterprise

resource planning system. There is an understanding that has come with the users' experience and knowledge that certain processes will inevitably have slower response times due to the nature of the request but overall indicated that the response delay in those instances is acceptable and they are not dissatisfied with the response. During high utilisation periods which are typically registration and examination result processing, it was noted that the system is less responsive due to the load and this puts some strain on other sections to be able to conduct their business functions.

4.4.2.2 Report generation process

The report generation process was a distinct theme in the ease of use category as well, in context with the timeliness category, two aspects presented itself in this theme. The first one was the time taken to start the report generation process was unacceptable in terms of the parameters that were required to be entered manually to obtain a standard report process using predefined built-in reports of the enterprise resource planning system. Here again, the themes of the user interface and menu functionality under the ease of use category have a significant impact on the timeliness of report generation. Highlighted by the respondents was that errors in the manual insertion of parameters to generate the report would have one of two consequences, these are the requested report fails or returns incorrect data rendering it useless and the process is repeated which delays the task being completed and any operational decision that is dependant on that report is also delayed.

The second consequence is that the report does generation does not complete and continues endlessly in a loop causing system slowness and data unavailability, the system slowness occurs due to the report generation process utilising too much system resources due to invalid parameter selection. The second aspect of this theme is related to non-standard report generation process; this is a much more complex process and causes significant delays in obtaining reports. The respondents have stated that non-standard reports have a minimum delay of at least two days because it not solely dependant on the system to generate the report. The enterprise resource planning system has a finite set up of standard reports, and it is important to note that non-standard reports are deemed reports that do not exist on the system and the logic behind the report generation has to be developed. Depending on the originating business unit for the non standard report request the process is slightly different, if human resources it requesting the report, the human resources information systems officer receives the request from colleagues in human resource and will request the report creation

from the internal developers, other business units will contact the internal developers directly. It can already be noted that there are delays in obtaining data from the system, depending on the developers' availability and workload the request takes any durations from two days to weeks and sometimes months to complete. This process for generating non-standard reports is a human-intensive, time-consuming process, the resounding dissatisfaction with the process is clear; the users believe that non-standard report generation should be more user-driven and system-friendly and dependant.

4.4.3 Format Category

The themes identified within the category of format are holistic reporting, report generation delays, report format generation and individual reports.

4.4.3.1 Holistic reporting

The holistic report theme targets in on reporting inefficiencies and these inefficiencies cause frustration with the support user base that uses the enterprise resource planning system to complete business operational activities. Respondents highlighted the system failure in terms of reporting processes. It was identified that standard built-in reports that should be provided with the required set of data are inadequate and the support staff find themselves in a time-consuming process of generating multiple standard reports and merging the content of these reports to obtain the data they require. The time consumption is proving to be an efficiency hurdle for the respondents, and they are left with management questioning the delay in producing the requested report. A significant amount of timeconsuming excel data manipulation takes place, human errors occur, and the reports have to be re-generated cause further delays in receiving the data. Respondents also mentioned that some reports are obtained from other systems that extract the data form the enterprise resource planning system and present it to the user in a particular format. The enterprise resource planning system should be able to generate this report as the data is housed with the central database. The respondents believe reports should originate for the primary enterprise resource planning system and not other secondary systems, and this poor workflow brings about delays and efficiencies.

4.4.3.2 Report generation delays

Report generation delays occur when non-standard reports of the enterprise resource planning system are referred to the internal development team to create and customise as per

request. The workflow of this process has multiple points of failure and delays. The delay in the present process to obtain a non-standard report is extremely challenging concerning the wait time. Some reports are time-critical and do not exist as a standard report on the system and have to be developed. Management usually has to forgo the luxury of making decisions at times in the absence of the report.

4.4.3.3 Report format generation

Respondents require the reports to be in a user-friendly format and easily understandable. Majority of the standard reports provide the correct format that is required by the user, but often it has to be further edited and manipulated to obtain exactly what is required from the report. Respondents have mentioned that depending on the report that is required, hours and sometimes days of manual manipulation of the report has to be done. The format that some extensive reports are generated in renders them useless because either there are supplementary reports that have to be generated to interpret the initial report or the report is so complex that it cannot be deciphered easily and hours of intensive analysis has to be carried out in order to provide a meaningful report. The reporting format of the enterprise resource planning system is not sufficiently equipped to provide reports in a variety of display and logical formats. Decisions based on these reports are often delayed due to the report not being displayed in the required format.

The other aspect about report format generation is the enterprise resource planning system cannot render the report in all the standard file formats that are required, specific reports are only available in pdf format, and this hinders the support staff if they are required to manipulate the data and present to management or at meets. Again hours on end are consumed to transcode the report into the required file format and after that manipulate the report. The respondents indicated the huge time loss and delays when the system could not provide the report in the required format. Management becomes increasingly disillusioned with the delays in receiving the report from the support staff and the staff become dissatisfied with the system because it cannot provide the data they need in the format required.

4.4.3.4 Individual reports

Again referring to standard reporting functionality in the enterprise resource planning system, the standard reports are generated used the fixed parameters as mentioned earlier in this chapter, often is the case that in human resources or finance departments required a subset of data from a standard report which needs to be reported on. The standard report

cannot be generated with custom parameters to provide the subset of the data that is required. The parameter input to generate the report is static, so once the whole report is generated, the support staff have to reduce the report now manually to obtain the subset of data that is required. This process is again manually and time-consuming and prone to human error, if the accuracy in the report is marred by human error decisions taken on that report might be inaccurate and can cause extensive and critical issues within the business.

4.5 Satisfaction rating

The final question in the interview was for the respondent to sum up in the context of the three categories and identify within themselves if they are satisfied with the enterprise resource planning system. To assist them in discovering their satisfaction, the researcher requested they provide a rating for their satisfaction with the enterprise resource planning system at the University of KwaZulu-Natal. The rating scale was from one to ten and a rating of five is neutral. The results of the rating are depicted in Figure 4.4.

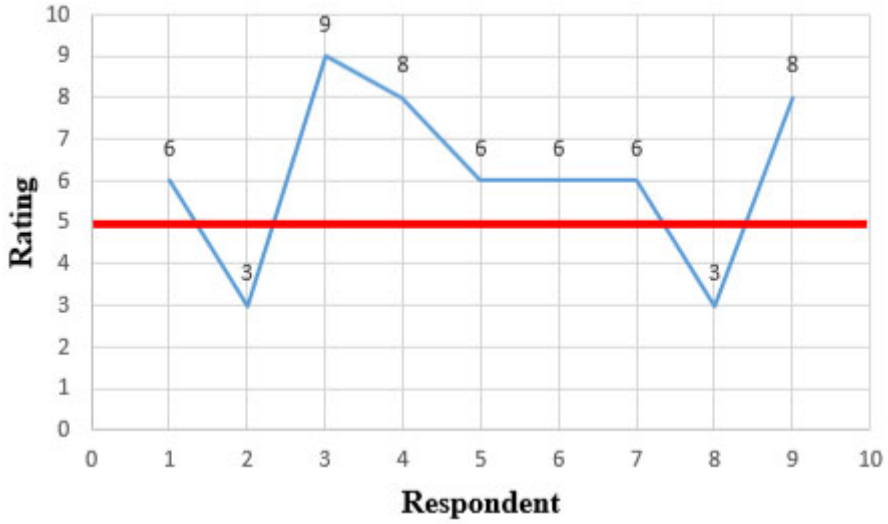

Figure 4.4 Respondent Satisfaction Rating

The rating of the respondents depicted in Figure 4.4 on a line graph indicating the five score neutrality value, there is a clear indication that the majority of the respondents rated their satisfaction with the enterprise resource planning system above a five. The average was around six (rounded off), and this provides us with an understanding that the users are marginally satisfied with the system.

4.6 Summary

The results of the study indicated that the users are marginally satisfied with the enterprise resource planning system. The issues identified in the themes are potential game-changers, and if left unattended has the potential to increase the dissatisfaction levels with the enterprise resource planning system. The available literature did not provide for sufficient referral to other studies conducted to ascertain if the users of the enterprise resource system are satisfied. The higher education institutions have a unique business structure and processes; the enterprise resource planning system is customised for higher education institutions, and in the research, the focus is on whether the implementation was successful by using the various end-user computing satisfaction or user satisfaction models to arrive and the answer. The results showed that the main issue that is causing dissatisfaction and operational inefficiencies with the loss of productive work time is reporting services within the application. The reporting functionality permeated the entire system, this theme appeared in each of the categories, and it came out strongly in the interviews as a crucial problem that requires attention and resolutions. Without a doubt, the user interface and menu functionality are the second two themes that users are dissatisfied with in regards to the system functionality and processes. The following chapter will terminate the study and provide some insight into future studies and recommendation for the stakeholders at the University of KwaZulu-Natal to take cognisance.

CHAPTER FIVE

Conclusions and Recommendations

5.1 Introduction

This study was undertaken to establish if the University of KwaZulu-Natal administrative support staff that use the back-office component of the enterprise resource planning system are satisfied with the functioning of the system. The research established that the administrative support staff who use the back-office component of the enterprise resource planning system are marginally satisfied with the system. There is a significant amount of improvement that can be undertaken to enhance interaction with the enterprise resource planning system. The research made evident critical operational hindrances, that are impeding efficiency within the departments that use the enterprise resource planning system. Delays in processing requests and service turnaround times are amongst the consequences of inadequacies within the enterprise resource planning system. The research objective was reached and will be discussed later in the chapter, along with recommendations to resolve the issues and future studies.

5.2 Conclusion

The need to conduct this study was to gauge if the administrative staff are satisfied with the functioning of the enterprise resource planning system at the University of KwaZulu-Natal. It was a singular objective and being a qualitative study using the end-user computing satisfaction model to qualify emotional inclinations of administrative staff in the organisation is not simple, but invaluable knowledge was obtained with the study. The enterprise resource planning system is not a perfect fit for the organisation, but in voicing that, there is no standard enterprise resource planning system that is an ideal fit higher education institutions. Overall the administrative support staff were marginally satisfied with the functioning of the enterprise resource planning system. Constructively they acknowledge that the system has flaws that are not insurmountable, and if attention were given to rectify those issues, they would be more satisfied.

5.3 Implication of this research

The objective of the study has answered the question if staff are satisfied with the enterprise resource planning system, but more importantly, it provided a platform for administrative staff to voice the difficulties that hinder them from being efficient and conducting the operational business of the institution effectively. The research has highlighted and validated the EUCS model by (Doll & Torkzadeh, 1988) can be applied to higher education institutions to determine end-user computing satisfaction and further to this it corroborates that there is no "one size fits all" when it comes to enterprise resource planning systems, and the higher education institutions's are similar to business in the global economy. The importance is to be agile enough as an enterprise resource planning vendor to tailor your standard enterprise resource planning systems to various clients. Distinct areas have been identified in the study that if the management of the institution resolves both processes and information technology hurdles, significant benefits in terms of efficiency in business processed would be achieved.

5.4 Limitations of the Study

The limitations of the study were not unsurmountable that they could not be overcome. The following limitations where identified:

- Interview Instrument

  The interview instrument is a powerful method to obtain rich data, but it comes at the cost of the quantity of data. The analysis of the sheer volume of data proved to be quite a time consuming, but this was overcome utilising pre-defined categories there limiting the scope of the data receiving and obtaining valid, useful data. The limitation with interviews is the availability of the respondents. The crucial aspect of overcoming that is to schedule interviews during less operationally busy periods.

- Identifying target respondents

  The identification of the respondents the twill be willing to spare their time and participate in the study is crucial, and often many refuse to participate, some due to no personal gain in the study, others do not care and the last batch, just too busy. The researcher identified administrative staff that are dedicated to working better and

smarter and want to a difference, also chose the respondents that will benefit the study. The truth is that if the respondents are known to the researcher, then it will be easier to solicit participation.

5.5 Recommendations to resolve the research problem

The research problem was to identify if the staff are satisfied with the enterprise resource planning system, but the information gathered during the study has provided opportunities for the University of KwaZulu-Natal to improve on numerous inefficiencies relating to it is enterprise resource planning system and business processes. There are simple, cost-effective changes that can be made to ensure efficiency.

- Implement regular in-house training for staff that use the enterprise resource planning system
- Engage with the IT department voicing difficulties that hinder operations and find solutions together.
- Communication is of paramount need, sections within organisation work isolation and not leveraging team power.
- Regularly evaluate processes to ensure inefficiencies have crept it and improve where improvement can be made.
- Engage with the custodians of the enterprise resource planning and have discussions on how to improve operations but always keep open minds.
- Certain aspects require funding to resolve with the enterprise resource planning system, budget for them early and identify them as soon as possible and mark for resolution.
- Perform benchmark tests regularly on the enterprise resource planning system to ascertain performance levels and functionality availability.

5.6 Recommendations of Future Studies

This study did not cover all aspects of user satisfaction with the enterprise resource planning system. Future studies can include:

- Increasing the sample size and extending the study to students as well, that interact with the enterprise resource planning system, the study will target a broader diverse user base.
- Include external suppliers into the study to evaluate all business processes.
- Do not limit the study to the qualitative method; employ a mixed method.
- Include executive management as part of the study.
- Research other EUCS models available that might be more suitable.

5.7 Summary

The data obtained provided sufficient evidence that the users' of the enterprise resource planning are satisfied with the system. The users have highlighted some issues but believe that if those issues are resolved, the system would bring higher levels of satisfaction with the enterprise resource planning system and enabling them to perform their duties efficiently and effectively.

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APPENDICES

Appendix 1 – Informed Consent Form

Informed Consent Letter

UNIVERSITY OF KWAZULU-NATAL
GRADUATE SCHOOL OF BUSINESS AND LEADERSHIP

Dear Respondent,

MBA Research Project
Researcher: Ahmed Faisal Hoosen – (031 260 2739)
Supervisor: Dr. AD Kader - (0829010225)
Research Office: Ms. P Ximba - (031-2603587)

I, Ahmed Faisal Hoosen am a MBA student, at the Graduate School of Business and Leadership, of the University of KwaZulu-Natal. You are invited to participate in a research project entitled, "A study into the user satisfaction with the Enterprise Resource Planning system at the University of KwaZulu-Natal." The aim of this study is to establish if the user community in HR, Finance and Student Academic Administration at UKZN are satisfied with the present Enterprise Resource Planning (ERP) system known as Integrated Tertiary Software (ITS).

Through your participation, I hope to understand if users within the three support sections mentioned above are satisfied with the ERP system (ITS) at UKZN. The results of the interviews are intended to identify potential areas in the ERP system (ITS) that can be enhanced to ensure an increase in user satisfaction and thereby possibly increase process and business efficiencies.

Your participation in this study is voluntary. You may refuse to participate or withdraw from the study at any time with no negative consequence. There will be no monetary gain from participating in this interview. The Graduate School of Business and Leadership, UKZN will maintain confidentiality and anonymity of records identifying you as a participant. Your consent will be sought to record the interview purely for data validation purposes and obtaining data for this study only and cannot be used for any other purpose.

If you have any questions or concerns about the interview or about participating in this study, you may contact my supervisor or myself at the numbers listed above.

The interview should take about fifteen to twenty minutes to complete. I hope you will take the time to participate in the study.

Sincerely

Investigator's signature_____ Date_____

UNIVERSITY OF KWAZULU-NATAL
GRADUATE SCHOOL OF BUSINESS AND LEADERSHIP

MBA Research Project
Researcher: Ahmed Faisal Hoosen - (031 260 2739)
Supervisor: Dr. AD Kader - (0829010225)
Research Office: Ms. P Ximba - (031-2603587)

CONSENT

I…… (Full names of participant) hereby confirm that I understand the contents of this document and the nature of the research project, and I consent to participating in the research project.

I understand that I am at liberty to withdraw from the project at any time, should I so desire.

AUDIO-RECORDING: YES / NO

SIGNATURE OF PARTICIPANT DATE

_____ _____

Appendix 2 – Interview Schedule

Interview Questions

1. Are you satisfied with the ITS (Integrated Tertiary Software) ERP system at UKZN?

    - Probe: In terms of the format of the user interface and the presentation of the data on screen, does it meet your needs?

    - Probe: Do you find ITS easy to use?

    - Probe: What do you find difficult to use in the ITS user interface?

    - Probe: The results of your queries and searches, are they timeous in order for you to utilize the data and make time sensitive decisions?

    - Probe: Is it easy to obtain data received from nonstandard reports?

    - Probe: Are there any aspects with ITS that you feel can be enhanced?

    - Probe: What aspects of ITS are you satisfied or not satisfied with?

    - Probe: Does ITS meet your expectations of an ERP system?

    - Probe: Are there any specific issues that you have found with ITS that hinders the efficiency of the performance of your job?

    - Probe: How can ITS be improved?

Appendix 3 – Ethical Clearance Letter

UNIVERSITY OF KWAZULU-NATAL
INYUVESI YAKWAZULU-NATALI

02 July 2019

Mr Ahmed Faisal Hoosen (952040024)
Graduate School of Business & Leadership
Westville Campus

Dear Mr Hoosen,

Protocol reference number: HSSREC/00000007/2019
Project title: A study into the user satisfaction with the Enterprise Resource Planning system at the University of KwaZulu-Natal

Full Approval – Expedited Application

This letter serves to notify you that your application received on 12 June 2019 in connection with the above, was reviewed by the Humanities and Social Sciences Research Ethics Committee (HSSREC) and the protocol has been granted **FULL APPROVAL**

Any alteration/s to the approved research protocol i.e. Questionnaire/Interview Schedule, Informed Consent Form, Title of the Project, Location of the Study, Research Approach and Methods must be reviewed and approved through the amendment/modification prior to its implementation. In case you have further queries, please quote the above reference number. PLEASE NOTE: Research data should be securely stored in the discipline/department for a period of 5 years.

This approval is valid for one year from 02 July 2019.
To ensure uninterrupted approval of this study beyond the approval expiry date, a progress report must be submitted to the Research Office on the appropriate form 2 - 3 months before the expiry date.

Yours sincerely,

[redacted]

Dr Rosemary Sibanda (Chair)

Appendix 4 – Turnitin Report

Turnitin Originality Report

Final_Dissertation by Ahmed Hoosen

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Final_Dissertation by Ahmed Hoosen

From dissertation (MBA2019)

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Submitted to University of KwaZulu-Natal on 2016-11-11

< 1% match (student papers from 23-Jul-2013)

10 Submitted to International University of Japan on 2013-07-23

paper text:

Abstract The topic of the study was identifying user satisfaction levels with the enterprise resource planning system at the University of KwaZulu-Natal. This research study sought to establish if the administrative support staff using the back-office of the enterprise resource planning system at the University of KwaZulu-Natal are satisfied with the functionality of the

2**enterprise resource planning system. The research**

approach was a qualitative explorative study. The research instrument used was a face-to-face structured interview schedule with nine participants, of which all nine of them responded and agreed to participate. The support staff in the human resources, finance and student academic administration sections were targeted due to their interaction with the enterprise resource planning system in conducting business operations of the university. It was established that the administrative staff are marginally satisfied with the enterprise resource planning system. There were several critical business issues identified with the system; the reporting services of the system gave the users the most dissatisfaction. The reporting component has to be updated and provide benefit to the organisation so that efficiencies can be realised. It materialised as a theme in each of the categories.

9**i Table of Contents Description Page**

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Abstract.....

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v List of Tables vi

CHAPTER ONE

..... 7 **Introduction**

..... 7 **1.**

1 Introduction ..... 7 1.2 Motivation for the Study ..... 7 1.3 Focus of the Study ..... 7 1.4 Problem Statement..... 8 1.5 Objectives ..... 8 1.6 Methodology..... 8 1.7 Chapter outline ..... 8 1.8 Summary..... 9 CHAPTER TWO ..... 10 Literature Review ..... 10 2.1 Introduction

1**Enterprise Resource Planning System Implementation** Updated DeLone **and**

McLean EUCS Model Doll and Torkzadeh EUCS Model The Research Design Sectional Breakdown of Respondents Years Worked with An Enterprise Resouce Planning System Categories of Data Analysis Respondent Satisfaction Rating Page 7 12 14 15 22 25 28 32 39 39 40 46 v Number 2.1 2

5.**2 2.3** List **of** Tables Description **Enterprise Resource Planning** Module **Benefits** Benefits **of Enterprise Resource Planning**

in HEIs Factors of the Pearson & Bailey EUCS Model Page 20 21 26 vi

1**CHAPTER ONE Introduction 1.1 Introduction The study** evaluated **the**

end-user satisfaction

6**at the University of KwaZulu-Natal** with **the** functionality **of the**

present

1**enterprise resource planning system. Higher education institutions**

spend millions of Rands on purchasing and maintaining their

> 8enterprise resource planning system. These systems dictate how the

institution manages its business operations. It is clear that in today's global higher education sector, securing funding and student enrollment are the primary goals of most institutions. The enterprise resource planning system helps institutions realise their goals. The hands behind the wheel

> 5of the enterprise resource planning system are the support staff in the institutions spanning across the

multiple business units within the university. Their satisfaction with the functionality of the system has an impact on the use of the system and the organisation as a whole. Enterprise resource planning systems drive the organisation productivity level, and in higher education institutions, more research output equates to more funding and in turn, makes the university an institution of choice to attend. The enterprise resource planning system can only perform if the administrators on the system utilise the system to its maximum potential. The system is designed to provide integration and smooth data flow within the organisation. 1.2 Motivation for the Study The researcher identified the particulars

> 2of the enterprise resource planning system that the administrative support staff of the

University of KwaZulu-Natal are not satisfied with. This highlighted areas that require attention to resolve issues that are causing inefficiencies and dissatisfaction. 1.3 Focus of the Study The focus of the study was identifying areas within the

> 4enterprise resource planning system that the

administrative support staff are experiencing difficulties with, and attempt to find solutions to those issues. The operational business departments in the university rely extensively

> 2on the enterprise resource planning system

to conduct operations. These areas are 7 human resources, finance and student academic administration. The

> 2enterprise resource planning system is the key driver of the

university's operations. 1.4 Problem Statement The problem statement is that the higher education sector is facing a reduction in government support and higher student numbers. The fees must fall campaigns bring a startling reality to the fore if the government is reducing funding; how can the university sustain its business activities. It has to introspect to identify areas where savings can be achieved. The

> 5enterprise resource planning system is an expensive investment, and

if used correctly can reduce costs, but that is dependant on the support staff using the system correctly and effectively. Their satisfaction with the system will dictate how the system is used to benefit the organisation. 1.5 Objectives The objective of the study established that the administrative support staff of the University of KwaZulu-Natal are marginally satisfied

1**with the enterprise resource planning system.** The study **will**

elaborate on areas that the administrative staff identify as problems concerning the enterprise resource planning system. 1.6 Methodology The methodology employed in this study was a qualitative research study targeting the population of the back-office administrators

2**of the enterprise resource planning system.**

The research instrument selected was face-face-interviews to obtain the required data. The context of the user satisfaction was modelled around the end-user computing model of (Doll & Torkzadeh, 1988) but adapted to measure three factors only, namely ease of use, timeliness and format. 1.7 Chapter outline ? Chapter one introduces the study briefly, identifies objectives, motivation and methodology of the study. 8 ? Chapter two delves into the research literature concerning user satisfaction, satisfaction models and enterprise resource planning systems. ? Chapter three describes in detail the research design and elaborates on the research process. ? ? Chapter four is the presentation of the results and the discussion of the findings. Chapter five is the conclusions reached with the study and recommendations for future study and recommendations to the stakeholders. 1.8 Summary The study has determined that the administrative support staff of the University of KwaZulu- Natal are marginally satisfied

3**with the enterprise resource planning system** implemented. **The**

three critical business units identified various issues with the system that requires urgent attention. The issues brought to light areas within the

4**enterprise resource planning system that** needs **to**

optimised to bring about efficiency in business activities of the institution. The following chapter will interrogate the available research on the topic and investigating each aspect that was applied to this study. CHAPTER TWO Literature Review 2.1 Introduction The 21st century heralds the availability of unparalleled access to information, without a doubt if a moment is taken to look up from the smartphone, tablet or laptop screen a quick realisation would be evident about our connection to a vast store of information that we call the internet. The aggregation of all that information, available at the touch of a button clearly defines the information age. We are developing complex systems to help us manage the vast amount of data accumulated; the management and analysis of this data enable organisations to become efficient and streamline processes. Enterprise resource planning systems aggregate organisational data and make it available for the various departments within the organisation. It brings about integration and fluid real-time movement of data between sections within the organisation. Decisions are taken by the management of the organisations to implement and use enterprise resource planning systems, and this compels employees to use these systems to perform the daily operations of the organisation. Enterprise resource planning systems previously confined to manufacturing and business-driven organisations have recently been adopted by the educational sector as well. Universities have adopted and implemented

8**enterprise resource planning systems to** integrate **the**

various support sections and manage the organisations daily operations. The management and administrative users of these

> 8enterprise resource planning systems are hugely reliant on

these systems. The mere use of the enterprise resource planning systems does not indicate that the end-users are satisfied with the enterprise resource planning system. This chapter will interrogate the available literature on enterprise resource planning systems, demystifying what they are, elaborating on their purpose. Since the study occurred within a university, therefore it is imperative that the relevant literature pertaining to

> 7higher education institutions be examined to gain insight and understand the activities of institutions in the

higher education sector, this will then lead to how enterprise resource planning systems fit into higher education institutions and the role they assume.

> 4An enterprise resource planning system in the

working world provides instructions within the organisation about how employees, management and other resources within the organisation relate to each in the business cycle. Custom-built software is developed with a specific purpose, a rigid architecture and designed usually with 10 a single business process at the core whereas enterprise resource planning software is undifferentiated can be utilised in many different industries and businesses and can be moulded to suit the industry requirements. Enterprise resource planning systems can become the agent or driver of change because due to the idea of best practices, the enterprise resource planning system has these embedded within, and this is agnostic of local context requirements. The chapter will terminate with identifying the various end-user satisfaction models available in the literature, and the most suitable model for this research study will become evident. Adapting the model to suit the study parameters might occur. 2.2 What is an Enterprise Resource Planning System? Enterprise resource planning systems are fundamentally commercial software that contains operational specific modules integrated to form a complete software package; this package seamlessly integrates information from human resources, finance, accounting, supply chain and customers (Davenport, 1998). Enterprise resource planning systems are complex and comprehensive information system packages that integrate the functions of the business and processes (Haddara, 2014). According to (Haddara, 2014), enterprise resource planning systems were an evolutionary development from both requirements planning and manufacturing resource planning systems. Enterprise resource planning systems contain lengthy complex, interrelated programming code that defines and executes standard processes (Haddara & Elragal, 2013). The ideology that management sometimes delude themselves with is that

> 3enterprise resource planning packages are the “silver bullet” to

all their operational woes, but this is far from what happens in reality. According to (Davenport, 1998), there are numerous examples of the failed implementation of enterprise resource planning systems that have cost companies hundreds of millions of dollars and in some instances, bankruptcy. The notion that an off-the-shelf software solution is going to rectify all of the organisation’s operations hurdles and seamlessly cater for any business model and process flow is a fallacy, Mobil and Dell can attest to this (Davenport, 1998). An accepted definition of an enterprise resource planning system can be identified using the three primary characteristics associated with

3**enterprise resource planning systems, and** we can characterise **enterprise resource planning**

systems as follows: ? A collection or grouping of modules packaged to form an integrated architecture to form a complete system which can be used in the businesses as the primary engine for integrating all business activities with information technology and available in real- time extending beyond the boundaries of the organisation into external supply and value chains. ? They are bundled with an enormous amount of wealth in business knowledge gathered from business practices that the vendors have adopted in the system. This system will now alter the way the organisation conducts its business processes. ? Comes in a generic undifferentiated product that vendors, along with clients, have to spend a fair amount of time configuring and customising to suit the organisation. Enterprise resource planning systems were designed initially for use within an organisation, but in the recent past, it has seen considerable change and has evolved to now include and link external resources as part of the integrated business processes incorporating

8**customer relationship and supply chain management.**

Playing roles in business to business, business to customer and e-commerce arenas. Enterprise resource planning systems are poised on the verge of integrating the whole supply chain, taking the business into the future. This stance appears as though this is the next step in the evolutionary chain of the enterprise resource planning systems existence, but for now the focus of the enterprise resource planning systems is integrating all business units under a single central application to drive the entire business forward in the same direction. Enterprise resource planning systems can extend to using technology to accomplish various business processes incorporating planning, supply, warehouse inventory and packing by using radio frequency identification coupled with drones and automation on every level. It is not difficult to imagine and extend the imagination that enterprise resource planning systems are a vast collection of enterprise systems and not just one single massive enterprise resource planning solution. It is a system that continually seeks out integration to improve business functions throughout the entire organisation and to streamline its processes. With the correct implementation of an integrated and functional enterprise resource planning system, it is adept at delivering streamlined enterprise-wide business processes coupled with data management and information management. There are numerous vendors of enterprise resource planning systems, and some of the most popular ones are SAP, PeopleSoft, Oracle and BAAN. The anatomy of an enterprise resource planning system depicted in Figure 2.1, according to (Davenport, 1998). Figure 2.1 Enterprise Resource Planning Anatomy Adapted from Davenport, H.T., 1998. Putting the enterprise into the enterprise system. Harvard Business Review, July. p124. According to (Davenport, 1998), the anatomy of

4**an enterprise resource planning system** comprises of **the** core database **that**

drives the entire application housing the data and metadata. The various operational specific modules

2**of the enterprise resource planning system** utilise **the** shared **data** stored in **the**

central database. These modules or applications are: ‣ Human resources management ‣ Financial ‣ Manufacturing ‣ Inventory and supply ‣ Service ‣ Sales and delivery ‣ Reporting The enterprise resource planning system accommodates interaction and access from internal and external users. Internal users consist of: ? Sales force and customer service representatives ? Managers and stakeholders ? Back-office administrators and workers 13 ? Employees External users comprise of: ? Customers ? Suppliers Although enterprise resource planning systems have been around for decades, there are still high rates of failed

implementations, and the implementation projects usually exceed budget and timelines according to (Klaus et al., 2000). Enterprise resource planning systems have been typically designed with the best practices in conjunction with the most influential customers of the enterprise resource planning software, so many organisations have to realign and redesign their business processes to utilise and see benefits from the

1**enterprise resource planning system** (Klaus **et al.,**

2000). 2.3 Characteristics of Enterprise Resource Planning Software Enterprise resource planning software is a commercial product and is customisable and configurable to suit the various and diverse needs across various businesses in the economy. Enterprise resource planning software exists in three variants (Klaus et al., 2000): ? Generic ‣ This version is the most comprehensive complete version as it targets industries in all sectors and being generic, the configuration has to occur before use. ? Pre-configured ‣ This version provides pre-configured templates derived for the generic variant of the software. The templates designed are for specific industries. ? Installed ‣ This variant is the most commonly chosen option for most businesses; this option follows either a generic or a pre-configured package after that it is

5**adapted to the specific requirements of**

the organisation on-site. The generic variant

5**of the enterprise resource planning** software is **the**

only version that can customised explicitly according to the required purpose because any configuration that causes a change in either a reduction or an addition of any component of the software application will render that instance non-standard or non-generic in nature (Klaus et al., 2000). An analysis was undertaken of the currently available standard enterprise resource planning solutions assisted in the derivation of criteria used to identify the characteristics of an enterprise resource planning solution (Klaus et al., 2000). Enterprise resource planning software is generic software packages and is unintended for a specific market, but targeting businesses from any market, the differentiation for a particular business occurs during the system installation and configuration process. This process of customisation relates to other software as well, but enterprise resource planning software has been designed with more depth of customisation available. This degree of customisation might be interpreted as a negative characteristic, but it is this feature of customisation that allows for individualised implementations and unique configurations for enterprises (Klaus et al., 2000). Enterprise resource planning software is application software and is distinguishable from other software such as database, middleware or operating system software. This uniqueness in the depth and quantity of customisable options, along with numerous pre-configured alternatives establishes the characteristics of enterprise resource planning software (Klaus et al., 2000). The modularised enterprise resource planning software is integrated to accommodate business processes and the corresponding data across the entire organisation. The core of the enterprise resource planning software is the central data store, and this datastore houses all data from the various modules centrally (Klaus et al., 2000). The datastore managed by a database engine ensures consistency, controlled redundancy and transactional protection. The integrated modules provide business solutions that provide administrative functionality and support for core business processes. The high level of functionality is amongst the main differentiators of

8**enterprise resource planning systems as it**

claims to support all the various standard business functions such as procurement, logistics, material and quality management, production, maintenance, sales, distribution, financial accounting, asset and cash

management, controlling, strategic planning. These form part of the standard business functions, enterprise resource planning systems also contain industry-specific business processes for hospitals, student administration in higher education institutions and warehouses with high transaction volume (Klaus et al., 2000). Due to enterprise resource planning software being highly functional, it can be distinguished qualitatively from other application software. The enterprise resource planning software is modularly designed at the top level based on the various functions such as sales or procurement but adhere to a process-orientated view of the business. Standard business functions are seamlessly supported across the integrated modules in the application, and the user is often 15 oblivious to the actual module they are working within. Enterprise resource planning systems are extraordinarily complex and require the availability of comprehensive documentation, and this documentation must cover the typical software documentation but also include detailed documentation concerning the industry-specific implementation for the enterprise resource planning software. The documentation should indicate the relationships between the structure of the data and objects. Accessing this documentation should be quick and easy (Klaus et al., 2000). Enterprise resource planning systems cannot be classified by merely observing their functions because their footprint spans various industries and thereby giving varying characteristics amongst the varied implementations. Enterprise resource planning systems comprise of two variants, the one supports the coexistence of two different industries in one solution, the other is a pre-configured, single business function and individualised enterprise solution. An example of this is PeopleSoft that provides industry-specific solutions to communication sectors, the federal government, healthcare, financial services, higher education, manufacturing, public sector, retail service industries, transportation and utilities. (Klaus et al., 2000). Enterprise resource planning solutions are designed to operate in companies that span globally with businesses across varying timezones, currencies, legislature, and therefore a prerequisite for an enterprise resource planning system is the ability to function across different regions globally but still providing preconfigured country-specific modules and business functions and transacting in a multitude of currencies is a compulsory feature. A distinguishing feature of an enterprise resource planning solution is processing structured repetitious transactions accurately and expertly and performing the task well. Technical characteristics or features help determine the potential and functional features of this software. The technical aspect of displaying a

> 8**consistent graphical user interface across all** the integrated modules **of the system**

creates an impression for the user that they are working on a single software platform solution even though they are alternating between different functional areas within the application (Klaus et al., 2000). Existing enterprise resource planning solutions are modelled on a three-tier client-server architecture where there are three independent logical segments; they are the database, the applications and the presentation. Since enterprise resource planning software has a vast and diverse target market, the application has to scale according and be able to process vast volumes of data, and this is a significant technical characteristic of enterprise resource planning systems. Enterprise resource planning systems are typically hardware and operating system agnostic. 16 Enterprise resource planning systems are incredibly complicated, and this complexity requires sufficient administration to function at efficient and practical levels, the software provides various system monitoring tools, performance management tools, general and user administration interfaces (Klaus et al., 2000). 2.4 Uses and Benefits of

> 5**Enterprise Resource Planning Systems The** cross-sectional involvement **of enterprise resource planning systems**

is used to improve pivotal operational process-driven functions in the human resource, finance, procurement, accounting, sales and manufacturing sections (Haddara & Moen, 2017). According to (Olson et al., 2012), enterprise resource planning systems are used to manage the available resources of the

organisation effectively, thereby achieving efficiencies by integrating all the information-processing requirements of the organisation. The use of enterprise resource planning systems is to implement reduction of costs, permeate data sharing within the organisation and identify business processes that can be enhanced (Elragal & Haddara, 2013). Enterprise resource planning systems in their design span across multiple sections within an organisation, therefore they cater for centralised control and management of business workflow processes throughout the entire organisation. (Shang & Seddon, 2000), have designed a comprehensive framework for the usage and benefits of enterprise resource planning systems, their design consists of numerous organisational, strategic, managerial, operational and information technology infrastructure benefits and uses. 2.5 Evolution of Enterprise Resource Planning Systems Enterprise resource planning systems did not just come into existence as we know them today but evolved from other management information systems. According to (Watson & Schneider, 1999), in the last five decades, the initial concept of enterprise resource planning systems developed from materials requirements

> 3planning systems (MRP). The evolution of the enterprise resource planning

system in Figure 2.2, as indicated by (Watson & Schneider, 1999). Figure

> 12.2 Evolution of Enterprise Resource Planning

Systems Adapted from Watson, E.E. & Schneider, H. (1999) Using enterprise resource planning Systems in Education. Communications of the Association for Information Systems, I(9). p7. According to (Watson & Schneider, 1999), the gradual evolution of enterprise resource planning systems originated with MRP systems, but as business demands increased and with technological advancements, the inclusion of additional modules to MRP systems lead to the materialisation of MRP II systems. The pressure from business demands and the rapid advancements in technology especially in the information technology area saw another evolutionary leap for enterprise resource planning systems from MRP II systems to the structure we observe in enterprise resource planning systems (Watson & Schneider, 1999). 2.6 Understanding the Higher Education Institutions The advancement of technology and the explosion of the internet has compelled

> 7higher education institutions to review their strategies and redesign their

goals, vision and mission

> 7in the rapidly changing global higher education environment and

interrogate their business activities ensuring alignment with their mission, vision and goals. 2.6.1 Goals of Higher Educational Institutions 18 The core foundational goals that higher education institutions have adopted are research, education and cooperation. The academic and support staff ensure that the institution's goals and strategy through lecturing, researching and information technology support materialise (Kyvik & Lepori, 2010). The reaching of the institutional goals and fulfilling its strategic direction maintains a substantial level of attractiveness for research funding opportunities and various discipline accreditation (Kyvik & Lepori, 2010). 2.6.2 Business Activities of Higher Educational Institutions The global trend is that higher educational institutions are viewed more like businesses in the present economic climate, knowledge and research are the traded commodities, and in return external entities, government funding and incentives are the rewards. In interrogating the business activities of higher education institutions, two primary activities form the core, and these are education and research, the administrative support within the institution is the secondary activity (Zornada & Velkavrh, 2005). The strategic components of higher education institutions

from research excellence, development and output have in the 21st century compelled

7**higher education institutions to** discover ways **to** improve **and** expand **their**

primary activities, seek business excellence and find efficiencies in current business operations ensuring alignment with their vision and mission strategy (Zornada & Velkavrh, 2005). Suggestions by (Pollock & Cornford, 2004) elude to higher education institutions have similar processes to manufacturing organisations but identify that higher education institutions have uniquely distinct administrative activities. Traditional manufacturing organisations employ essential business administrative functions such as human resources, finance, operations & logistics, sales & marketing activities whereas the higher education sector has distinctive activities such as student and curriculum administration and timetabling (Rabaa'i, 2009). According to (Awad, 2014), higher education institutions of today have the following primary activities human resource, procurement, financial, warehouse, library and student management. According to (Zornada & Velkavrh, 2005), Figure 2.3 depicts the crucial business activities for higher education institutions in the current environment. Figure 2.3 Higher Education Institutions' Business Activities Adapted from Zornada, L. & Velkavrh, T.B. (2005) Implementing ERP Systems in Higher Education Institutions. In Information Technology Interfaces ITI 2005. Cavtat, 2005.p5. According to (Zornada & Velkavrh, 2005), there are three primary groups of business processes in higher education institutions, and these are educational, research and non-academic, within these groups there are numerous activities that exist and vary between institutions. Each of these business groups requires support from administrative systems and support personnel to execute the daily operations and achieve the higher education institute's goals and strategic plans. 2.6.3 University of KwaZulu-Natal Business Activities The University of Kwazulu-Natal's business activity structure is similar to the business activities identified by (Zornada & Velkavrh, 2005), where the two primary activities are academic and non-academic, the non-academic is administrative support, and the academic is education and research. Figure 2.4 depicts the two primary activities undertaken by UKZN and elaborates on the composition of these two activities. Figure 2.4 UKZN's Primary Activities Adapted from Govender, Leanne. (2019) About Us: University of KwaZulu-Natal [Online]. (1) Available from: https://www.ukzn.ac.za [Accessed 1 May 2019]. The academic activities of UKZN occur within the four colleges containing nineteen different schools, the non-academic component of the university comprises of seventeen support orientated sections. The library is a member of the non-academic component of the university. The four colleges within their respective areas of focus have pockets of administrative support personnel available to them (Govender, Leanne, 2019) 2.7

1**Enterprise Resource Planning in Higher Education Institutions** During **the**

past decade, the worldwide adoption of enterprise resource planning systems in the Higher Education Institutions has seen tremendous growth and as the demand increases the 21 vendors of enterprise resource planning systems have identified higher education institutions as their new target market (Soliman & Karia, 2015). The business activities of higher education institutions are continually changing, and the enterprise resource planning systems are expected to keep pace with the changes and requirements in the higher education sector (Soliman & Karia, 2015). There is a developing need for higher education institutions to visualise improvements in their operations by ensuring more transparency and manageability (Zornada & Velkavrh, 2005). According (Soliman & Karia, 2015), enterprise resource planning systems in higher education institutions offer departments with the automation of numerous tasks and a key component in managing the organisations' resources along with providing real-time data access to support decision-making requirements. The higher education institutions have realised that to gain a competitive advantage, and differentiate, and information technology must be embraced and used as a crucial tool in the research market, just as the business, manufacturing and finance sectors (Karande et al., 2012). (Ghuman & Chaudhary, 2012) have identified higher education institutions are seeking constant automation and integration from their business processes, including services provided by human resources, student administration, finance and academic sectors within the institution. According to (Ram et al., 2013), the

ideology of enterprise resource planning involves acquiring knowledge about the most effective and efficient business practices, after that utilise this knowledge to re-engineer or redesign antiquated processes. It is imperative to take cognisance that enterprise resource planning systems should be configurable to suit organisations' business processes, to ensure end-to-end integration with all sections within the organisation and higher education institutions are no exception to this (Kwahk, 2006). According to (Abugabah et al., 2015), although the

> 1**implementation of enterprise resource planning systems in higher education institutions**

are regularly portrayed as being highly complex and challenging. The risks and expenses are usually enormous and occasionally the implementation is a failure or is detrimental to the institution; the return on investment does not ever materialise in the short-term but more long-term to medium-term. 2.7.1 Role of Enterprise Resource Planning in Higher Education Institutions Enterprise resource planning systems in the higher education sector have seen tremendous pressure exerted by global trends to adopt advancing technologies,

> 4**higher education institutions have to** embrace changes in **the**

technological landscape to remain current and competitive, governments globally have requested

> 7**higher education institutions to raise their**

levels of efficiency and performance (Allen & Kern, 2001). According to (Fisher & Walker-Gibbs, 2006),

> 7**higher education institutions are forced to**

change strategies to increase their performance levels due to being faced with numerous challenges such as student and government increasing expectations, being competitive in the higher education institutions sector, maintaining quality and performance requirements and decreasing government funding and support. Enterprise resource planning systems are being utilised to respond to the numerous

> 7**challenges that higher education institutions face** remaining sustainable **in**

the volatile higher education environment (Mcredie & Updegrove, 1999), enterprise resource planning systems are replacing antiquated administration and management information systems in higher education institutions (Pollock & Cornford, 2004). The higher education institution would find an improvement in teaching and learning services with the use of enhanced managerial tools (Kvavik et al., 2002) and this would usher increases in effectiveness and organisation change (Fisher & Walker-Gibbs, 2006). Enterprise resource planning systems in higher education institutions are capable of delivering applications that would benefit teaching and research, and this will have an organisation-wide impact (Watson & Schneider, 1999). With the

> 1**implementation of enterprise resource planning systems in higher education institutions,** access **to**

organisational data is improved. This will enhance management of the institution enabling staff to access students' information with ease and resolve issues and queries rapidly (Davis & Huang, 2007) and this brings about an increase in service delivery, response time and overall enhancement in business processes (Kvavik et al., 2002). The global phenomenon overtaking higher education institutions to become more business orientated across first, second and third world countries, in Australia, governmental pressures to become more business orientated, declining funding from government, constant growth in student numbers, structural changes in academia, inter-institutional competition have drive higher education institutions's to improve management processes (Allen & Kern, 2001). Amongst this changing landscape of

7**higher education institutions, the higher education** sector **in** Australia **has**

replaced their legacy administrative systems with an enterprise resource planning system (Beekhuyzen et al., 2001). There are significant similarities between large corporations and higher education institutions where both replace their legacy administrative systems with enterprise resource planning applications (Allen & Kern, 2001). The higher education institutions across the world implemented enterprise resource planning systems to achieve enhanced management for their increasingly complex operations (Rabaa'i et al., 2009). The global competition in the higher education institutions sector has driven these institutions to re-evaluate their student management systems and investigate customizable enterprise resource planning solutions in the cloud and on-premise (Petrides, 2004). (Abugabah & Sanzogni, 2010) identified that the higher education sector is trailing behind other industries in the adoption of enterprise resource planning systems in their organisations and in doing so are depriving themselves of business enhancement. 2.7.2 Advantages and benefits of Enterprise Resource Planning Systems in Higher Education Institutions Enterprise resource planning systems in higher education institutions provide numerous benefits and advantages such as the reduction of backup costs, and the enterprise resource planning system would enable user-friendly services via a common portal for the administration of all business activities of the institution in real-time. The cost savings of the backup process occurs by reducing the number of servers since the enterprise resource planning system would replace several separate management information systems (Alshaer, 2016). According to (Sabau et al., 2009), the introduction of a single secured system where users from the educational institution have access to services and confidential data quickly due to the integration of educational activities and technology. Internal communication for any organisation is a critical business process; enterprise resource planning systems using business process workflows improve communication in the process enhance self-service and quicker response time for all users of the system. The system caters for the generation of various reports utilised by management to make business decisions and reduces paper footprint since reports do not have to be printed but are available centrally (Sabau et al., 2009). Further to these benefits, an enterprise resource planning system integrates the various support sections within the university and establishes a common central platform for administration (Sabau et al., 2009). According to the research by (Zornada & Velkavrh, 2005), some of the main advantages of enterprise resource planning systems in higher educational institutions are: ? Enhanced management due to improved information access ? Improved service delivery for academics, support staff and students ? The reduction of risk associated with business processes ? Monetary gains due to increased efficiency ? Integration of business functions such as student administration, human resource and financial management Research by (Baweja, 2015) suggests that benefits from

4**an enterprise resource planning system in a higher education institution**

affects four primary stakeholders; these are: ? Academic staff ‣ enterprise resource planning system manages all student-related administration ‣ Focus more time on teaching than administrative processes ‣ Efficient access to human resource processes ? Students ‣ Provides a single web-based portal for all the administrative needs ‣ Online teaching and learning platform. ‣ Communication with the institution. ? Parents ‣ Communication with the institution ‣ View their child's progress and test/exam scores ‣ Obtain their child's financial data ? Management ‣ Administrative processes become accurate and consistent ‣ Automation

reduces time wastage ‣ Institutional wise reporting 25 ‣ Cost savings ‣ Management of all support sectors. Enterprise resource planning systems are software packages that have several modules incorporated in the application to provide a holistic solution (Davenport, 1998), according to (Baweja, 2015) eleven enterprise resource planning modules would provide benefits to the educational institution. (Baweja, 2015) suggests that there are eleven modules

4**in an enterprise resource planning system that** would provide benefit **to the**

higher education institution tabulated in Table 2.1 ERP Module Business Activity Benefit 1. Admission Admission and registration difficulties can be reduced and simplified with online registration mechanisms, provides the capabilities for document management. Automates processes during the registration periods and provides feedback. 2. Transportation Provides information about the institution's transport infrastructure such as routes, fares, schedule and online notifications. 3. Time Table Automate time-tabling processes, thereby reducing time spent by administrative staff and available online in real- time. 4. Library Integrates as part of the student's record and provides for a portal to utilise and manage library resources by students and administrative staff. 5. Attendance Monitor the attendance of staff and students, provide attendance registers for compulsory lectures and trend patterns of attendance so preemptive measures can be engaged. 6. Exam Management Automate exam schedule creations for students and staff, capture student marks and process results and automate result emailing. 7. Fee Management Maintaining full financial records of student fees and providing automated reports. 8. Hostel Management Provide complete management of residences and provide a facility to log faults and queries. Manage services in the hostel. 9. Inventory Maintains the life cycle of all assets in the institution, including funding aspects of asset management. 10. Communication Provide real-time communication with staff and students via email or SMS. Used for general and emergency notifications. 11. Enquiry management Provide via a central portal where students can make enquiries or request, and administrative staff will respond, allowing for online resolutions and reduced queues. Table 2.1 Enterprise Resource Planning Module Benefits Adapted from Baweja, S.K. (2015) Uses of Educational Enterprise Resource planning. International Journal of Engineering Research and General Science, III(1), p716. Research by (Baweja, 2015) highlights eleven enterprise resource planning modules designed to improve performance in the higher education institution. Table 2.1 depicts the

1**enterprise resource planning** module **and the** corresponding **business**

activity benefit. (Kalema et al., 2014) research indicates eleven benefits of an

1**enterprise resource planning implementation in higher education institutions** tabulated in **Table 2.**

2. Benefit Business Activity 1. Integration Provide simple, seamless protocols for third party application integration 2. Teaching and Learning Provide a learning management system as an integrated component. 3. Efficient workflow Ensure timeous accurate workflow processes for student registration 4. Multiple data source access Enable efficient access to external data sources. 5. Central data storage Data is stored and managed by a central database engine. 6. Infrastructure Reduce infrastructure footprint by reducing hardware quantity 7. Management reporting Ensure timeliness in providing reports 8. Data sharing Provide the ability to share data quickly and collaborate thereby reducing paper usage 9. Communication Provide access and integration to various messaging platforms 10. Portal Enable an adaptive integrated portal for all administrative processes. 11. Customisation Flexibility in the system to quickly implement new features.

1**Table 2.2** Benefits **of enterprise resource planning**

in HEIs Adapted from Kalema, B.M., Olugbara, O. & Kekwaletswe, R.M. (2014) Identifying Critical Success Factors: the case of ERP Systems in Higher Education. The African Journal of Information Systems, VI(3), p67. According to (Kalema et al., 2014), with the

> 4**implementation of an enterprise resource planning system in a higher education institution,**

there would be eleven benefits achieved. Table 2.2 depicts the attainted benefit and the corresponding business activity derived from the benefit. 2.7.3 UKZN's

> 1**Enterprise Resource Planning Implementation The** University **of**

KwaZulu-Natal identified the need to integrate various information systems that were separate in the university. According to (Davenport, 1998), the anatomy of an enterprise resource planning system, as depicted in Figure 2.1 indicates a central database with the various operational specific applications connected to the central data store. UKZN's enterprise resource planning system has similar architecture. Depicted in Figure 2.5 is the architecture of UKZN's

> 2**enterprise resource planning system,** indicating **the** components of **the enterprise resource planning system** that exist at **the**

time of conducting this research. Figure 2.5 UKZN's

> 2**Enterprise Resource Planning System** Implementation **Adapted from**

Govender, Leanne. (2019) About Us: University of KwaZulu-Natal [Online]. (1) Available from: https://www.ukzn.ac.za [Accessed 1 May 2019]. According to (Govender, Leanne, 2019), the University of KwaZulu-Natal's enterprise resource planning application is Integrated Tertiary Software (ITS) and is a customisable enterprise resource planning solution specifically designed for higher education institutions. The system comprises of six core modules and one secondary module: The six core modules: ? Student management ? Finance ? Human resources and Payroll ? Asset management ? Space management ? Management information and The one secondary module is a web interface module for administration of the student, finance, and human resources & payroll systems. 2.8 User Satisfaction with the enterprise resource planning system The primary determinants of a successful implementation of an

> 2**enterprise resource planning system** are **the** attitudes of **the enterprise resource planning system'**

s users' (Abdinnour-Helm et al., 2003). The user's satisfaction with the enterprise resource planning system is influenced by either direct or indirect behavioural factors (Amoako-Gyampah, 2007). There has been significant research regarding the user satisfaction with information systems, and one of the most cited models to measure user satisfaction is the DeLone and McLean model which maps the effect of using the information system against the user's satisfaction (Lowry et al., 2007). The model assumes that the information system and the information quality has an indirect effect on the user and therefore on the organisation via a reciprocal relationship between user satisfaction and use (Delone & Mclean, 1992). About ten years after designing the Delone and Mclean Model for end-user computer satisfaction, the authors

included new constructs into the model (Costa et al., 2016) The Bailey and Pearson model listed numerous factors that are used to determine user satisfaction, the Bailey and Pearson instruments and the derivatives are a reliable base benchmark tool for measuring satisfaction in studies (Mohamed et al., 2006). End-user computer satisfaction frequently measures the success of information systems (Doll et al., 1995). Using the end-user computer satisfaction model developed by previous researchers, it provides tremendous validity because it was developed using reliable instruments but also the various other methods to measure user satisfaction are complicated to validate, or they are weak,

10**(Doll et al., 1995). (Doll & Torkzadeh, 1988)** developed a **model**

which consisted of five factors, namely ease of use, format, timeliness, content and accuracy. The instrument was designed to work in the end-user computing environment and insisted the model be interpreted better. 2.8.1 The DeLone and McLean End-User Satisfaction Model The new Delone and Mclean model's effectiveness level is based on the effect the information impacts the receiver (Delone & Mclearn, 2003); the explanation of the model is as follows: System quality – focuses on measuring technical success. Information quality – based on the semantic success Service quality – is based on reliability, assurance, responsiveness and empathy Use – deals with user satisfaction User satisfaction – effectiveness of success is measured Net benefits – are based on the use and the user satisfaction result Intention to use – leads from increased user satisfaction. Use and user satisfaction are closely related, but use precedes user satisfaction purely in a process sense. The positive relationship with use will lead to an increase in user satisfaction topically. From the increases in user satisfaction, an increase in the intention to use and use will increase. Usually, net benefits occur after the increase in use and user satisfaction (Delone & Mclearn, 2003). Figure 2.6 indicates the new updated model (Delone & Mclearn, 2003). Figure 2.6 Updated DeLone and McLean EUCS Model Adapted from Delone, W.H. & Mclearn, E.R. (2003) The DeLone and McLean model of Information systems success: a ten-year update. Journal of Management Information Systems, XIX(4),p.24 According to (Delone & Mclearn, 2003) there are interrelations between the seven constructs in the model, the red arrows indicate consequence or process flow. 2.8.2 Bailey and Pearson End-User Satisfaction Model The end-user computing satisfaction model (EUCS) that has been utilised the most in research to evaluate information systems is the instrument model developed by Bailey & Pearson in their research paper titled "Development of a Tool for Measuring and Analyzing Computer User Satisfaction" (Aggelidis & Chatzoglou, 2012). Bailey and Pearson designed a model that contained thirty-nine factors to evaluate an information system on (Bailey & Pearson, 1983). The model by Bailey and Pearson containing the thirty-nine factors depicted in Table 2.3 (Ives et al., 1963). Table 2.3 Factors of the Pearson & Bailey EUCS Model Adapted from Ives, B., Olson, M.H. & Baroudi, J.J. (1963) The Measurement of User Information Satisfaction. Communications of the ACM, XXVI(10), p.790. The Bailey and Pearson model with the thirty-nine factors in Table 2.3 underwent assessment and modification initially by (Ives et al., 1963), and after that by (Baroudi & Orlikowski, 1988). As a result of the modifications to the model, a new concise model emerged consisting of only thirteen factors, and into three primary constructs with the grouped factors therein (Aggelidis & Chatzoglou, 2012). These are as follows according to (Baroudi & Orlikowski, 1988), "Information product – this is the respondent's self-reported assessment of the quality of output delivered by the information system." "Electronic Data Processing Staff and Services – this is the respondent's self-reported assessment of the attitude and responsiveness of the EDP Staff as well as the quality of their relationship with the EDP staff." "User Knowledge and involvement – this is the respondent's self-reported assessment of the quality of training provided, their understanding of the system and their participation in its development." The thirteen factors that feature under each group are: ‣ Relationship with EDP Staff ‣ Processing of Requests for Changes ‣ Degree of EDP Training Provided ‣ Users' Understanding of System ‣ User's Sense of Participation ‣ Attitude of EDP Staff ‣ Reliability of Output ‣ Relevancy of Output ‣ Accuracy of Output ‣ Precision of output ‣ Communication with EDP Staff ‣ Time Required For New System Development ‣ Completeness of output. 2.8.3 The Doll and Torkzadeh End-User Satisfaction Model The Doll and Torkzadeh model focuses on the current personal computer environment and end- user computing environment (Doll & Torkzadeh, 1988). Validation of the EUCS model is difficult to deny the success of a system when users are happy with the information system, so "satisfaction" has some face validity.

Numerous validation tests occurred conducted on the Doll and Torkzadeh model, and it proved very effective (Mohamed et al., 2006). According to (Doll et al., 1995), the model consists of five factors: ? Ease of use ? Format ? Timeliness 33 ? Accuracy ? Content. Figure 2.7 demonstrates the construction of the Doll and Torkzadeh model (Doll & Torkzadeh, 1988). Figure 2.7 Doll and Torkzadeh EUCS Model Adapted from

> 10**Doll, W. & Torkzadeh, G. (1988) The measurement of end-user computing satisfaction. MIS Quart,**

XII(2), p.230. (Doll & Torkzadeh, 1988) designed their instrument purely to measure end-user computing satisfaction with five factors; namely ease of use, format, timeliness and this instrument was geared only to function within the end-user computing environment. The five factors: ? Ease of Use According to (Branscomb & Thomas, 1984), the ease of use in software development has integral importance in the design of the software. Evidence in mounting indicating that effective functioning of an application is related to the ease of use (Goodwin, 1987). (Doll & Torkzadeh, 1988), suggest that if an application is easy to use, users become increasingly advanced in the operation of the application and are now able to make of all the capabilities of the application which in turn can increase productivity and provide more alternatives to decision makers (Doll & Torkzadeh, 1988). A system should follow ease of use guidelines and be based on the purpose of the application and the essential functions the application is designed to accomplish. There will be resistance in learning the system if it is complicated and challenging to use. Ease of use is expected to increase the overall level of EUCS, and if the system is not easy to use then, productivity is lost along with delays in business operations (Mohamed et al., 2006). ? Format (Bailey & Pearson, 1983), classified the format of the information reported by the system as a descriptive measure whereas (Doll & Torkzadeh, 1988) used the format as a secondary factor in determining EUCS. The displayed format of request data affects the end user's satisfaction level if their expectations are not met (Mohamed et al., 2006). ? Timeliness According (Doll & Torkzadeh, 1988), timeliness is the measure of the speed of the system in responding to requests for data, delays in data or report generation cause dissatisfaction and a ripple effect across business operations of the organisation. ? Content Reporting is a crucial function in information systems of today, and the content is used regularly as a measure of an information system. The end-user perceives the content is vital, primarily when the content is used to make the business decisions. The use of information system reports is one of the most frequently reported measures of the success of an information system gauged on. (Delone & Mclean, 1992). ? Accuracy The accuracy of the data is a fundamental measure of the quality of a system, and if uses cannot trust the data being received from a system then there is a lack of confidence in the results and reports, this can lead to substantial operational inefficiencies within the organisation and lead to devasting business issues. 2.9 Summary The literature is vast with regards to

> 5**enterprise resource planning systems,** user satisfaction models **and the**

latest global movement in the higher education sector and the move to adopt

> 8**enterprise resource planning systems. This chapter** interrogated **the**

various components of this study elaborating on the definition of enterprise resource planning systems. Discussions occurred around the uses and benefits of

> 3**enterprise resource planning systems and** notwithstanding **the** failures **of enterprise resource planning**

implementations with the consequences of a failed implementation. A bit of history

> 8on the evolution of enterprise resource planning systems displayed the

changes over time that information system underwent to become enterprise resource planning systems. Understanding the higher education environment was crucial to understanding the need for enterprise resource planning systems in higher education institutions, the goals and business activities of higher education institutions were investigated, and the role of enterprise resource planning systems in higher education institutions is significant. Business advantages in higher education institutions were discussed around the implementation of enterprise resource planning solutions in the higher education sector. Various models of user satisfaction validation were researched, and there is clear evidence that user satisfaction has a direct relationship with enterprise resource planning usage and successful implementation. The following chapter covers the research design and the methodology undertaken during this study. CHAPTER THREE Research Methodology 3.1 Introduction This chapter describes in detail the various components in the research methodology framework utilised in this research. The aim of the study will dictate the data that is required to be collected, thus ensuring the validity of the data accumulated. The researcher will discuss components of the framework, such as the research design and methods employed, thereafter the study setting, the population chosen and the sample size selected for data harvesting. The researcher will describe and discuss the sampling method chosen

> 6for the research study and elaborate on the construction of the research instrument. The

researcher will discuss the data collection process and the data analysis component of the research methodology framework and provide the relevant justifications for the data collection, and data analysis techniques utilised in the study. A discussion concerning the aspect of validity and reliability of the research study and the bias component of the research methodology will ensue. The various ethical considerations that could influence the study were brought to the fore along with the processes to mitigate them. This chapter concludes with a summary that draws attention to the components of the research methodology framework discussed in detail. 3.2 Aim of the study The research intends to identify if the users at the University of KwaZulu-Natal are at present satisfied

> 3with the administrative enterprise resource planning system. The

study into user satisfaction

> 1with the enterprise resource planning system was restricted to

the three dimensions or categories

> 2of the enterprise resource planning system, these being the ease of

use, timeliness of data retrieval and the format relating to the presentation of the data and user interface. 3.3 Research design The elements of the research design, as evidenced in Figure 3.1, according to (Sekaran & Bougie, 2013). Figure 3.1 The Research Design Adapted from Sekaran, U. & Bougie, R. (2013) Research Methods for Business. 6th ed. Chichester: John Wiley & Sons Ltd., p95. A research design allows for the creation of a planning document or blueprint that indicates the processes for data collection, measurement

and analysis based on the research questions of the study. The research design elaborates on each step in the process undertaken, starting at the problem statement and concluding with the data analysis (Sekaran & Bougie, 2013). The nature of the study was exploratory as the administrative enterprise resource planning system is crucial for administrative support staff at UKZN to accomplish multi-departmental operations of this higher education institution daily. The enterprise resource planning application drives operational management, and the administrative support staff have no option but to use this application to execute their employment functions. Their satisfaction concerning the enterprise resource planning system defined by the three categories mentioned earlier in this chapter is unknown. The absence of knowledge about the users' satisfaction with the

1**enterprise resource planning system** presented **the researcher**

with an opportunity to undertake a qualitative approach to the study as this approach to data collection provides a higher degree of richness in the data obtained. A qualitative approach will yield comprehensive insights into user satisfaction with the

2**enterprise resource planning system based on the**

three categories. This approach will bring to the fore critical aspects within the three groups that the users' use to determine their satisfaction and lead to identifying if UKZN users are satisfied with the

1**enterprise resource planning** system. 3 **.4 Research** methods **The**

qualitative approach directed the selection for the research strategy to be a survey. According to (Sekaran & Bougie, 2013), the survey strategy for business research allows the researcher to collect qualitative data and is a popular research strategy, further to this the survey strategy utilises in a business context research such as customer satisfaction and management information systems. 3.5 Study setting The researcher is employed

6**at the University of KwaZulu-Natal** and holds **a**

principal technical position in the information and communication services department. The researcher manages the team that is

2**responsible for the** operations **of the enterprise resource planning**

application from an information technology perspective. The

3**team is responsible for** assisting and resolving **enterprise resource planning system-**

related issues that the administrative support staff at UKZN experience. Often in their interaction with the support staff, the support staff express their dissatisfaction

2**with the enterprise resource planning** application. **The**

researcher identified that research was required to determine if the support staff are satisfied

> 3**with the enterprise resource planning system** within **the**

three categories and identifying specific components in those categories. 3.6 Population The population refers to an entire group of events, people or things of interest that the researcher wishes to investigate (Sekaran & Bougie, 2013). The UKZN staff complement comprises of both academic and support staff. The researcher identified that within the support sector staff there is a population that uses the back office component

> 2**of the enterprise resource** 39 **planning** application, these are **the**

primary users of the enterprise resource planning system and utilise it regularly for their job functions. The target population for the study is the enterprise resource planning back-office support staff. 3.7 Sample The population of the enterprise resource planning back-office support staff spans primarily across three critical departments within the support sector. These utilise the enterprise resource planning system daily to conduct the university's operations. These are the finance, human resources and student academic administration departments. The researcher selected four participants from the human resources section, three from the finance section and two from the student academic administration section. 3.8 Sampling method The nonprobability sampling designs are those where the elements in the population have no probabilities associated with them, rendering them as sample participants (Sekaran & Bougie, 2013). According to (Sekaran & Bougie, 2013) purposive sampling targets specific types of people that can provide the data criteria set out by the researcher, within this type of sampling there are two major types namely judgement and quota sampling. Judgment purposive sampling was selected as the nonprobability sampling method as it involves selecting candidates who can provide the researcher with the information that is required (Sekaran & Bougie, 2013). 3.9 Research instrument The researcher based the research instrument on the objective of the study and in that way the data required had to be relevant to the three dimensions of user satisfaction identified, these being the ease of use, timeliness of data retrieval and the format relating to the presentation of the data and user interface. In light of the specifics of the research design in the study, the researcher selected a face-to-face interview instrument, as this will yield the rich, in-depth specific data that is required by the researcher. 3.10 Data collection 40 The data collection process involved face-to-face interviews. Interviewing can be divided into two types, which are structured and unstructured. Unstructured interviews are such that the interviewer does not have a planned sequence of questions to ask the respondent whereas structured interviews the researcher is aware of the information needed from the outset of the interview and a list of predetermined questions are posed to the respondents soliciting responses (Sekaran & Bougie, 2013). The type of interview conducted was a structured one. The researcher in this study prepared a list of questions that each respondent had to respond to; at times the interviewee would be guided to answering within the paradigm of the three categories or dimensions that are being researched to obtain relevant purposeful data. The researcher ensured that the structured interview concluded with collecting the required data. The interviewees on occasion would find difficulty in articulating their opinion on a particular aspect in

> 2**respect to the enterprise resource planning** system **and the**

researcher had to rephrase or seek confirmation from the respondent. 3.11 Data analysis The richness of qualitative data in the form of words from interview notes and interview transcripts, the quantity of the data collected are usually overwhelming, and analysis of the data is complicated. The reason for this is due to the lack of well-established guidelines and commonly accepted rules concerning the interpretation of qualitative data (Sekaran & Bougie, 2013). The analysis of qualitative data has three distinct processes; these

processes are the reduction of data, the display of the reduced data and the drawing of conclusions according to (Miles & Huberman, 1994). 3.11.1 Data reduction The inherent need for data reduction is due to the incidence of large amounts of data that qualitative data collection produces. The reduction of data is the first step in the data analysis process of qualitative studies (Sekaran & Bougie, 2013). (Sekaran & Bougie, 2013) identify that the method to reduce the data is through coding and categorisation. The analytic process of coding takes the qualitative data gathered, reduces, rearranges and integrates it to form theory, and the purpose of coding is to arrive at meaningful conclusions relating to the data (Sekaran & Bougie, 2013). These codes are merely labels given to a unit of text that is subsequently aggregated into groups and become categories. The coding process 41 begins with the identification and selection of the coding unit that takes the form of words, paragraphs, sentences and themes and categorisation is the process of taking the coding units and organising, arranging and classifying them (Sekaran & Bougie, 2013). 3.11.2 Data display (Miles & Huberman, 1994), state the data display is the second significant activity undertaken when analysing qualitative data According to (Sekaran & Bougie, 2013), the data display component of qualitative data analysis involves taking your reduced data and rendering it in a concise and organised manner for display. There are various methods of displaying the reduced data; some of these are charts, diagrams, graphs and matrices and this is too organise the data and discover relationships and patterns that will facilitate conclusions. 3.11.3 Drawing conclusions Conclusion drawing is the last analytical process that the analysis of the qualitative data is subjected to, this is achieved by answering the research questions and is the heart of data analysis (Sekaran & Bougie, 2013). Drawing conclusions are reached by explaining the relationships and patterns observed, making comparisons and contrasts and lastly determining what the identified themes stand for (Sekaran & Bougie, 2013). 3.12 Reliability and validity of the study The validity of the study is achieved by careful selection of the departments in which the respondents employed in, and the chosen respondents would provide the researcher with valid data for the research. Majority of the respondents had numerous years of experience working with the enterprise resource planning application at UKZN. Their expertise provided for rich, accurate qualitative data that would be relevant to the objective of the study. The researcher in narrowing the responses from the participants by indicating the three dimensions or categories that the user satisfaction research is referring to, lead to the reliability of the data obtained. The reliability of the data collected enhanced by using structured face-to-face interviews, which ensured the respondents responded to the same questions. The recorded interviews are referenced regularly to ensure reliability during comparison with the prevailing literature. 3.13 Bias The researcher took careful consideration when designing the interview questions to prevent the respondents from being asked biased questions. The researcher assured the respondents that the interviews are informal, and the recording of the interview is purely for data collection purposes, as this would solicit unbiased responses from the participant. 3.14 Ethical considerations A rigorous ethical process is followed to conduct the research and conduct the study at UKZN. The first ethical process is to obtain a Gatekeeper's letter. This letter provides the researcher with the authorisation to perform the research at UKZN. The following step is for the researcher to submit an application to the ethics committees for review of the intended study and to obtain approval for the research to be conducted. These committees ensure the researcher adheres to the necessary ethical protocols as dictated by the university. 3.15 Summary This chapter chronicled in detail the research design of the study. The chosen approach to conduct the study is a qualitative research method, and the location was

6**the University of KwaZulu-Natal. The** study was confined **to**

three dimensions or categories of user satisfaction

3**with the enterprise resource planning system,** these being **the**

ease of use, timeliness of data retrieval and the format relating to the presentation of the data and user interface. The participants were selected based on their interaction

2**with the enterprise resource planning** system **and** from **the**

three departments that extensively utilise the enterprise resource planning application. The chosen research instrument was face-to-face structured interviews as this provided for the researcher to channel the participants' responses and obtain useful, valid and reliable data. Before conducting the research, all the necessary ethical protocols were invoked. The research study is qualitative in design and will utilise a three-step analytical process to analyse the data. The three-step process involves reducing the data, displaying the data and then drawing conclusions. The forthcoming chapter will present the acquired data and discussions around the data will ensue. CHAPTER FOUR Presentation of Results and Discussion 4.1 Introduction This chapter relates to the results of the study, and the researcher has analysed the data received from the interviews, the interviews were structured, which solicited specific data from the respondents. The data received from the respondents were confined to the three categories identified in the previous chapter. These categories were adapted from the

10**end-user computing model by (Doll & Torkzadeh, 1988). The** pre-categorising **of**

the data allowed the researcher to obtain valid data about the user satisfaction with the enterprise resource planning system concerning the ease of use, format and timeliness of the system. The data is qualitative in design and the end-user computer model selected coupled with the face-to-face interviews allowed for the obtaining of face valid data, and this is because user satisfaction is attributed the emotional feeling of the respondents. It was then easier to identify the themes evident in the data and categorise the data. The research methodology defined the categories that were investigated, relevant themes were extracted from the collated data, and it produced a complete understanding of the user's satisfaction level at the University of KwaZulu-Natal with the enterprise resource planning system. It is important to note that most of the research identified focuses on determining if the

2**implementation of the enterprise resource planning system was** successful using **the**

various user satisfaction or end-user computing satisfaction models. It may become evident that some of the themes repeat themselves in each category; this was as a result of the theme playing a significant role in the category. This study sought to determine if the users are satisfied with the enterprise resource planning system relating to the three categories. There is limited literature in regards to this type of study. Reference literature was difficult to locate except for one where only one category was used in evaluating the enterprise resource planning system, and that was "Effectiveness of an Integrated Tertiary Software Mobile Information System for Student Registration and Admission at a University in Gauteng" (Mashabela & Pillay, 2017). 4.2 Demographics of respondents The respondents were carefully selected from the three sections at UKZN that primarily use the enterprise resource planning system daily conducting business operations at UKZN. The three departments that were selected are Human Resources, Finance and Student Academic Administration. The total number of interviews conducted was nine, and all of the staff members were from the support sector. Figure 4.1 Sectional Breakdown of Respondents Figure 4.1 displays the number of respondents per section chosen from Human resources four participated, three from Finance and two from Student Academic Administration. The interviews were conducted on two campuses, namely Howard College and the Westville campus. Figure 4.2 indicates the current number of years the respondents worked

3**with the enterprise resource planning system** at UKZN. **The**

average number of years working with the enterprise resource planning system is thirteen and a half years (rounded to half a year). Figure 4.2 Years Worked

> 4**with An Enterprise Resource Planning System** 4.3 Categories **The** researcher identified at **the** onset **of**

the study that

> 10**based on** the **user satisfaction model by (Doll & Torkzadeh, 1988), the**

three categories selected were ease of use, format and timeliness. Due to the environment at the

> 6**University of KwaZulu-Natal, the researcher** identified **that the**

three factors in Figure 4.3 would be pertinent and would

> 6**provide the required data for the study.**

Figure 4.3 Categories of Data Analysis The data was analysed in the context of the three categories in Figure 4.2 and the relevant themes pertaining to each category was identified and will be presented and discussed. 4.4 Themes Identified The themes were identified from the raw data post; the data reduction process after that, they were then placed into one of the three pre-determined categories. The categories were pre- determined to ensure the validity of the data collected, and the respondents, if not directed, would provide unnecessary data for the study. The following themes were identified in the data and were coded to fall within the pre-defined categories. 4.4.1 Ease of Use Category The themes identified to fall within the ambit of the ease of category are menu functionality, user interface, poor menu item descriptions and report generation process. 4.4.1.1 Menu functionality The respondents unanimously voiced their dissatisfaction with the menu functionality

> 1**of the enterprise resource planning system. The** common consensus **is** that **the**

menu prevents ease of use of the application. The opinion of the respondents' was that the menu is "clunky" to navigate through and causes delays in resolving queries. It does not provide a holistic view of the record that is actively being accessed. Querying a student or staff record requires the administrator to toggle between three and five menus and screens, this delays resolution of the query and decreases service turn around time. The administrators indicated that this constant movement between menus to perform transactions on the system poses a risk of making mistakes either while capturing or processing requests. New employees find the system antiquated and complex to navigate because the menu setup is not intuitive and to perform a task it requires that you know the shortcode description for that menu and here again the risk of selecting the incorrect the option is increased. This makes the new staff member and present staff members apprehensive about utilising the system. The execute button and help interface are not clearly identifiable, and this further delays inexperienced users from performing their duties as they then seek assistance from their colleagues; this now, in turn, delays two employees from performing their duties. 4.4.1.2 User interface The user interface theme was another component the respondents commented negatively about, and from the responses, it was identified that the user interface appearance and structure is aged and not in tune with the web style interface that the participants are confident and familiar in using. The appearance of the interface is being compared to that of an Android, Apple and laptop user interface.

The user interface was described as being from the “DOS era”, and this makes it difficult for new incumbents into the organisation to learn the system quickly, easily and become productive

> 3**using the enterprise resource planning** system **to**

conducted daily operations. 4.4.1.3 Menu item descriptions Inadequate menu item descriptions is a problem that plagues both the experienced and inexperienced users

> 2**of the enterprise resource planning system. The** respondents identified that **the**

menu items do not have meaningful descriptions, and navigation is difficult within the menu if the option shortcode or full name is unknown furthermore the menus are not structured in any logical way. The ability to complete the task effectively and efficiently depends on your memory and experienced knowledge of how to navigate within the system. 4.4.1.4 Data validation Data validation from within the system for data input or medication, critical vital fields are not protected nor is the content on those fields validated. The causes of administrative burden and unnecessary delays in executing tasks. The data from the enterprise resource planning system it out-dated for numerous records and this causes great frustration and systems and services cannot depend on the data. Reporting is directly affected by incorrect data being captured. The enterprise resource planning system allows for free text to be typed in key field areas like identity number, student numbers and severely affect data validation and reporting. Student numbers that are allowed to be entered with spaces in them cause various issues with receipt printing, automated Active Directory account creation, parking disc systems. From a staffing point of view, crucial pieces of information can be left out like identity numbers, and the system does not automatically verify if the identity number exists, this has tremendous potential to duplicate record created for the same individual. This type of issue has already occurred a couple of times, and the enterprise resource planning application should be configured with more stringent data validation techniques. 4.4.1.5 Report generation process The respondents identified the same theme in previous themes discussed above and were extremely dissatisfied with the report generation business process. It has become the most disliked process in the

> 3**enterprise resource planning system. The** report generation process **in the**

ease of use category was confined

> 1**to the enterprise resource planning system’**

s standard report generation process, and this is utilising the system’s preconfigured reporting functionality. The reason for discussing the report generation process theme last in the ease of use category is because the four themes discussed above contribute to the dissatisfaction of the report generation process theme. In addition to this, the respondents articulated that the report generation process is cumbersome, prone to errors being made, which could have negative consequences to the entire system performance. It was noted that during the generation of certain reports failures or issues with a record in the report will prevent the entire report from being generated.

> 2**It was** suggested **that the enterprise resource planning system**

should allow the generation of the report to continue and complete listed any failures or errors. 4.4.2 Timeliness Category The themes identified to fall within the realm of the timeliness category are

responsiveness and report generation process. 4.4.2.1 Responsiveness 48 This theme identifies the user's perceived system responsiveness, and this was generally favourable, and the users were largely satisfied

> 3**with the** speed **and** response **of the enterprise resource planning system.**

There is an understanding that has come with the users' experience and knowledge that certain processes will inevitably have slower response times due to the nature of the request but overall indicated that the response delay in those instances is acceptable and they are not dissatisfied with the response. During high utilisation periods which are typically registration and examination result processing, it was noted that the system is less responsive due to the load and this puts some strain on other sections to be able to conduct their business functions. 4.4.2.2 Report generation process The report generation process was a distinct theme in the ease of use category as well, in context with the timeliness category, two aspects presented itself in this theme. The first one was the time taken to start the report generation process was unacceptable in terms of the parameters that were required to be entered manually to obtain a standard report process using predefined built-in reports

> 2**of the enterprise resource planning system.** Here again, **the** themes **of** the user interface **and**

menu functionality under the ease of use category have a significant impact on the timeliness of report generation. Highlighted by the respondents was that errors in the manual insertion of parameters to generate the report would have one of two consequences, these are the requested report fails or returns incorrect data rendering it useless and the process is repeated which delays the task being completed and any operational decision that is dependant on that report is also delayed. The second consequence is that the report does generation does not complete and continues endlessly in a loop causing system slowness and data unavailability, the system slowness occurs due to the report generation process utilising too much system resources due to invalid parameter selection. The second aspect of this theme is related to non-standard report generation process; this is a much more complex process and causes significant delays in obtaining reports. The respondents have stated that non-standard reports have a minimum delay of at least two days because it not solely dependant on the system to generate the report. The enterprise resource planning system has a finite set up of standard reports, and it is important to note that non-standard reports are deemed reports that do not exist on the system and the logic behind the report generation has to be developed. Depending on the originating business unit for the non standard report request the process is slightly different, if human resources it requesting the report, the human resources information systems officer receives the request from colleagues in human resource and will request the report creation from the internal developers, other business units will contact the internal developers directly. It can already be noted that there are delays in obtaining data from the system, depending on the developers' availability and workload the request takes any durations from two days to weeks and sometimes months to complete. This process for generating non-standard reports is a human- intensive, time-consuming process, the resounding dissatisfaction with the process is clear; the users believe that non-standard report generation should be more user-driven and system- friendly and dependant. 4.4.3 Format Category The themes identified within the category of format are holistic reporting, report generation delays, report format generation and individual reports. 4.4.3.1 Holistic reporting The holistic report theme targets in on reporting inefficiencies and these inefficiencies cause frustration with the support user base that uses the enterprise resource planning system to complete business operational activities. Respondents highlighted the system failure in terms of reporting processes. It was identified that standard built-in reports that should be provided with the required set of data are inadequate and the support staff find themselves in a time- consuming process of generating multiple standard reports and merging the content of these reports to obtain the data they require. The time consumption is proving to be an efficiency hurdle for the respondents, and they are left with management questioning the delay in producing the requested report. A significant amount of

timeconsuming excel data manipulation takes place, human errors occur, and the reports have to be re-generated cause further delays in receiving the data. Respondents also mentioned that some reports are obtained from other systems that extract the data form

> 5the enterprise resource planning system and present it to the

user in a particular format. The

> 1enterprise resource planning system should be able to

generate this report as the data is housed with the central database. The respondents believe reports should originate

> 3for the primary enterprise resource planning system and not

other secondary systems, and this poor workflow brings about delays and efficiencies. 4.4.3.2 Report generation delays Report generation delays occur when non-standard reports

> 3of the enterprise resource planning system are referred to the internal development team to

create and customise as per request. The workflow of this process has multiple points of failure and delays. The delay in the present process to obtain a non-standard report is extremely challenging concerning the wait time. Some reports are time-critical and do not exist as a standard report on the system and have to be developed. Management usually has to forgo the luxury of making decisions at times in the absence of the report. 4.4.3.3 Report format generation Respondents require the reports to be in a user-friendly format and easily understandable. Majority of the standard reports provide the correct format that is required by the user, but often it has to be further edited and manipulated to obtain exactly what is required from the report. Respondents have mentioned that depending on the report that is required, hours and sometimes days of manual manipulation of the report has to be done. The format that some extensive reports are generated in renders them useless because either there are supplementary reports that have to be generated to interpret the initial report or the report is so complex that it cannot be deciphered easily and hours of intensive analysis has to be carried out in order to provide a meaningful report. The reporting format

> 3of the enterprise resource planning system is not sufficiently equipped to provide

reports in a variety of display and logical formats. Decisions based on these reports are often delayed due to the report not being displayed in the required format. The other aspect about report format generation is the

> 5enterprise resource planning system cannot render the report in

all the standard file formats that are required, specific reports are only available in pdf format, and this hinders the support staff if they are required to manipulate the data and present to management or at meets. Again hours on end are consumed to transcode the report into the required file format and after that

manipulate the report. The respondents indicated the huge time loss and delays when the system could not provide the report in the required format. Management becomes increasingly disillusioned with the delays in receiving the report from the support staff and the staff become dissatisfied with the system because it cannot provide the data they need in the format required. 4.4.3.4 Individual reports Again referring to standard reporting functionality

> 3**in the enterprise resource planning system,**

the standard reports are generated used the fixed parameters as mentioned earlier in this 51 chapter, often is the case that in human resources or finance departments required a subset of data from a standard report which needs to be reported on. The standard report cannot be generated with custom parameters to provide the subset of the data that is required. The parameter input to generate the report is static, so once the whole report is generated, the support staff have to reduce the report now manually to obtain the subset of data that is required. This process is again manually and time-consuming and prone to human error, if the accuracy in the report is marred by human error decisions taken on that report might be inaccurate and can cause extensive and critical issues within the business. 4.5 Satisfaction rating The final question in the interview was for the respondent to sum up in the context of the three categories and identify within themselves if they are satisfied

> 1**with the enterprise resource planning system. To**

assist them in discovering their satisfaction, the researcher requested they provide a rating for their satisfaction with the enterprise resource planning system at the University of KwaZulu-Natal. The rating scale was from one to ten and a rating of five is neutral. The results of the rating are depicted in Figure 4.4. Figure 4.4 Respondent Satisfaction Rating The rating of the respondents depicted in Figure 4.4 on a line graph indicating the five score neutrality value, there is a clear indication that the majority of the respondents rated their satisfaction

> 3**with the enterprise resource planning system** above a five. **The**

average was around six (rounded off), and this provides us with an understanding that the users are marginally satisfied with the system. 4.6 Summary The results of the study indicated that the users are marginally satisfied with the enterprise resource planning system. The issues identified in the themes are potential game-changers, and if left unattended has the potential to increase the dissatisfaction levels

> 3**with the enterprise resource planning system. The**

available literature did not provide for sufficient referral to other studies conducted to ascertain if the users of the enterprise resource system are satisfied. The

> 7**higher education institutions have a** unique business structure **and**

processes; the enterprise resource planning system is customised for higher education institutions, and in the research, the focus is on whether the implementation was successful by using the various end-user computing satisfaction or user satisfaction models to arrive and the answer. The results showed that the main issue that is causing dissatisfaction and operational inefficiencies with the loss of productive work time is reporting services within the application. The reporting functionality permeated the entire system, this

theme appeared in each of the categories, and it came out strongly in the interviews as a crucial problem that requires attention and resolutions. Without a doubt, the user interface and menu functionality are the second two themes that users are dissatisfied with in regards to the system functionality and processes. The following chapter will terminate the study and provide some insight into future studies and recommendation for the stakeholders

6**at the University of KwaZulu-Natal to**

take cognisance. CHAPTER FIVE Conclusions and Recommendations 5.1 Introduction This study was undertaken to establish if the University of KwaZulu-Natal administrative support staff that use the back-office component of the enterprise resource planning system are satisfied with the functioning of the system. The research established that the administrative support staff who use the back-office component of the enterprise resource planning system are marginally satisfied with the system. There is a significant amount of improvement that can be undertaken to enhance interaction

3**with the enterprise resource planning system. The**

research made evident critical operational hindrances, that are impeding efficiency within the departments that

1**use the enterprise resource planning system.**

Delays in processing requests and service turnaround times are amongst the consequences of inadequacies

4**within the enterprise resource planning system. The**

research objective was reached and will be discussed later in the chapter, along with recommendations to resolve the issues and future studies. 5.2 Conclusion The need to conduct this study was to gauge if the administrative staff are satisfied

1**with the** functioning **of the enterprise resource planning system** at **the**

University of KwaZulu-Natal. It was a singular objective and being a qualitative study using the end-user computing satisfaction model to qualify emotional inclinations of administrative staff in the organisation, is not always easy but invaluable knowledge was obtained with the study. The enterprise resource planning system is not a perfect fit for the organisation, but in voicing

2**that, there is** no standard **enterprise resource planning system that**

is an ideal fit higher education institutions. Overall the administrative support staff were marginally satisfied

1**with the** functioning **of the enterprise resource planning system.**

Constructively they acknowledge that the system has flaws that are not insurmountable, and if attention

were given to rectify those issues, they would be more satisfied. 5.3 Implication of this research The objective of the study has answered the question if staff are satisfied with the enterprise resource planning system, but more importantly, it provided a platform for administrative staff to voice the difficulties that hinder them from being efficient and conducting the operational business of the institution effectively. The research has highlighted and validated the EUCS model by (Doll & Torkzadeh, 1988) can be applied to higher education institutions to determine end-user computing satisfaction and further to this it corroborates that there is no “one size fits all” when it comes to enterprise resource planning systems, and the higher education institutions’s are similar to business in the global economy. The importance is to be agile enough as an enterprise resource planning vendor to tailor your standard enterprise resource planning systems to various clients. Distinct areas have been identified in the study that if the management of the institution resolves both processes and information technology hurdles, significant benefits in terms of efficiency in business processed would be achieved. 5.4 Limitations of the Study The limitations of the study were not unsurmountable that they could not be overcome. The following limitations where identified: ? Interview Instrument The interview instrument is a powerful method to obtain rich data, but it comes at the cost of the quantity of data. The analysis of the sheer volume of data proved to be quite a time consuming, but this was overcome utilising pre-defined categories there limiting the scope of the data receiving and obtaining valid, useful data. The limitation with interviews is the availability of the respondents. The crucial aspect of overcoming that is to schedule interviews during less operationally busy periods. ? Identifying target respondents The identification of the respondents the twill be willing to spare their time and participate in the study is crucial, and often many refuse to participate, some due to no personal gain in the study, others do not care and the last batch, just too busy. The researcher identified administrative staff that are dedicated to working better and smarter and want to a difference, also chose the respondents that will benefit the study. The truth is that if the respondents are known to the researcher, then it will be easier to solicit participation. 5.5 Recommendations to resolve the research problem The research problem was to identify if the staff are satisfied

> 1**with the enterprise resource planning system,** but the **information** gathered during **the**

study has provided opportunities

> 6**for the University of KwaZulu-Natal to** improve **on**

numerous inefficiencies relating to it is enterprise resource planning system and business processes. There are simple, cost-effective changes that can be made to ensure efficiency. ? Implement regular in-house training for staff that use

> 3**the enterprise resource planning system** ? Engage with **the**

IT department voicing difficulties that hinder operations and find solutions together. ? Communication is of paramount need, sections within organisation work isolation and not leveraging team power. ? Regularly evaluate processes to ensure inefficiencies have crept it and improve where improvement can be made. ? Engage

> 2**with the** custodians **of the enterprise resource planning**

and have discussions on how to improve operations but always keep open minds. ? Certain aspects require funding to resolve with the enterprise resource planning system, budget for them early and identify them as

soon as possible and mark for resolution. ? Perform benchmark tests regularly on the

> 2**enterprise resource planning system to** ascertain performance levels **and**

functionality availability. 5.6 Recommendations of Future Studies This study did not cover all aspects of user satisfaction

> 1**with the enterprise resource planning system.** Future studies **can**

include: ? Increasing the sample size and extending the study to students as well, that interact

> 1**with the enterprise resource planning system,** the study **will**

target a broader diverse user base. ? ? Include external suppliers into the study to evaluate all business processes. Do not limit the study to the qualitative method; employ a mixed method. 56 ? Include executive management as part of the study. ? Research other EUCS models available that might be more suitable. 5.7 Summary The data obtained provided sufficient evidence

> 2**that the** users' **of the enterprise resource planning** are satisfied with **the** system. **The**

users have highlighted some issues but believe that if those issues are resolved, the system would bring higher levels of satisfaction with the

> 2**enterprise resource planning system** and enabling them **to** perform **their**

duties efficiently and effectively. 9 11 12 14 17 19 20 22 23 24 26 27 28 29 30 31 32 34 35 36 37 38 42 43 44 45 46 47 49 50 52 53 54 55 57 58