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Exploring Factors Causing Disparity between Desired and Experienced Effects of Campus ERP Systems

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Abstract

Enterprise Resource Planning (ERP) systems have been used by organizations and companies throughout the world since 1990. Many universities have recently replaced their legacy systems with ERP systems to improve work efficiency. One solution available for universities by way of management information system is the Campus ERP system. The Campus ERP system helps universities incorporate all departments and functions within a single database system that manages all student information. The Campus ERP is used to facilitate the routine work of end users and to achieve a better resource management. Nevertheless, the effects of the Campus ERP systems experienced by users do not correspond with their desired effects of these systems. To investigate the reasons for these differences, we conduct an empirical study at the University of Nizwa (UoN) in Oman to identify the differences between desired effects and experienced effects of the Campus ERP system and the reasons for these differences. The target group from UoN were administrators, developers and teachers. We examine the impacts of the Campus ERP system by introducing the TOC model as a catalogue of criteria to investigate the determinants affecting the influence of the ERP system. In our study, we classify these determinants as avoided reasons, identified reasons, and unidentified reasons. We investigate whether there exists any difference between desired effects and experienced effects at UoN, assuming that the university is aware of the avoided reasons and the identified reasons. Thus, we set out to discover the unidentified reasons for the difference. By doing so, we contribute to a new understanding of unknown influential factors that lead to the difference between desired and experienced effects of ERP systems, which is significant as a yardstick for the successful implementation of Campus ERP projects.

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Table of Contents

List of Figures

List of Tables

1. Introduction

This introductory chapter presents research background, the problem area and the motivation for this research. It also introduces research objectives and research questions and describes the scope and limitations of the research.

1.1 Background

The Enterprise Resource Planning (ERP) system requires the integration of the entire range of processes and functions of a business in order for users to be able to view all business operations from the perspective of a common information and information technology (IT) architecture (Robert Jacobs, 2007) According to Robert Jacobs, ERP is an information system that integrates organizations tools and data into a centralized database that affects a large number of end users in the organization (Robert Jacobs, 2007).

ERP systems have developed rapidly with the growth of information technology fields and have a substantial effect on organizations (Robert Jacobs, 2007). Many organizations and institutions of higher education have replaced their legacy systems with the ERP system to integrate all their business processes into a centralized system (Seo, 2013).

ERP was initially developed with tools to support the financial sector, including accounting, sales, materials distribution and management, human resources, production planning, computer integrated manufacturing, supply chain, and customer information (Shehab, Sharp, Supramaniam & Spedding, 2004). ERPs have since been developed further and now provide tools that support education and telecommunication. The tools help improve the performance of business processes and reduce cycle times (Shehab et al., 2004). The ERP system is an application solution used worldwide to integrate information and business processes into a centralized database to help universities, among other organizations, reduce workflow time and increase efficiency (Swartz & Orgill, 2001). The extensions of an ERP system are shown in Figure 1.1 below.

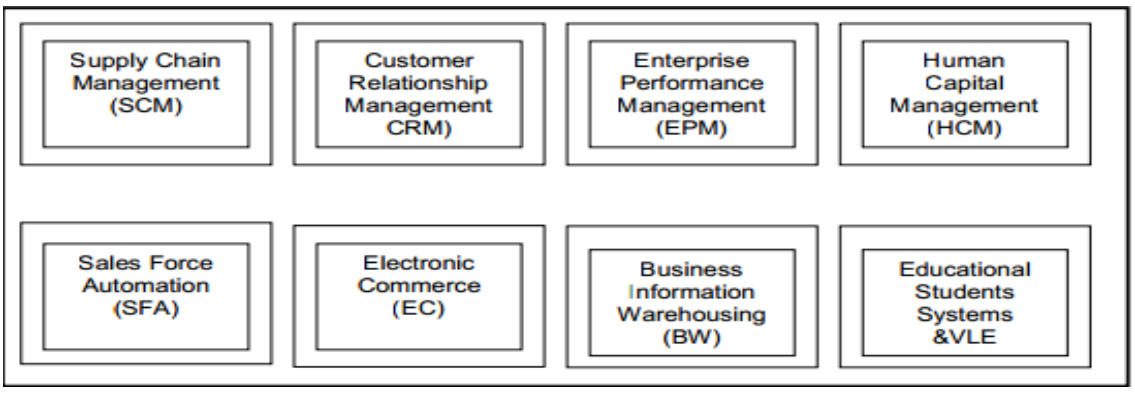

Figure 1.1 ERP extension (Seo, 2013)

ERP systems in universities help combine administrative processes from different departments into an enterprise resource planning system to increase operational efficiency (Rabaa'i, Bandara, & Gable, 2009). Ghuman and Chaudhary (2012) define Campus ERP as an information system that helps universities integrate and automate administrative services, such as human resources,

accounting, payroll and inventory, and used for academic services such as recruitment, admissions, registration, and student records.

Ghuman and Chaudhary (2012) observe that campus ERP solutions in universities improve processes for all users, including staff in every faculty and students in every grade. The data is standardized and can be accessed over the Internet (Ghuman & Chaudhary, 2012). Students can log on to get access to the system, see their academic progress, interact with each other, and to even take advantage of distance studies (Ghuman & Chaudhary, 2012).

Improper selection occurs when decision makers procure ERP systems that are not suitable for their business target. Before procuring a management system, executives should clarify organization needs to discard any reasons that may cause systemic inefficiency. With inadequate resources, Rosemann and Wiese (1999) mention that the ERP system is very complex because it has comprehensive functions. Due to this, the ERP system requires a long time, and a considerable amount of resources, such as money and human resources, need to be invested during the selection process. Thus, the informed approval from the administrator of the university is necessary for the successful adoption of the campus ERP system.

1.2 Problem discussion

The selection and implementation of the Campus ERP system have drastically changed the work environment in universities. As Boudreau and Robey (1999) point out, several universities worldwide have successfully implemented Campus ERP systems. Boudreau and Robey (1999) further highlight that a significant amount of research has been conducted on the successful implementation of Campus ERP systems in educational institutes. On the other hand , research papers and reports from several other organizations have found that Campus ERP system implementation does not generate expected results (Willis & Willis-Brown, 2002). Moreover, very little is known about the difference between the desired effects and the experience effects of implementing Campus ERP systems.

More and more universities are starting to implement the Campus ERP system. The system is used as a transition from spreadsheets to a more effective way of integrating information. Although many researches has been conducted in other environments with regards to the effectiveness and expectations of these systems, very little has been conducted in the university environment (von Hellens, Nielsen, & Beekhuyzen, 2005). Therefore, it is not known whether or not these systems live up to the expectations of universities. Consequently, there is a pressing need to explore the expectations and experienced effects of the implementation of Campus ERP systems.

1.3 Purpose

The purpose of this study is to investigate whether or not the implementation of the Campus ERP system lives up the university expectations. Furthermore, to find out whether there is a difference between the desired effects and the experienced effects of this implementation. For this purpose, we will use TOSP model to examine the effects of Campus ERP systems in order to determine the differences between users' expectations of the system prior to use and their assessment of it after having used it. By looking into these reasons, we hope to offer guidance to different kinds of customers with regards to the issues they need to be aware of in order to satisfy their

expectations of Campus ERP systems. Knowing the different experiences between different groups of customers in a university environment can help eliminate misunderstandings regarding the use of the Campus ERP system, and can help developers design a system that delivers the effects expected by the potential customers of the Campus ERP products. The findings of such a study can also help universities make informed decisions regarding the implementation of a Campus ERP system by being aware of the consequences of its implementation and the means to avoid unexpected issues.

1.4 Research questions

In order to address the problems stated above, this study aims to answer two questions:

RQ1: What are the differences between the desired effects and the experienced effects of the implementation of a Campus ERP system?

RQ2: What are the causes of these differences?

1.5 Delimitations

Our research aimed at investigating the differences between the experienced effects and the desired effects of the Campus ERP system. We look into the desired effects for administrators to purchase an ERP system. As a case study, we will focus on the current situation at Nizwa University, both at the administrative and the academic levels, to determine whether a Campus ERP system can address the needs of the customers there, and detail the reasons for these differences. Since our research based on Nizwa University, we will exclude the perspectives of parties outside the university. Our informants are limited to the developers designed the Eduwave software, administrators in the IT department, and teachers in UoN.

1.6 Target Group

We hope that this thesis can contribute to empirical research on the design of Campus ERP systems. Our target group thus includes IS developers, system administrators, and teachers. Furthermore, we hope that our research can assist university administrators advocating for the introduction of Campus ERP systems at their respective universities.

2. Literature review

The purpose of this chapter is to provide general information on ERP and Campus ERP. We also describe here the models and theories used to respond to our research questions.

2.1 ERP Overview

An ERP system can be defined as the design of enterprise information system that helps integrate, combine and optimize the information workflow, business processes and functions of different departments into one database in order to collect and store data, reduce cycle times, enable faster access to information, and facilitate better management (Abdinnour-Helm, Lengnick-Hall, & Lengnick-Hall, 2003). That means the ERP system should be an integrated and centralized system that can control, monitor and run the tasks of every departments within an enterprise.

Maleki & Anand (2008) mention that ERP system is different from CRM system, though both of them are aiming at facilitating the business processes. They state CRM system emphasizes on the functionality of managing clients' information, activities, and opportunities. It is used mostly for realizing marketing targets. On the other hand, ERP system is used to managing business operations like purchasing, warehousing, ordering and customer service. Maleki & Anand (2008) point out that the dividing line between the ERP system and CRM system became unclear because the enterprise systems vendors mixed the functions of the two. However, the difference between the two systems is obvious. The definition of ERP system and CRM system can be clearer: ERP system tends to be more comprehensive. It is likely to be designed for the whole working processes including accounting and human resource management. CRM system is designed mainly for collecting customers' information and dealing with customers' requests. The functions of CRM system are more specified and not much on the office administration.

The enterprise resource planning system has introduced to universities as a method to integrate their management system by providing support for administrators and academic services, including those to staff and students, human resources and financial management (Ahmad, Othman, & Mukhtar, 2011). There are several benefits for universities in switching from older systems to ERP, such as better access to information, better services for faculty and students, greater access to administrative services, improved efficiency, better flow of information, and reduced use of paper (Ahmad et al., 2011).

2.2 ERP Effects

ERP systems are standardized systems that are customizable to help enterprises in business administration by integrating solutions for operating processes (Rosemann & Wiese, 1999). Typically, following its successful implementation, organizations can greatly benefit from the ERP system in lowering cost, enabling information sharing, and increasing e-business capacity. It is designed to address the various information flow problems that afflict a medium or large organization.

Nevertheless, unlike the material requirements planning (MRP I) and the manufacturing resource planning (MRP II), which merely focus on improving the performance of a specified part of the system, ERP affects the entire organization and requires long-term implementation (Stevens,

1997). This feature makes ERP less feasible with regard to limitations of time and budget. The effectiveness of ERP may also vary. As Trunick (1999) reports, only 40% of all ERP projects realize part of their expected effects, whereas 20% of ERP projects end in failure. Thus, a well understanding of the criteria of the effectiveness of ERP is essential.

In order to judge the disparity of the effects of campus ERP, we compare the experienced effects and the desired effects of the ERP project. We define the experienced effects as the effects achieved after the implementation of ERP systems. Meanwhile, we define the desired effects as the effects that the customers want to achieve before the implementation of ERP systems.

2.2.1 Criteria for Identifying the Effects of Campus ERP

The effects of campus ERP are described in many literatures. In the recent study of Uwizeyemungu and Raymond (2010), a graph is created to show the evaluation model from different theoretical perspectives as we present in Figure 2.1.

S. UWIZEYEMUNGU AND L. RAYMOND

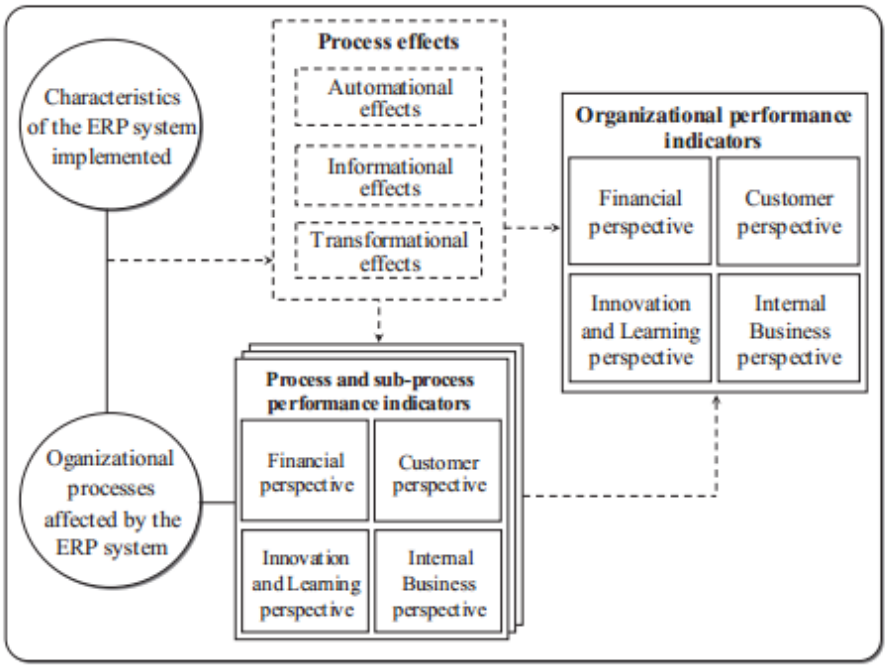

FIG. 1. Evaluation model of ERP system effects.

Figure 2.1 Evaluation model of ERP system effects (Uwizeyemungu & Raymond,2010)

The above figure illustrates the two models to measure the general ERP system effects—the process model and the balanced scorecard model. The process model divides ERP system effects into automational effects, informational effects and transformational effects. The balanced scorecard model examines ERP system effects from four perspectives: financial, customer, innovation and learning, and internal business. The combination of process model and the balanced scorecard model seems to be an adequate and all-arounded method, yet it is not quite

suitable for evaluating the effects of a campus ERP system. That is because organizations like universities usually do not follow the enterprises' way of doing business. In other words, universities are not mainly aiming at achieving profits. Shang and Seddon (2000) introduce five perspectives to examine the effects of ERP—operational, managerial, strategic, IT infrastructure and organizational perspectives. These five dimensions concern the effects of ERP on the changes of the organizational performance, working processes as well as the improvement of IT systems. The five dimensions give a better view on judging the effects of campus ERP.

In order to identify the Alpha company's motivations to implement the ERP system, Uwizeyemungu and Raymond (2010) analyse the motivations based on the framework that contains ERP effects in four perspectives: technical, operational, strategic and performance. The table 2.1 below shows the contents of the four perspectives.

Table 2.1 Motivation Framework (Uwizeyemungu & Raymond, 2010)

Alpha's motivations to adopt an ERP system

Motivations for adoption	Importance[a]
Technical	
- Search for integration	4
- Obsolescence of legacy system	4
- Weak capability of legacy system	4
Operational	
- Access to reliable information	4
- Improve the monitoring of orders	4
- Improve the time-of-delivery confirmation system	4
Strategic	
- Support the firm's envisaged growth	5
- Position the firm competitively as a "world-class" enterprise	5
Performance	
- Improve customer service	5
- Improve organizational efficiency (shorter cycles, improved quality, better control of costs)	4

[a]importance of the motivation on a scale of 1 (unimportant) to 5 (very important).

We find this model is the most feasible one to work as a criteria for us to compare the desired effects and the experienced effects in our case study. It doesn't pay much attention to the effects on the financial issue, but much more on processing and future growth. We use the TOSP model as our criteria to judge the agreements and differences between the experienced and desired effects. In order to identify each of the effect in campus ERP domain, we justify the four perspectives as follows:

The technical perspective investigates the integration as well as the updating and improvement of the legacy system. From this perspective, the effects on the ERP system itself are examined. It includes the changes in system quality and user experience.

The operational perspective refers to the accessibility to get reliable information, and timely processing of tasks. As for campus ERP systems, this perspective helps to investigate the possibility of getting tutorial materials, uploading documents, as well as completing work in time.

The strategic perspective looks into the support for the university's development, and the gain on competitiveness. In this perspective, the improvement of image of the university is considered.

The performance perspective emphasizes on the improvement of service, organizational efficiency, quality and cost control. It evaluates the overall effects on the efficiency of the work performance.

From the above explanation, we find out the desired effects of general ERP can also be adaptable for campus ERP. Gattiker and Goodhue (2005) describe the benefits of the ERP implementation and the factors that may influence these benefits. They also suggest methods to improve the systems of companies using ERP systems. In their study, they claim independence and differentiation can influence the experienced effects of ERP systems.

The benefits of using ERP systems in organizations can be divided into two classes (Al-Mashari, Al-Mudimigh, & Zairi, 2003). The first class is tangible benefits that help organizations reduce inventory, transportation, logistics and personal costs, increase production, and improve business management, on-time delivery performance and workflow (Al-Mashari et al., 2003) . The second class consists of intangible benefits, which help organizations enhance the visibility of data, respond more quickly to customer requests, integrate systems, effect standardization, flexibility, and simultaneous accessibility for different customers, as well as the global sharing of information (Al-Mashari et al., 2003).

2.2.2 The history of the Campus ERP system

The adoption of the PeopleSoft Campus ERP system by Georgetown University is a typical instance for understanding the extent to which experienced effects match the desired effects of the system. Before 1995, Georgetown University lacked a centralized and integrated information technology (IT) infrastructure, where each campus of the university had its own IT system. The university decided to implement the new system to create a web business system that would enable centralized access to information, intellectual property and data administrators. They implemented the PeopleSoft Campus ERP to serve and manage financial aid and admissions aid to students. As a consequence, all Georgetown University campuses are now connected through a central online database that serves more than 30,000 students. (Blitzblau & Hanson, 2001)

The University of Houston also transitioned from its old system to the PeopleSoft Campus ERP system, which provides a centralized database for all its campuses. The old system created numerous redundancies, as each campus has its own system. The implementation of the Campus ERP system has led to a significant change. It provides users novel online self-service options, such as checking admission status, registration, credit card payments, instalments, grade retrieval, class requirements, scheduling, and transcript ordering. (Gaska, 2003)

John L. Thomas, the director of information services for the university, said:

"*We weren't having problems with our legacy system, but we needed a way to allow students online access rather than force them to stand in line for what they needed. We wanted to make the learning management system available to everyone*."

Florida Agricultural and Mechanical (A&M) University implemented the Campus ERP system in 2003 in three phases: the first phase involved financial management components, the second phase included human resources and payroll components, and the third phase consisted of student administration components (Shivers-Blackwell & Charles, 2006). The perceived use of the ERP system in Florida A&M was to improve effectiveness in student administration matters (Shivers-Blackwell & Charles, 2006). While it was perceived to have had different effects for different users in the university – administrator, faculty and student, it appears that it helped all users with their tasks, such as student admission status, financial aid, grade submission, assignment posting, online comments, and other communications.

In 2000, Luther College decided to replace its legacy system, which only supported finance, human resources and payroll departments. The new enterprise resource information system enabled different administrative departments to share data and communicate with each other more effectively and efficiently (Wee, 2004). The Datatel information system is a campus-wide integrated information system chosen by Luther College. It is an ERP system with different modules, such as technical, core, human resources, financial, student system, benefactor, and other tools (Wee, 2004). Users are reported to be more comfortable and confident in using the Datatel enterprise system than the using the old one (Wee, 2004). The perceived usefulness of the ERP system determines the satisfaction of the end user, and it is a method to determine whether the legacy system needs to be replaced by the ERP system. Moreover, it examines whether the ERP system helped in the enhancement of the work performance or the system has a significant relation to the changes involved in the university (Amoako-Gyampah, 2007).

From the above, we can conclude that the ERP system seems to be a feasible solution for most universities. The system is a business management software that allows universities and other organizations to integrate their old system data into the new system, manages business processes and automates back-office functions. Moreover, the ERP system helps universities integrate all data in a centralized database, improves overall performance, and increases productivity through automation of several functions. Thus, most universities – University of Houston, Florida A&M, Georgetown University, Luther College, etc., has achieved the expected benefits from the adoption of the ERP system.

2.2.3 The Desired Effects of Campus ERP Systems

Previous studies show that many universities have attempted to replace their old systems by Campus ERP system. This is because previously the distribution of information is over different computer systems, which caused many operational problems. In the past, universities were faced with overhead problems. These problems included: maintaining numerous different systems; repeatedly entering the same data in more than one server; and reformatting data in one system in order to be used by another (Abdinnour-Helm et al., 2003).

Ross and Vitale (2000) explain the motivation for ERP projects (see Figure 2.2).

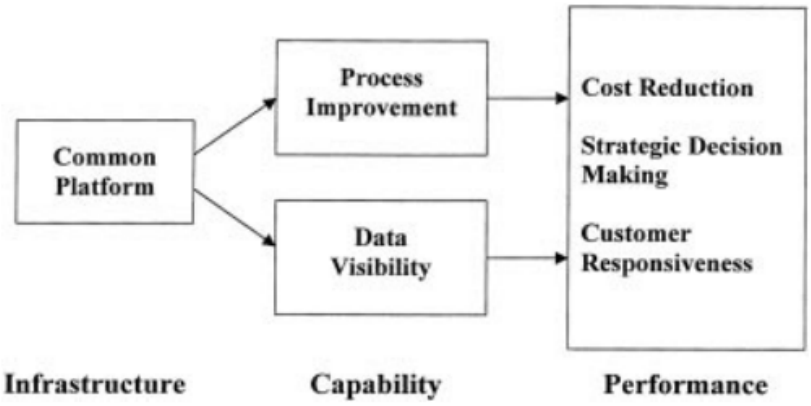

Figure 2.2 Motivation for ERP (Ross & Vitale, 2000)

According to Ross and Vitale (2000), the six main reasons for ERP implementation can be explained in three aspects: Infrastructure, Capability and Performance. Infrastructure is the common platform. Capability involves process improvement and data visibility and performance is evaluated by the cost reduction, strategic decision making and customer responsiveness. The performance aspects are used as metrics to evaluate to what extent the ERP systems help to achieve the business goals.

As argued by Ross and Vitale (2000), the basic reason for implementing ERP is to make a common platform to facilitate the business. Looking more closely, it can be seen that there is a relationship between the three aspects of motivations. The replacement of the old infrastructure can lead to the realization of the capability aspects. And then, the changes in the performance aspects can be achieved if better processing and data visibility are satisfied. Ross and Vitale's theory of motivation of ERP provide a guideline to examine the desired effects of ERP systems.

2.3 The Influential Factors of the Effectiveness

There are many studies that reveal the critical success factors of ERP projects. We classify them into three main categories. Previous studies on factors that cause dissonance between the effects experienced by users and their desired effects of the ERP system can be categorized into perspectives pertaining to technology, organization and communication. ERP Failures caused when the experienced effects go against the desired effects.

Many studies have researched failures of ERP adoption. Failures are caused when the actual effects of the implementation of ERP are detrimental to the desired effects. Etezady (2011) has investigated the effects of the long-term implementation of ERP on companies in the financial sector. He compared 79 firms that adopted the ERP system with 79 others that did not, and concluded that the adoption of the ERP system does not make a significant difference to companies in the financial sector. Millman (2004) also concludes that ERP cannot fulfill customers' expectations or realize its guaranteed value for most companies. He claims that failure to clearly define the goals of the implementation of the ERP system leads to ERP failures.

One reason for the dissonance between customers' expectations and their experience of ERP can be traced to an epistemic disconnect between the vendor and the customer. Few ERP consultants are knowledgeable about the operating processes of their clients' organizations, while few ERP users are aware of the functionality of ERP systems (Soh, Kien, & Tay-Yap, 2000).

Sumner (2000) claims that neglecting organizational fit and training can lead to risks for ERP projects. On the one hand, if the ERP system is not customized to the organization in question, or if its objectives are not clearly defined, the desired effects cannot be realized. On the other hand, if the staff of the organization is not trained well in handling the system, the desired optimization of the organization's processes cannot be attained.

Calisir and Calisir (2004) studied 51 end users and concluded that end user satisfaction is determined by the perceived usefulness and learnability of the system. They claim that ease of use can affect end user perception of the usefulness of ERP systems. The usability of interfaces can affect the perceived effects of ERP: as Park and Hwan Lim (1999) conclude, end user satisfaction can be determined by the usability of interfaces. Gefen (2004) is convinced that building trust is essential to successfully implementing ERP, and describes the perceived quality and effects of ERP. He emphasizes the substitution of legacy systems, electronic data interchange (EDI) and productivity in the context of the usefulness and ease of use of ERP systems.

Information system quality is the best manner of verifying user satisfaction and the perceived success of an IS software (Wu & Wang, 2006). Furthermore, an ERP system that offers accurate, timely and reliable outputs is crucial for the success of the system (Wu & Wang, 2006).

Thompson and Higgins (1991) propose the expectancy theory, which states that people behave or act in order to be rewarded. Szajna and Scamell (1993) propose the concept of "realistic expectations," which suggests that lowered expectations of an IS can lead to lower user satisfaction. If the buyer has high expectations of a product and explains clearly and in extenso his/her desiderata, it results in better customer satisfaction with the IS product in question. Lowered expectations imply fewer changes to customize the IS product to the customer's needs, hence resulting in lower customer satisfaction.

From the above, we are willing to evolve from past theories to advocate a catalogue of criteria to investigate the causes of the difference between the experienced and desired effects of the ERP system. Thus, we create the TOC (technology, organization, and communication) model to further explain reasons for the agreement and the difference.

Table 2.2 TOC model

Perspectives	Components	Responsible Persons	Supported Literatures
Technology	Choice of Modules	Supplier	Davenport 2000
	Usability		
	Ease of Use		
Organization	University culture	User	Ahmad et al. (2011)
	Leadership		Davenport 2000
	Preparation		
Communication	The expression of needs	Supplier and User	Mahrer, 1999
			Wong, Scarbrough, Chau, and Davison (2005)

The "Technology" perspective aims to investigate the design of the system: the functionality, the modules, the ease of use, etc.

The "Organization" perspective involves a consideration of the university culture, the leadership, preparation for the implementation, etc.

The "Communication" perspective emphasizes an accurate expression of the buyer's need as well as an accurate understanding of the requirements of the vendor.

2.3.1 The Technological perspectives

From the technology perspective, Bick and Börgmann (2009) point out that the users of a campus management system are students, teachers, administrators, library staff, etc. They believe that all classes of users should get the information needed to efficiently carry out their tasks in the management system. Furthermore, they argue that it is advisable to enable users to change their own data. This seems like standard advice for developers to heed.

2.3.2 The Organizational perspectives

From the point of view of organization, Davis and Huang (2007) claim that the factors that can negatively influence the effects of ERP systems on campus management are poor preparation, weak leadership in implementation, going over the budget and time limits, and tentative acceptance of the new system due to the university culture can render ERP systems unsatisfactory.

The organizational culture facilitates the carrying out system changing process and implementation and the university needs to prepare their users for this changes in order and

needs to engages them for any changes in the university (Dezdar & Ainin, 2012). Ke and Wei (2008) described the leadership in organizational culture as a crucial influence for the effectiveness of Campus ERP adoption and organizational culture changes. The perceived effect of leadership in ERP adopting can proactively adopt an organizational culture with the help of ERP implementation and that finally ensure the success of ERP.

The relevant factors from the technological and organizational perspectives can affect one another. For instance, in a study on a university in northeast of United States, Alvarez (2002) points out that integration, which means collaboration between units or individuals, can affect the effectiveness of campus ERP systems. Integration is determined by both the design of the campus ERP system – whether it enables users to interact – and the university culture – whether staff in every department of the university actively collaborates with the project.

2.3.3 The Communicational perspectives

We define communicational factors involve the reasons caused in the communication process between the system providers and the buyers, as well as the reasons caused in the communication process between administrators and other end-users of the campus ERP systems.

The communication effectiveness is the effort that helps the university to facilitate the smoother of an implementation process. It can be done by requiring an enthusiastic effort to everyone. The administrator of the system must focus on the communication perspectives with their users and developers to recognize their work and achievement. The lack of communication between users leads to the failure of implementation. (Barker & Frolick, 2003)

2.4 The Configuration of the Checking Model

Though there are many studies that reveal the reasons of unmatching the desired effects, there are limited studies researched on how these mentioned influential factors affect the effectiveness of the campus ERP in practical, whether they really make a difference or not. We even don't know whether they are just an assumption of people and not of much significance.

In order to identify the reasons causing the difference of the desired effects and the experienced effects in practical use, we introduce the following model according to the features of the influential factors. (see Figure 2.3)

The reasons can be identified as the avoided reasons, the discovered reasons, the undiscovered reasons. In our research, we evaluate whether there are any differences between the desired effects and the experienced effects given the premise that UoN has already have a clear idea about the reasons and successfully avoided them.

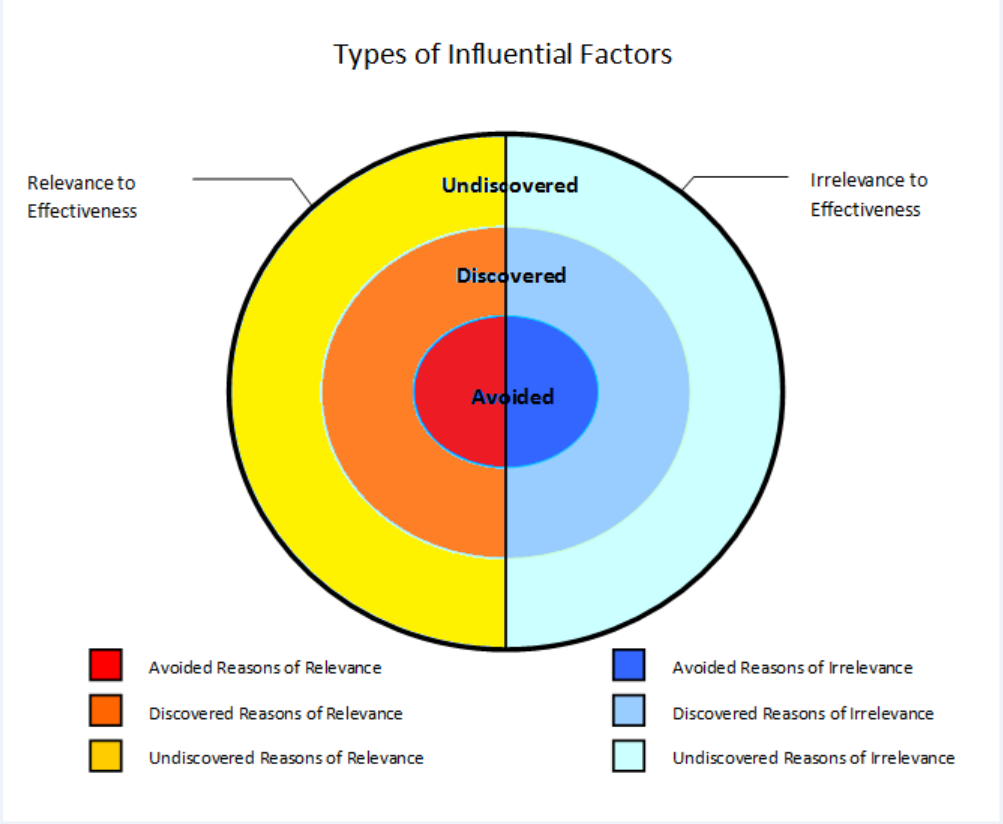

Figure 2.3 The Checking Model of Influential Factors

The types of influential factors that may cause the differences between the desired effects and experienced effects can be classified into three types: the avoided, the discovered and the undiscovered. The irrelevant reasons mean the reasons that claimed to be the reasons that can cause the differences, though, may not really affect in empirical studies. In our study we will conduct our research based on this checking model, we will investigate whether there is still a difference between the two effects, so that we can find out the unidentified but relevant reasons for causing the differences.

2.5 Research framework

Figure 2.4 shows the research framework that we have designed for our research. We first examine the desired effects of universities to adopt ERP systems. We then investigate the experienced effects of the Campus ERP system at Nizwa University, our case study. For this, we obtain responses from administrators as well as teachers regarding the effect of Campus ERP on their everyday performance. We will then be in a position to analyze the similarities and differences between the desired effects and the experienced effects of Campus ERP. If there are no obvious differences between the desired effects and the experienced effects, we will investigate the causes of the agreement.

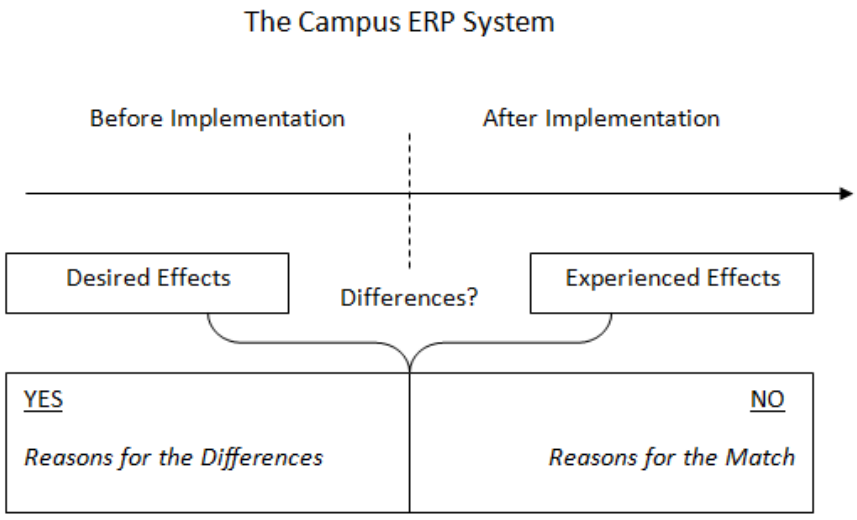

Figure 2.4 The research framework

The differences between the desired and experienced effects of adopting the Campus ERP system are the main aspects of our study. The desired effects will help us determine the expectations that the university has of the Campus ERP system. The experienced effects will help us determine if the system meets the needs of the university.

Our final research model for analysis is a combination of the TOSP, the TOC, the checking model and the research framework. We combined the TOSP and the TOC model in the framework to explore the desired effects and the experienced effects, as well as the differences between the two effects respectively. In the later stage, the checking model is also combined in the framework to investigate whether the summarized reasons drawn from our findings really play a key role in causing the differences, or to what extent these defined reasons can influence the experienced effects in our empirical study.

By using this model, we will not only have a clear knowledge of the effects on Campus ERP, the differences between the effects, but also have the tool (the checking model) to judge the influence power of each reason on causing the differences between the desired effects and the experienced effects of Campus ERP system.

3. Methodology

In this study, we are focusing on gathering information to identify the desired effects and the subsequently experienced effects of Campus ERP in universities in order to examine whether there are differences between them and, if so, what the reasons for them are. Therefore, this study can be described as an exploratory study.

We will describe in this chapter the methods we used to collect information for our case study. We present in detail our approach in the early and later stages of our research, provide a description of the structure of our interview, as well as the collection and handling of data. The final part of this chapter contains an assessment of the reliability and validity of our research, along with a consideration of ethical issues involved.

3.1 Research Type

There are different research types in scientific research and it classifies depending to the purpose of the research and data collection and data analysis and it can be classified in three types: exploratory, descriptive and explanatory (Bhattacherjee, 2012). Depend to our research question and data collection our research type can be classified as exploratory research.

According to Bhattacherjee (2012) exploratory research is conducted in new areas of inquiry that aim to find out the extent of a particular phenomenon, issue, or behavior, then generate some initial ideas about that phenomenon and finally test the feasibility of under-taking a more extensive study regarding that phenomenon.

Our research is aiming to investigate the different between the desiderata and the experienced effects of Campus ERP system using TOSP model explained in Chapter 2. Our study also measured the reasons of this difference by using the TOC model described in Chapter 2. Hence considering the nature of the study and the types of our research question, this research fits into the type of exploratory study.

3.2 Research Strategy

The choosing of appropriate research strategy depends to the object of analysis and purpose of our study. In this study, we intended to get an understanding of the objects of our study. Our objective was to focus on understanding the difference between desired effects and experienced effects of adopting the Campus ERP and get the reasons for these differences. From our objectives, we found that a qualitative research method would be suitable for our research, as a qualitative research method are designed to assist researchers understand phenomena in context by isolating specific aspects and measuring them using a dedicated instrument (Recker, 2012). Qualitative research has two typical sequential stages: data collection, which can be conducted through interviews, and documentation (Recker, 2012). This goes in line with our purpose to show how the Campus ERP system affects the university requirements and needs by identifying different effects and the reasons of these effects.

Therefore, we conducted qualitative interviews among different users in University of Nizwa who have a long experience of work process before and after the adoption of Campus ERP system. The reason of choosing the qualitative research is based on the social context of the Campus ERP system. As we describe in research type, our purpose requires to conducted explorative study, we have considered that qualitative research is more appropriate research for this study.

3.3 Research Approach

Choosing an appropriate research approach is highly dependent on the nature of the research purpose, which is also crucial for the researcher to define a proper strategy afterwards (Kvale & Brinkmann, 2009). In order to describe the research models that we created in chapter 2, we need to describe research approach we had when we create those models.

As explained by Kvale and Brinkmann (2009) the method approach can be conducted in seven main steps thematisation, design, interviewing, transcription, analysis of interviews, verification and reporting.

The first phase in research approach we conducted a broad internet searching to have a great knowledge in the field of ERP system in education. This search has been facilitated through the scholar's article from Google and direct science research.

Then, we have conducted a different literature review in the field of the ERP system in education that helps us to create TOC and TOSP models in order to answer our research questions. Furthermore, from the both models, we get to the final framework that describe in chapter 2.

3.4 Data collection

There are different methods to collect data. The main method has been interviews. In our thesis we used a semi-structured interview because we tend to get the best result when doing interviews (Kvale & Brinkmann, 2009). The semi-structured interviews gave interviewee a freedom to answer question and the interviewer can control the process and point it to the preferable direction.

Further, Kvale and Brinkmann (2009) argue that semi-structured interviews is a good way of letting the interview be more dynamic and easy to handle, rather than having strict questions answered one by one. This dynamic way to conduct interviews was preferred in our research, as this study is search for deeper explanations and the possibility to broaden the interview questions.

Before conducting the interviews, we conducted a proud search of knowledge to fully understand the area of our research. As explained by Randolph (2009), conducting a various literature review is help researcher to gain knowledge about a particular field of study, including vocabulary, theories, phenomena, methods and history. Guided by this statement we focused our attention to the proper investigation of the prior studies where the effectiveness of Campus ERP

in education was conducted and that helps researcher to use the models and framework to answer the research question.

In order to perform the interviews, we followed an interview guide as see in (Appendix 1) that contains some guidance during the interviews. It consisted of different questions divide in different part follow by the main criteria in both models discussed in chapter 2. Moreover, through the interview, we used a follow up question whenever the interviewees give new opened up answers (Kvale & Brinkmann, 2009).

Data was collected from the users inside the university, which used the Campus ERP system on their daily work and also they already know the situation of the university system before adopting the new system. They are familiar with the desired effect before adopting the system and the experienced effect after adopting the system. We can then know the differences of those effectiveness and the reasons that cause these differences.

3.5 Design of interview guides

We created an interview guide to ensure that we had the necessary guidance for the semi-structured interviews. The creation of interview guide acted as a template for the task to perform our interview. The guide itself consisted of a series of questions that directly related to our research purpose of examining differences between desired effects and experienced effects of adopting the Campus ERP system and what cause these differences. The guide's questions were sorted into four different categories, they are: warming up questions, main session, closing questions and debrief.
In the warming up question section we presented ourself to the respondents and the interviewees presented themselves. We asked questions regarding the background of their education and responsibilities. Moreover, we asked them casual questions regarding university they work at in order to make the respondents comfortable. By asking these straightforward questions at the start of the interview respondents were enabled to get ready for the upcoming questions (Kvale & Brinkmann, 2009).

The main part of the interview was divided into subsection each referring to a certain criteria that included in our research models and framework. For this purpose the main part of the interview was based on several questions where interviewees were asked to say how they behave in certain situation. Namely, questions reflected various situations, which interviewees are facing daily during the usage of the Campus ERP system comparing with the situation before this system.

The ending questions were used in order to tie everything up and ensure that we had all of the necessary information to progress with our research study (Kvale & Brinkmann, 2009). We also made a point of asking the interviewees whether or not they wanted to remain anonymous, as they may have changed their mind in this regard as a result of what they said during the interview (Kvale & Brinkmann, 2009).

3.6 Selection of interviewees

Since the purpose of this research is to identify the difference between desired effect and experienced effect of implementing Campus ERP systems and to examine the reasons that cause these differences, it was of great importance to make contact with people who possess the correct experience concerning the process before and after such an implementation. Thus, in order to obtain respondents for the study, the first step was to contact the university that operated in this field. Since the respondents in this study were anonymous we were unable to publish names due to ethical conflicts. Due to the exploratory nature of this research, an understanding and insight into the phenomena was required, which was why the sampling was conducted as non-probability expert sampling where the respondents were chosen non-randomly based on their expertise (Bhattacherjee, 2012). Therefore, the respondents were chosen based on their expertise in the process before and after the implementation of Campus ERP system. Our respondents in this study are teachers, the administrator of the Campus ERP system and the developer of Campus ERP system. Students and other staff were not involved in this study because they were not involved in the processes before and after the implementation of the Campus ERP system. Hence, they were not aware of the whole process nor the reasons for the UoN to implement the Campus ERP system.

We conducted different interviews in UoN in Oman with different respondents. UoN adopted the Campus ERP system in 2010. Meanwhile, we conducted another interview with one developer of the Campus ERP system. Those interviews were done to obtain the necessary information for conducted the research and explain the differences between the desired effects and experienced effects of adopting Campus ERP system and the causes of those differences.

All the interviews were conducted in video conference by Skype, as all the interviews are in different countries and our schedule was not allowing us to travel to Oman and do face to face interviews. The interviews were conducted in English. During the interviews we followed the interview guide and also with follow up question we were trying to gathering more information that help us in our research (Kvale & Brinkmann, 2009). The interviewees and a description of their experience and profession are presented in Table 3.1.

Table 3.1: Respondents and experience

Respondents	Experience
Developer	9 years of experience working as a developer for cross-technology domain release management, process design, optimization and policy. The developer oversees the entire development and production process of business products.
Administrator	Approximately 9 years working at the UoN and 6 years working with the Campus ERP system Initially a project leadership and to maintain the enterprise system.
Teachers 1	About 7 years working at the UoN and 4 years of experience working in Campus ERP system.
Teacher 2	About 6 years working at the UoN and 3 years of experience working with Campus ERP system.

The interviews with informants were made over the phone and lasted for approximately 30 to 45 minute each. One of us took the role as the interviewer and the other one took notes. The conversations were also recorded and together with the notes we were able to be more accurate when transcribing the interviews afterwards.

A great benefit with recording the interview, according to Kvale & Brinkmann (2009), is that we could play it over again in order to reduce misunderstandings. In the beginning of the interview we oriented the interviewee by describing the purpose with the study and asked if there are any questions regarding the proceedings of the interview. Another purpose to use recording was to give us the opportunity to control the unaware interpretations we might make as an interviewer.

3.7 Transcription of Interview

Transcription of interview is the first step of the analysis phase, as it uses to change from one form to another (Kvale & Brinkmann, 2009). Transcribing of interview is considered as conversion of the oral interview conversation into a written text willing to analysis (Kvale & Brinkmann, 2009). We conducted the process of conversion in order to be able to accurately analyze the collected data. The conducted transcripts are very important for the interview as they help to confirm our research models. We transcribed all of the audio records into written text. This was followed by checking the transcribed text in order to ensure that each of our written texts was accurately understood in the same manner. The process of checking the interview transcripts included sending each transcript to interviewee, allowing them to check the accuracy of its content. They then went through their transcript, highlighting any difference between its text and the interview's proceedings, enabling us to make changes to each transcript before utilizing it within the study.

3.8 Data Analysis

In this research the semi-structured interviews were our main data source and we have considered how to analyze this data in the most effective way. There are several data analysis techniques explained by Recker (2012) and we have chosen selective coding in our data analysis, as it used to identify from one to another category and then relate all other categories to the main categories. We have decided to create a coding schema that has been used in the interview transcript in order to show the finding from the interviews.

With help from coding schema, we have shown quotations from the transcriptions in the empirical findings chapters and that helps us in our discussion chapter. The main purpose of the data analysis is to evaluate the empirical data that helps to create a good structure for our discussions chapter. We have used our TOSP and TOC models in the same order to find the data and discuss it later with the connection of theoretical part. We have shown the important quotation for each in both models from each interviewee in the table and explain the main idea for each criteria. We repeated this process for each criteria and explained how the interviewees have responded to our questions and motivated their own knowledge and experience. Finally, we drew the empirical finding as a summary of our collected data.

In order to make it clear to extract the results from our interview transcript (see Appendices 2, 3, 4, 5), we will code our interview transcript according to our TOSP model, TOC model and checking model as presented in Tables 3.1, 3.2, 3.3. These tables individually present the coding scheme for the interviews with their perspectives and associated coding.

Table 3.2 Coding scheme for interviews (Evaluation of ERP effects)

Perspectives for Judging the ERP Effects	Code
Technical Perspective	TCC
Operational Perspective	OPE
Strategic Perspective	STA
Performance Perspective	PER

Table 3.3 Coding scheme for interviews (Reasons for the Differences of ERP effects)

Perspectives for Reasons of Disparities	Code
Technology Perspective	TCG
Organization Perspective	ORA
Communication Perspective	COM

Table 3.4 Coding scheme for interviews (Relevance of Reasons)

Types of Reasons	Code
Avoided Reasons of Relevance	AR
Discovered Reasons of Relevance	DR
Undiscovered Reasons of Relevance	UR
Avoided Reasons of Irrelevance	AI
Discovered Reasons of Irrelevance	DI
Undiscovered Reasons of Irrelevance	UI

TOSP model will help obtain answers our first research question: that is, to identify the differences between the desired effects and the experienced effects of the implementation of campus ERP system. The TOSP model is used to check the effects of the campus ERP system from four dimensions.

As we illustrated in Section 2.2.1, the technical perspective of the TOSP model is to examine the effects on the system itself. For example, the changes in the ERP functions, interfaces, etc., inside the information system, which can make a difference for the usefulness of the ERP system. The operational perspective is to judge the effects on the processing of tasks of everyday work. It emphasizes the changes in the details of work, the changes in processing tasks that previously failed to process automatically by information system, or can only be processed by manpower. The strategic perspective is to evaluate the effects on the target for development, competitiveness. The emphasis is on the help for building a better image of the university, as well as help on the popularity, fame, etc. The performance perspective is used to check the

effects on the overall performance that especially puts emphasis on work efficiency within the university environment.

The TOC model will help us answer our second research question: that is, to investigate the reasons for causing the differences between the desired effects and the experienced effects of the implementation of the campus ERP system. Our TOC model is aimed at identify the influential factors of causing these disparities in three aspects.

As we explained in Section 2.3, the technology perspective of the TOC model is to examine the causing factors from the design of the ERP system. The organzation perspective is to analyse the reasons coming from the organzational culture. The communication perspective is to analyse the reasons that resulted from the successfulness of communications between the developers and the users.

Addtionally, the influential factors of the TOC model is insufficient in judging the influential power of each potential reason in the TOC domain. Thus, as we illustrated in Section 2.4, we use the checking model to clarify the effects of each influential factor and classify these reasons into six categories. We are working on revealing the undiscovered reasons of relevance (UR), which is a significant contribution of our study.

3.9 Research quality

The quality and the analysis of the data collected are very important and can be verified by examining the reliability, validity and ethical aspects of the research (Bhattacherjee, 2012)

3.9.1 Reliability

Reliability is the degree to which the measurement of a construct is consistent or dependable such that it can be used to measure the same construct multiple times, with the result of the measurement being more or less the same each time. For instance, you are likely to get the same value of your weight every time you step on the scale, unless your weight has actually changed (Bhattacherjee, 2012). In interviews, respondents interpret the questions through the lens of their experiences, knowledge and preconceived ideas, so that the researcher needs to be confident regarding the accuracy and quality of these interpretations. Moreover, the researcher needs to know some solutions in order to achieve for the goal of the research (Kvale & Brinkmann, 2009).

In this study, we needed to be aware of this manner of interpretation during the interview process because it affects the findings of the research. Thus, in order to minimize the chances of misinterpretation, we sent a transcript of the interview to the interviewees for them to confirm the accuracy of their recorded responses (Kvale & Brinkmann, 2009).

3.9.2 Validity

Validity refers to the extent to which a measurement adequately represents the underlying construct that it is supposed to measure using theoretical or empirical approaches, and should ideally be measured using both approaches (Bhattacherjee, 2012). It is very important to ensure that the interviewer understands the respondents correctly, and this can be accomplished by having respondents approve transcripts of their interviews(Kvale & Brinkmann, 2009).

In order to ensure the validity of our study, we provided respondents with a detailed description of the objectives of our research in order for them to understand our focus and provide appropriate responses.

3.9.3 Ethical aspects

Bhattacherjee (2012) states that research ethics are important to ensure the quality of the data because science has often in the past been manipulated in unethical ways by people and organizations to advance their private agenda, and to engage in activities contrary to the norms of scientific conduct. The researcher should not manipulate his/her data collection, analysis, and interpretation procedures in a way that contradicts the principles of science (Bhattacherjee, 2012). Moreover, the researcher must distinguish clearly in their research right actions from wrong. Thus, the researcher should consider ethical aspects before, during and after the study (Bhattacherjee, 2012).

In our study, we first considered the ethics at the beginning of our research by seeking formal approval from the university. Thus we can be permitted to interview the employees from the university. Moreover, we described in detail to all interviewees the purposes of our study. We also informed them beforehand about the details of the interview process.

We would like to keep in contact with our interviewees. We also informed them about our progress, including material that has been published in the media, because they have the right to know. Furthermore, out of respect for the interviewees' desire to remain anonymous, we agreed to designate them by their official roles in the university rather than by their real names.

4. Empirical Findings

This chapter describes the empirical finding based on the administrator, developer and two teachers perspectives of the desired effects and experienced effects when adopting Campus ERP system in University of Nizwa UoN. It also examines whether there are any differences between these desired and experienced effects and the reasons for these differences.

4.1 The effectiveness of adopting Campus ERP system

In this section we present the empirical findings. The data is based on semi-structured interviews as we discussed in the methodology chapter. The data will be presented based on the TOSP model and according to the four perspectives: technical, operational, strategic and performance.

4.1.1 Technical perspectives

Table 4.1 below presents some of the comments from our respondents regarding the technical perspective of implementing Campus ERP. These comments describe the effects on the university needs and requirements.

Table 4.1 Technical Perspective

Developer	"… UoN needs to have a fully integrated solution that provides them with better services…." "…. The campus ERP system is a comprehensive e-learning and education management platform that contains different modules integrated together…."
Administrator	"… As the old system did not provide us with the integration of the system, we faced a lot of problem…." "… Campus ERP system has integrated function that lets us to integrate a student model with their financial model, Academic and LMS.." "… still some of the users ask for more integration for special module especially attendance function…"
Teacher 1	"… There are different problem cause from the old system…" "… University attends to move from manual process to electronic process to improve their work process…."
Teacher 2	"… The old way of our work process based on the paper and spread-sheets…." "… No share file and information between all department…." "…. The campus ERP system helps to solve all this problem by using one integration and centralize system..."

Based on the above comments in Table 4.1, it appears that the technical perspectives are valued by the respondents with regards to the implementation of Campus ERP system in UoN. The comments also indicate that this system provides UoN with integration function of all work processes and resource management in one centralized database.

All the respondents said that the idea of implementing Campus ERP system in their university to integrate a student model with their three models: Financial, Academic and Learning Management System (LMS) in one centralized database would be beneficial.

At the UoN, they seem to have a student model that consists of three separate models: Financial, Academic and Learning Management System (LMS). During the semi-structured interviews, all the respondents said that the idea of implementing Campus ERP system and integrating their existing three models into on centralised database would be beneficial.

Moreover, all respondents claimed that the old system of using spread-sheets caused a different problem as spread-sheets lacked the integration function, as each user works individually with their spread-sheets. Furthermore, the Developer respondent defined the Campus ERP system that UoN implemented as a comprehensive e-learning and education management platform that contains different modules that are integrated together.

> "…. The campus ERP system is a comprehensive e-learning and education management platform that contains different modules integrated together…."

In addition, some respondents reported that there are some users who would like to see further improvements in the functions of the system, to provide a smarter functionality.

> "… still some of the users ask for more integration for special module especially attendance function…"

Consequently, the difference experiences of the users can result in a failure to reach the technical effectiveness of the system. Therefore, the university needs to be more attentive to the technical perspectives for the success of the implementation of Campus ERP system.

4.1.2 Operational perspectives

Table 4.2 presents some of the responses from our respondents with regards to the organizational perspectives of implementing Campus ERP and how that has an effect on the university needs and requirements.

Table 4.2 Operational Perspectives

Developer	"….. campus ERP system is the resource optimization system helps university to reduce staff workload, Monitoring and utilizing reports…." "..... Administrative and instructional tools provided in Campus ERP, help instructors to better manage and utilize their time...."
Administrator	"…. campus ERP system helps us to generate a complex and statistical reports of any information that university needs in easy way…." "…. Using Campus ERP system helps us to save a lot of time and give us the ability to access to the information in easy way….."
Teacher 1	"… Using one centralized database affect the work process of the university and that improve our daily work and it save us a lot of time…." "… I think moving from manual process to electronic process in the academic work will help in the work... now working in one database will reduce all these

	challenges …"
Teacher 2	"…. The campus ERP system manages the whole work process in one centralized system and that saves university a lot of time…." "… Help us to access and monitor the information in an easy way and can generate different information from the system…."

Based on the above comments from our respondents in Table 4.2, it reveals that the operational perspectives with regards to the implementation of Campus ERP system in UoN are based on the reliability to access information, ability to monitor and generate different reports. Our teacher respondents claimed that the implementation of Campus ERP system in UoN helped them reduce their workload. The processing of student information is assisted well by the system. For instance, Teachers no longer need to record student information by manual input. The information storage function has simplified the working processes for the staff.

> "… I think moving from manual process to electronic process in the academic work will help in the work... now working in one database will reduce all these challenges …"

In regards to the ability to monitor and generate different reports, our administrator respondent pointed out that the Campus ERP system has the utilizable tools to generate complex and statistical reports and that saved them a substantial amount of time compared with their old system of spread-sheets.

> "…. campus ERP system helps us to generate a complex and statistical reports of any information that university needs in easy way…."

Furthermore, the Developer of the Campus ERP system defined the specification of the system as a resource optimization system that helps to reduce workloads and utilize time efficiently.

> "…. Using Campus ERP system helps us to save a lot of time and give us the ability to access to the information in easy way…."

4.1.3 Strategic perspectives

In Table 4.3 below some of the comments from our respondents with regards to the strategic perspectives of implementing Campus ERP and how that has an effect on the university needs and requirements is presented.

Table 4.3 Strategic Perspectives

Developer	"…. campus ERP system supports the growing of the university and provide them with different services include Student/School Information/Management System, Resource Optimization System, and Student Financial System…."
Administrator	"… Growing up with the number of students lead to the complexity to manage the information and data for the work process…." "…. Campus ERP system support these growing by providing university of one system manage student registration records, student personal information and student academic records…"

Teacher 1	"…. The university has spent time searching for a new system that helps them to improve their work strategy and performance…." "…. This new system university applied to electronically manage the whole educational process and improve academic performance…"
Teacher 2	"… The new strategy of implementing Campus ERP system in university helps to manage a student information include student registration, student finance invoice, student schedule, attendance, grade and student academic progress…."

In terms of the strategy perspectives, all respondents are satisfied with the system design and its functionality. They stated that the Campus ERP system supported the growth of the UoN and it provides the UoN with a centralized system that integrates student registration records, student personal information and student academic records.

> "…. Campus ERP system supports these growing by providing university of one system manages student registration records, student personal information and student academic records…"

Moreover, our administrator respondent pointed out one of the targets for implementing the Campus ERP system is to use it as a strategic tool.

> "… Growing up with the number of students lead to the complexity to manage the information and data for the work process…."

Based on the above comments, it appears that the effectiveness in the strategic perspectives is one of the main important perspectives that need to be considered when implementing a Campus ERP system. The UoN needs to be aware of users' needs and requirements especially with the change and growing of the university.

4.1.4 Performance perspectives

Table 4.4 below presents some of the comments from our respondents with regards to the performance perspectives of implementing Campus ERP and how that has an effect on the university needs and requirements.

Table 4.4 Performance Perspective

Developer	"… Campus ERP system helps UoN to perform their work process and increase the efficiency of the work…." "…. The campus ERP system can be compatible with mobile platforms, Facilities Booking Module, reduce the workflow time management…"
Administrator	"… System has high quality, reliable and very useful…" "… System provides us with the complex static report…" "… In overall the system has a high quality, but some time we have some slowness in the system and that because of the high number of users access to the system at the same time especially in the registration period time …" "….By using Campus ERP system our work efficiency has increased, the

	workload reduce…"
Teacher 1	"…. New system improves our work process…" "… Evaluate the quality of the system as a high quality…" "We get accurate information…" "… System in overall is reliable and flexible…"
Teacher 2	"… System in overall is reliable and flexible…" "… The technical problems that we faced during our work not affect the quality of system…" "…. Improve the work efficiency…"

The quality of information is the most important aspect of any system. With the Campus ERP system, the quality of information concerns the actual information produced by the system. The information quality of the system is measured in terms of accuracy, consequence, reliability and the availability of information. Moreover, in terms of information quality, most of the respondents reported that the information was usable, available anytime, accurate and integrated.

Furthermore, the administrator we interviewed at UoN expressed that the overall system is reliable, integrated and flexible to use. The information produced by the system was also expressed positively:

> "… System has high quality, reliable and very useful…"

> "… System provides us with the complex static report…"

In the other hand, all of our respondents from UoN claimed that there are some technical issues faced on the workload in the system, but that it did not affect the quality of the system.

> "… The technical problems that we faced during our work not affect the quality of system…"

The administrator explained that, there are different periods when many users access to the system at the same time and that may cause slowness in the performance of the system:

> "… In overall the system has a high quality, but some time we have some slowness in the system and that because of the high number of users access to the system at the same time especially in the registration period time …"

All informants pointed out that their desired effects of implementing the Campus ERP system are to achieve the target that the system supports them to increase their work efficiency and reduce the workflow of information.

> "…. The campus ERP system can be compatible with mobile platforms, Facilities Booking Module, reduce the workflow time management…"

> "….By using Campus ERP system our work efficiency has increased, the workload reduce…"

"…. New system improves our work process…"

"…. Improve the work efficiency…"

Furthermore, the Developer respondent defined the Campus ERP system as the compatible system that can be integrated with a mobile platform:

"…. campus ERP system can be compatible with mobile platforms, Facilities Booking Module, reduce the workflow time management…"

4.2 The Influential Factors of the Effectiveness

The data presentation in this section is based on the TOC model and its three perspectives to investigate the causes of the difference between desired effects and experience effects.

4.2.1 Organization perspectives

The below, Table 4.5, presents some of the comments from our respondents with regards to the organizational perspectives of implementing Campus ERP and how that has an effect in the university needs and requirements.

Table 4.5 Organizational Perspectives

Teacher 2	"....we are involved to talk with the administrator to give them our suggestion in the moving of new system..."
Teacher 1	"...we are involved in the process of change of the system...." ".....we receive survey from the administrator and give a feedback for our needs..." ".... high expectation from other users can affect the expected result from the system..."
Administrator	"….contact with other university who implement Campus ERP system to know how the system works with them and what is the effect…" "…. We get a support from different users in the university including faculty and manager…" "….enforce users to finish their job in time by configure a time limit for each job especially in grade enters time…" "…The implementation of any system required various things to be done in order to get success with the system…especially from the hardware side…we inform our staff with the new system that will going to implement…"

Based on the above comments, it appears that the implementation of the Campus ERP system in the university increases the organizational perspectives as it helps them to integrate and have a consistency between users. The increase of organization perspectives in the university creates

different changes of the university work process including the management of all resources and organizations in the work environment.

The impact on success from the organization perspectives can be identifying by the user satisfaction and customization of the system. The Administrator of the UoN conducted a survey to see if the implementation of the Campus ERP system was successful and to see if the system met the needs of the university.

From a university culture perspective, the Administrator commented on the advantages of seeking other opinions about the system:

> "….contact with other university who implement Campus ERP system to know how the system works with them and what is the effect…"

The Administrator explained that from the preparation aspects, to achieve an organizational theme, approaching other universities who have already implemented the Campus ERP system would be beneficial. By doing this, the UoN can see how the system affects other university's needs and whether they are satisfied with the system's efficiency. Also, our Administrator respondent pointed out that budget, time required and IT infrastructure including software and hardware needs are very important aspects that need to be considered when they prepare for the implementation of the new system.

> "…The implementation of any system required various things to be done in order to get success with the system…especially from the hardware side…we inform our staff with the new system that will going to implement…"

In addition, some of our respondents reported that there are some users who are not satisfied with some functions in the system and they are looking forward to improving the functionality. These comments are reasonable, although, it appears that some have higher expectations of the system than others:

> "…As there are a lot of people need the system to be smart enough in order to do their job…"

Accordingly the different experiences of the users can result in the failure to reach the organizational perspectives of the system. For this reason, a university should be aware of the users needs to achieve the organizational perspectives and that will then tend to lead to success the implementation of Campus ERP system.

4.2.2 Technology perspectives

The below, Table 4.6, presents some of the comments from our respondents with regards to the technology perspectives of implementing a Campus ERP and how they evaluate the system.

Table 4.6 Technology Perspectives

Developer	"...a comprehensive e-learning and education management platform..." "....designed to assist decision makers in planning, analysis and decision support...." "....Students can interact with their instructors and with each other through

	multiple communication and collaboration tools....” ”.....Administrator have the ability to communicate their views and concerns directly to their students, colleagues and administration through a variety of communication & collaboration tools.”
Administrator	“….user friendly web server’s systems used as the information management system that offers university with centralize system used by different users...” “… System has communication feature that allow all users to communicate with each other through email and SMS….” “…As we handle different training session for faculty and student, we get some different feedback from them …”
Teacher 1	“… System includes different module that contains a different function to improve work…” “…system is centralized and can be used by different users in the department in the same time….” “… System has communication function to communicate with each other but still I think need more improvement…” “…student must connects with their phone and parents phone….to be aware of eventful basic mission and student status…”
Teacher 2	“…System contains well design and it contains different function and module that help to improve work process….” “…some of the function needs to be improving to achieve the goal…” “…system has different features contains the communication features between student and teachers and between each other…”

In terms of the technology perspectives, all respondents have accepted the design of the system. They are happy with the system functionality and module. The Administrator of the system described the system as the user-friendly system and that it provides the UoN with centralized functionality to manage student information.

Further, both Teacher respondents agree with the design and the structure of the system. They emphasized the importance of the services offered by the system, and argued for a better design of modules for grading, attendance and course registration.

> “… System includes different module that contains a different function to improve work…”
>
> “…System contains well design and it contains different function and module that help to improve work process….”
>
> “…some of the function needs to be improving to achieve the goal…”

The Developer described the design of the system as being an effective way to assist the UoN to have better decision makers in planning, analysis and decision support.

> "…designed to assist decision makers in planning, analysis and decision support...."

All respondents reported that the system has a communication function and collaboration tools to communicate with each other. However, the Teachers commented on the communication functionality and that there is a possible need for improvement. They pointed out that the communication function needs to integrate a student account with their phone and their parents phone to be aware of the eventful mission and student status to follow up.

> "…student must connects with their phone and parents phone….to be aware of eventful basic mission and student status…"

When dealing with new technology, the administrators of the system need to fully understand the technical aspect in depth to insure that no risks may happen with this technology.

The Administrator and both Teacher respondents mentioned that a training session to introduce a new system to the users is very important. Such training sessions help the user to understand the system and to know how to use the system:

> "…As we handle different training session for faculty and student, we get some different feedback from them …"

4.2.3 Communication perspectives

The below Table 4.7 presents some of the comments from our respondents with regards to the communication perspectives during and after the implementation of Campus ERP system.

Table 4.7 Communication Perspectives

Developer	"...different meeting conduct between us and the IT administrator to explain their need and requirement before implementation...." "....phone, email and also visiting site we conduct to communicate after the implementation to check the satisfaction of the user and any new update required for the system...."
Administrator	"…Phone, survey and email are the way to contact with our users to get feedback from them…" "… Phone and email are the contact way with the developers of the system…"
Teacher 1	"…. Different communication process between us and the administrator to give them feedback in the system and share our needs and requested update with them…."
Teacher 2	"…communication between us and administrator to get a feedback through phone and email and also through conducting survey…."

During the implementation process, the communication between the Developer and the Administrator were mainly through email and via telephone. This communication took place mainly to ensure that the needs of the university were met before the system was up and running. Other communication between university staff and then Developer were also through email and via the telephone.

> "…phone, email and also visiting site we conduct to communicate after the implementation to check the satisfaction of the user and any new update required for the system...."

> "…Phone, survey and email are the way to contact with our users to get feedback from them…"

> "…communication between us and administrator to get a feedback through phone and email and also through conducting survey…."

After the implementation of the system, the Developer communicated with the UoN staff not only through emails and via telephone, but also via a visiting website where comments could be made. This visiting website gave the Developer's customers the chance to seek help if problems arose or to leave positive comments towards the implementation of the system. Through this, the Developer was able to assess the desired effects of the implementation and the experienced effects of the system.

> "....phone, email and also visiting site we conduct to communicate after the implementation to check the satisfaction of the user and any new update required for the system...."

4.3 Summary of Empirical Findings

For our first research question, we can conclude that the differences between the desired effects and the experienced effects of the implementation of the campus ERP system are mainly in the following areas. First, from the technical perspective, the need for a better attendance function in the technical perspective is not satisfied (see Table 4.1). Second, from the performance perspective, the ERP system can cause slowness when many users access into it and by that time, it cannot work smoothly as expected by users (see Table 4.4). There were no obvious disparities from the operational and strategic perspectives.

As for the answers to our second research question, from the help of the checking model of influential factors, we can come to the following conclusions. From the organization perspective, the empirical result showed that the role of the administrators is very crucial for the normal operation of the Campus ERP system. Administrators need to act more actively and vigorously in promoting the use of the system (see Table 4.5). This requires better management of the human resources of each department, allowing staff in each department the opportunity to learn to use the system spontaneously. The culture of the university may need the inculcation of a more flexible concept of management. This means that managed staff, such as teachers, should not be made to feel compelled to use the system. The prioritized demands of the staff should be well understood by the administrators.

5. Discussion

This chapter aims to discuss the results presented in the previous chapter. The chapter is divided into three parts. The first part discusses the differences between the desired effects and the experienced effects of Campus ERP systems by using the TOSP model. The second part reveals the reasons of these differences by using the TOC model. The third part concludes the chapter with a summary of the discussion.

5.1 Differences between the desired effects and experienced effects of Campus ERP systems

This section presents the operational, technical, strategic and performance perspectives of evaluating the effects of Campus ERP system based on the TOSP model.

5.1.1 Operational perspectives

The operational perspective helps to examine the Campus ERP system effects on the operation of the UoN. The Campus ERP system effects on the university's operational processes are discussed in terms of reliability, ease to access information, reduction of time and generation of different reports.

As we discussed in the literature review, the operational theme is one of the factors that can cause disparities between experienced effects and desired effects of the Campus ERP system implementation. As described by Abdinnour-Helm et al. (2003), the operational perspective emphasizes the way to solve the following problems that were faced by the old system: improvement of the accessibility of information, and the reduction of the processing time. As our respondents pointed out, the adoption of Campus ERP system has helped the UoN generate complex static reports, resulting in better decision making. Previously, the UoN administrators were required to spend excess time on completing reports. Thus, the embedded centralized database in the Campus ERP system has enabled UoN to access information in more effective and easy manner. Moreover, the system is able to generate accurate information.

5.1.2 Technical perspectives

Al-Mashari et al. (2003) point out that the technical perspective of the Campus ERP system can be described by the improvement of integration. Integration means the enhancement of the relationship among all users. In technical perspective, the effects are mainly on the possibility of getting better resources and work processing. As our respondents pointed out, the adoption of the Campus ERP system enables UoN to build a good relationship between the university and the Ministry of Higher education (MoH).

On the other hand, Gaska (2003) argues that from a technical perspective, the effects on sense-making between users are emphasized. From this point of view, the availability of sharing tasks, experience and information among users in a simpler manner were discussed during the semi-

structured interviews. On this issue, some of our respondents (both teachers) considered that the use of the centralized system is impressive, due to its accessibility by all users in every department at UoN.

5.1.3 Strategy perspectives

As pointed out in our literature review, Ross and Vitale (2000) explain the strategic motivation for Campus ERP system is to build the platform to improve the processing phases, efficiency of the system and customer responsibilities. As our respondents pointed out, the implementation of Campus ERP system supports the growth of the university. This is in accord with the goals set by UoN, that is to say, to move from the old spread-sheet system to the Campus ERP system. The changes in the development of the UoN are emphasized in the strategy perspective. The data accrued from our respondents show that the Campus ERP system helped with a better collection of information, and an increase in the number of students. The strategic perspective is an important aspect to be considered for the success of the Campus ERP implementation, because it affects the image of the university, and it evaluates the base for the development of the university.

5.1.4 Performance perspectives

Wu and Wang (2006) believe the quality of information generated from the system should be regarded as one of the criteria to check the successfulness of the performance of Campus ERP systems. They claim the evaluation of the information quality can be measured by the accurate, timely, and reliable outputs. As our respondents pointed out, the Campus ERP system implemented in the UoN is reliable and flexible. They perceived that the high quality of the system is mainly due to two aspects: the availability of the system at any time and the integration of the information. The uses expect the Campus ERP system to help them do their work from any place at any time. Moreover, their work can by processed immediately into the database giving them updated information at all times. One point that can affect the performance was pointed out by the teachers: an occurrence in the slowness in the system. This issue can cause a failure of the system, and then finally will affect the expectation of the users with regards to performance and quality. In this sense, the quality of the system becomes a very important issue. Therefore, adequate attention and interests of the university must be drawn before and after the implementation of Campus ERP system to ensure the quality of performance.

5.2 The Influential Factors of the Desired Effects and Experienced effects of Campus ERP systems

In this section, we discuss the empirical findings according to our literature review based on the TOC model. Each TOC element is discussed regarding to the disparity between the desired effects and the experienced effects of Campus ERP system in UoN.

5.2.1 Technology Perspectives

Zhang, Lee, Huang, Zhang, and Huang (2005) claim that, the incorrect data input into the Campus ERP system will adversely affect the functions of other modules within the system. Due

to this, the functionality of the system is affected, which subsequently leads to the wrong generation of the report and information generated by the system. During the semi-structured interviews, the administrator pointed out that the unfulfillment of the desired effects is mostly due to one typical feature of the system: incomplete data in one department can affect the other related departments. If this situation occurs, the impression of the Campus ERP system is that it is not functioning properly, whereas it is not a system functionality problem, it is more of a user problem.

Buonanno et al. (2005) explain the design of the Campus ERP system module as a customization process of combining different features as well as different departments all together into one database. For example, PeopleSoft is one of enterprise systems that is composed of different modules including: customer relationship management, supplier relationship management, business intelligence, product lifecycle management modules, and student management modules. As stated in our literature review, different universities implement PeopleSoft Campus ERP software with different modules. This system is used to help integrate all work processed into one centralized database.

During the semi-structured interviews, the developer respondent described their Campus ERP system as a comprehensive e-learning and educational management platform, which includes: learning management module, content management module, student information module and instructional management module (see Table 7). This design supports the fact that Campus ERP systems should be designed in a way that users are able to navigate among different modules. However, insights from the semi-structured interviews showed that more attention needs to be paid to the customer requirements in order to not only ensure that the technology is fast but also identify the desired effects towards the implementation of the system (Calisir & Calisir, 2004). Thus, the successfulness of implementing Campus ERP systems can be achieved by the accurate integration of ERP system modules and with the capacity to enable that the customers are able to navigate between each module.

5.2.2 Communication Perspectives

Barker and Frolick (2003) emphasize that an administrator needs to draw more attention to communication perspectives before and after the implementation of Campus ERP system. At the same time, they need to make more efforts for other users to be involved in this process. From this point of view, communication is one of the important factors that need to be considered for the implementation of the Campus ERP system. Our respondents reported that the communication process has been conducted among the administrators, teachers and developers before and after the implementation of Campus ERP system within the UoN. They further reported that their most important communication tools are: emails, telephone conversations, meetings and customer surveys (see Table 4.7 Communication Perspectives)

These tools are used to gain a better understanding of their customer needs, requirements and the goals of the UoN.

5.2.3 Organizational Perspectives

As we discussed in the literature review, Dezdar and Ainin (2012) propose that preparation in the organization is the most important factor that needs to draw attention before implementing a Campus ERP system. In the preparation stage, customers within the university are advised to become involved in the change. Our administrator respondent described the significance of the organizational culture on achieving the desired effects for Campus ERP systems and indicated that in the preparation stage, different factors needed to be considered (see Appendix 3 index 21). Budget, time as well as IT infrastructure including software and hardware, were all mentioned as being significant in the preparation. Therefore, system administrators need to pay more attention in the preparation stage. Unless all requirements for implementing are met, such as those mentioned above, the prepared stage can not be completed and the implementation can not proceed. Hence, the lack of preparations may cause a failure in the implementation of the Campus ERP system.

The customer participation in the preparation stage can be described as an important factor to achieve the goals and needs in accordance with the desired effects. Another influential factor in the organizational domain is leadership, which is described by Ke and Wei (2008) as a crucial influence for the effectiveness of Campus ERP system implementation and organizational culture changes. Our administrator respondent described their leadership in their organizational culture as playing a important role in enforcing customers to use the system in right way. The respondent said that this is enforced by the efforts made by the leaders in each department.

In sum, our findings show that the successfulness in implementing Campus ERP systems is positively related to organizational culture. They further reveal that the Campus ERP system has helped with the improvement of the organizational culture.

5.3 Summary of the Analysis

In this section, we show the analysis of the types of causes of the differences between the desired effects and experienced effects according to the TOC and Checking Model for Influential Factors as described in Chapter 2. Below in Table 6.1 the TOC model and Checking Model for Influential Factors is presented along with the reasons and the relevance of their perspective effects in the following areas: Technology, Organisation and Communication. The reasons and relevance of the effects, on the Campus ERP system implementation at UoN are grouped in categories of avoided, discovered and undiscovered.

The analysis of the data show that most of the potential reasons from the technology perspective are solved, such as weak in navigating, lack of integration. On the other hand, the Campus ERP system implemented in UoN is regarded as too comprehensive and too much customization. These issues are not identified by the designers.

As for the organization perspective, individualistic decision making is avoided at the UoN. This is because the UoN has an organizational culture where everyone in the university are welcomed

to be involved in the decision making processes, hence the surveys of the needs of the staff are collected. Whereas, in the implementing phase of the Campus ERP system, as our administrator respondent described, only the staff from the IT department have the responsibility of distributing the usage of the ERP system, and as well as for the training process. Therefore, this evidence suggests an undiscovered reason: the overuse of a singular function department.

The communication perspective results showed that it was difficult to avoid disparaties for the desired effects and the experienced effects. This might be because everyone has different opinions, and the system cannot be designed to satisfy all customers' needs. High expectations towards the Campus ERP system will always exist. One interesting observation was that for the training, the developers wrote an instruction manual about how to use the Campus ERP system. Despite this being a positive initiative, the manual is more than 100 pages. As a consequence, the teachers tended to reject the manual as a useful tool. These insights suggest that the developers may need to not only customize the system itself, but also need to customize the training guide. It is advisable to embed the manual into the Campus ERP system itself rather than have a separate manual to follow.

Table 5.1 The analysis of the Relevance of Reasons

TOC Model	Checking Models for Influentual Factors		
	Types of Reasons	**Relevance to Effectiveness**	**Irrelevance to Effectiveness**
T (Technology)	**Avoided**	Weak in navigating, Lack of integration	-
	Discovered	-	-
	Undiscovered	Too comprehensive Too much customization	-
O (Organization)	**Avoided**	Individualistic decision making	-
	Discovered	-	-
	Undiscovered	The overuse of a singular function department	-

C (Communication)	**Avoided**	**-**	**-**
	Discovered	High Expectation, Improper Goal Setting,	**-**
	Undiscovered	Unfeasible supporting materials for training	**-**

In sum, we can conclude from Table 6.1, the most crucial undiscovered reasons that can lead to the differences between the desired effects and the experienced effects are the too comprehensive design and the overuse of a singular department. On one hand, if the system developers want to satisfy their customers' desired targets, they need to identify their specific needs more clearly. They need to make more efforts to communicate with the administrators. To be more specific, the developers should let the other party express the right direction to them, clear up the idea that *the more comprehensive, the better*, and finally reach a consensus in the design phase of the Campus ERP systems. On the other hand, the administrators of the university need to make endeavours to formulate a better functional distribution, not let one singular department undertake too many responsibilities. As a result, the process of implementing the Campus ERP system might be carried forward faster and more successful within the university.

6. Conclusion

The purpose of our research is to empirically define the difference between the desired effect and experience effect and examine the influential factors of the different effectiveness. During the empirical findings and discussions we have used four elements to find the effectiveness of adopting Campus ERP system (technical, performance, operational and strategic) and TCO model (Technology, Communication and Organizational) to examine the influential factors of the Effectiveness. Based on the main framework explains in Chapter 2 will present our results.

The final part of the thesis will answer our research questions presented in the introduction section. This section will concentrate on our research questions, while the explanation of the complete results is presented in the Discussion section. Since there are some limitations to our study, we will explain them and relate some of them to the possible future research.

6.1 Research question

Q1. Different between desired effects and Experience effects

The main function of the Campus ERP system is the management of student information. It does everything that faculty and administrators need to do their work. It allows online registration, and contains a student schedule, students' marks and attendance. It allows students, when they register for a course, to access to the course website and download all required materials. It also allows them to check their financial statements. The system allows teachers to upload their materials on course websites, to formulate exams and assignments, and enter student grades and student attendance. It also links to the administration so that the administrator can track students' progress and know their academic status.

The expression of the desired effects of the ERP system is largely determined by the official positions of the respondents. Developers' expectations are on a macro scale, related to the overall performance of the system, since their aim is to fulfil all users' needs as much as possible. Developers' desired effects of the system are primarily determined by the requirements of administrators because the administrators are the decision makers and the actual buyers of the system. If there is a lack of communication between administrators and teachers, the teachers' expectations are likely to be neglected, and will ultimately lead to a failure to satisfy end users' requirements.

The experienced effects delivered by the Campus ERP system in UoN have exceeded the desired effects of from the administrator's perspective with regard to providing a better system for the management of student information records and registration.

From the description of the experienced effects of the Campus ERP system, we can conclude that from the viewpoint of administrators, the system does more than what they expected. The system has more features that can help the university improve its work processes. The system has the ability to integrate other third-party modules into the university system. Moreover, the administrators mentioned that while there are some issues with the use of the system, these issues are not technical in nature but depend instead on the university's rules and regulations. The reasons for the varying expectations discussed presently.

We can observe from their responses that teachers pay more attention to modules they use in their routine work. They emphasized the importance of the services offered by the system, and argued for a better design of modules for grading, attendance, course registration. They did not show any interests in the financial issues of the university.

Q2. Reasons that cause the different between desired effects and experience effects

The first reason worthy of note is that expectations are relatively high, which are affected by technological limitations. Some of the expectations, like better attendance management processes argued by teachers, can be solved by adopting an entrance-card attendance system. People tend to think that software will solve all their problems and will automate every process. Such expectations can never be fulfilled. Furthermore, as the university has different stakeholders with varying expectations, this does not fit with the cost and time constraints on the project.

The second reason offered by the developers is incorrect assumptions of the system due to incomplete knowledge of system requirements, where the developer assumes that a requirement will take two months to deliver, but then it eventually takes more time to fulfil.

The third reason is changing regulations and work processes that affect the expected result of the system. The administrators have also commented that frequent changes in business rules compels the IT department to reconfigure the system, and this gives the impression that the system is not functioning properly.

The fourth reason is that people refuse to use the system, or that they do not accept working in the system, which affects the expected result. Thus, incomplete data in one department due to such technology-resistant people will affect other related departments, thus portraying the impression the system is not functioning properly.

The maintenance of data, on the other hand, can cause anxiety regarding divulging private information. Some information regarding working processes is announced and shared synchronously, while the results of the information cannot be modified easily. For example, it is troublesome for users to change the format of the tests. Users are resistant to using the system because they are afraid that some of their private information will thus become accessible to other users, or even to users outside the university.

The last reason is knowledge sharing, which is crucial to achieving any goal. This includes knowledge of using the system and that of the processes and regulations of the university. Improper knowledge sharing between staff will affect the use of the system.

Due to different reasons, the Campus ERP system will not be designed specifically to take every aspect of the university into account. We can conclude that in order to avoid the disparities between the desired and experienced effects, improved requirements proposals, a better understanding of the requirements of all users, and the ease of use and the popularity of the system are the main factors.

6.2 Limitations and suggestions for further research

In our research, we investigated reasons that cause agreement or disagreement between the desired effects and the experienced effects of the Campus ERP system. We did not examine the degree to which each of these reasons affects this agreement or disagreement. Furthermore, we did not include in our research information about the priorities of designers given instances of varying time and budgetary limitations. We believe it worthwhile for future research to investigate these issues.

Appendix 1 Interview Guide

Warming Up Questions

1. Can we start our interview now?
2. Could you give us a brief description about your background?

Main session

Part 1- Strategy

3. When you know your university would adopt this system?
4. How you perceive your role in the campus ERP project?

Part 2- Size and structure

5. How you describe your needs to the developers? Have you set priorities for your needs?
6. Why you think the Eduwave software is suitable for Nizwa University?

Part 3 - Environment and task

7. Please explain the aspects that you want to change by the Eduwave ERP system before it's implemented.
8. Can you give us an explanation of your working process before the Campus ERP system implemented?

Part 4- Technology

9. What's your opinion on the reasons that may lead to unfulfilled expectations?
10. How you perceive the Eduwave ERP system after it implemented? How you perceive the modules in the Eduwave ERP system?

Part 5- Individual

11. How your customers described their objectives about what they want to achieve with the help of the campus ERP system?
12. What are the areas that you valued most to measure the quality of an ERP system?
13. Can you describe more how each user used the system and how it help them?

Closing Questions

14. What's your opinion on the reasons that may lead to unfulfilled expectations?
15. Can we mention your name in our thesis?

Debrief

Express thankfulness to our informants, and ask for future contact and inform of them if they want us to send the manuscript to them.

Appendix 2 Interview Transcription of Developer

Interview with developer- 16.04.2014

Zubaida (Z)

Mengmeng (M)

Index	Interviewer & Respondent's Titles	Questions & Comments	Code
1	Z	Hi.	-
2	M	Hi.	-
3	Developer	Hi.	-
4	Z	We are very happy to have the chance to communicate with you. You are the key developer of the ITG company, and your answers will be very helpful to us.	-
5	Developer	Haha, I'm glad to help you. I hope it will do some help for your research.	-
6	M	Could you give us a brief description about your background?	-
7	Developer	I have been working with ITG since 2005. I am responsible for the cross technology domain release management, process design, optimization and policy. I am working as a major liaison between application development and production for release management control. I am overseeing the entire development and production process of a business's products.	-
8	M	Can you tell us whether campus ERP have any specials compared to the normal ERP (other kinds of ERP)?	-
9	Developer	The campus ERP system is a comprehensive e-learning and education management platform, It includes Learning Management, Content Management, Student Information, Instructional Management, and more, all integrated under the same solution. The solution also includes an EMIS component which is specifically designed to assist decision makers in planning, analysis and decision support. More important, Campus ERP system offers customer with new and compelling ways in education, allowing users to	TCC

		engage in virtually in every aspects and learning process.	
10	Z	Thank you very much. Firstly, we want to know why you create the Campus ERP system for Nizwa University. What kind of help you want to offer to your customers?	-
11	Developer	The campus ERP system is designed and built to serve as a full education management platform, that means that it is designed to serve institutions such as Nizwa University and not just create to university of Nizwa. The idea of creating this product in university of Nizwa comes from the need to provide a fully integrated solution which helps the Educational institutions in providing a better service and a better education for all students while allowing stakeholders to engage in virtually every aspect of the teaching and learning process.	- TCG
12	M	Then, why you think the Eduwave software is suitable for Nizwa University? How you perceive the previous situation of UoN?	-
13	Developer	University of Nizwa needs a software that provides them with different services that helps them in the management of student system and integrate all work process in one database. UoN doesn't have any system before, all their work based on the spreadsheets and paper. No proper way to do work and save the information. So Campus ERP system helps UoN to perform their work process and increase the efficiency of the work. Moreover, by using Campus ERP, they can integrate all their data from spreadsheets to the new system and having one system that deals with all work process and can be used by different people in the same time.	TCC ORA
14	M	Can you explain the process about how can you get cooperation with UoN?	-
15	Developer	Usually we contact our customers through email and phone. UoN has been very cooperative with us in order to finish their requirement and needs at the time. They are always with us in the same line because we also need their help to understand each requirement.	COM
16	Z	How long they require you to complete the design of the system?	-
17	Developer	We already have the system and it has been used by other universities. But each university has different requirement	COM

		and different function. So, we need just to add or change the function from the main system and provide our customers with their needs. I think around one year takes to start, initiate of the system in one. We spend another time in order to integrate all the information from spreadsheets into the system and check the information.	
18	M	Who are the people of UoN that you communicated with before you designed the campus ERP system?	-
19	Developer	Almost we contact the administrator, manager in the university and IT administrator. But during our implementation of the system, the main contact person is IT administrator as they will be the main responsible persons in the system.	COM
20	M	How your customers described their objectives about what they want to achieve with the help of the campus ERP system?	-
21	Developer	We conducted a meeting between our company and UoN. The meeting describes the need and requirement the UoN need from the system. So, on the meeting we introduce the system and show customers how the system work and what the system have. And then, there are different discussions in the system and the requirement of the UoN.	COM
22	Z	Can you list some of the services that Campus ERP provides it to the University of Nizwa?	-
23	Developer	Yes, of course. We can divide service into three main points: the software includes Student/School Information/Management System, Resource Optimization System, and Student Financial System. Each point includes different services. The Student Information/Management System provides services for Student Information, Graduated Students, Attendance, Transcripts, Academic Year-End Processing, Courses Management, Study Plans, Student Advisory, Evaluation, Buildings & Facilities, Student Financial System, Compatibility with mobile platforms, Facilities Booking Module, Workflow Management, etc. The Resource Optimization System includes Student Time-Table, Exam schedule, Exam and academic planning, Academic staff requirement and availability, Academic	TCC TCG

		staff workload, Monitoring and utilizing reports. The Student Financial System includes Undefined Student Payment, Automatic Invoice generation, Add/Drop Invoice, General Invoice, Scholarships Management, Integration with other models.	
24	Z	Is this system created by the requirement for Nizwa University (a customized system only designed for Nizwa University)?	-
25	Developer	No, EduWave is a comprehensive e-learning and education management platform that can be localized to serve many universities and not just Nizwa university. Some of the customized features need by Nizwa university include the integration with third party software such as integration with Point of sale, integration with NCR machines and integration with Papercut.	COM
26	M	Nice to hear about this. How the campus ERP system affects on the work of every group of users (administrators, teachers, etc.) respectively?	-
27	Developer	Well, a number of comprehensive tools and learning resources are provided in EduWave, to help students track their progress, improve their performance, and enjoy their learning experience. With EduWave, students can access their learning material and textbooks -personalized and in rich media format- from any computer, anytime and anywhere. Students can interact with their instructors and with each other through multiple communication and collaboration tools such as email, discussion forums and group study-sessions. EduWave also allows students to register online, access their study plans, schedules, courses, attendance records and any other related data. They can also perform assessments, and directly communicate with all parties, such as advisors, instructors, etc. The administrative and instructional tools provided in EduWave, help instructors to better manage and utilize their time, allowing for higher efficiency, and more room for innovation and creativity. EduWave provides extensive instructional design and authoring tools to support the role of educators. In addition to accessing and managing learning content and curricula, instructors can easily create their own teaching material. They are able to quickly author and publish customized learning content, and communicate complex ideas and concepts. They are also	TCC TCG

		able to teach across distances, and provide effective guidance and support through conducting online EduSessions. With the available assessment tools, instructors are able to measure individual student performance and progress. They can design and conduct online assessments, manage students' grades and attendance records. They also have the ability to communicate their views and concerns directly to their students, colleagues and administration through a variety of communication & collaboration tools. As for the Administrators and Registrars, EduWave includes a comprehensive online registration system, which also covers student admission and financial. It also provides administrators & registrars with tools that help them develop and maintain complete and accurate information, monitor development & performance, plan and adjust resources, resulting in more effective decisions. Administrators are able to easily and securely develop and manage related administrative data files, build the organizational hierarchy, define all related resources, create users' profiles, authorize and control access to users, develop registration schedules, and communicate directly with related parties. For community as well... by integrating technology, innovation, and advanced educational practices, EduWave are a comprehensive tool that helps the educational sector to enhance productivity and sets the ground to foster innovation, creativity and the building of a collaborative learning community.	
28	Z	It is really a comprehensive system as you described. Do you think it can satisfy all your expectations?	-
29	Developer	Yes, most of the expected features were there, it is hard to include all the features on one release, but we used an agile iterative process to implement all the requested features, that way we had the opportunity to get users updates and includes it in the next iteration.	TCG UR
30	M	Are you set a priority in the requirement?	-
31	Developer	Yes. We used a form that includes a priority field. So the customer needs to set a priority for each requirement (High, Medium, Low). So, we start to finish the requirement from the high priority requirement.	COM

32	M	There's another question that we would like to know... ...Have you faced with any limitations so that you cannot design a system that fulfill all your expectations?	-
33	Developer	Yes, and No, Limitations are always there. Limitations can be Technology limitation, Hardware Limitation, Time Limitation, Requirements Limitation, etc., but we try to get over these limitations by balancing the needs verses cost and time.	TCG
34	M	Do you think you have solved your customers' problems after the adoption of the system?	-
35	Developer	Yes, the main goal was achieved, having a system that handles the Educational Management, in addition to the ability to integrate and operate with third party system was our goal and we achieved it.	STA
36	Z	Are there any reasons that may lead to unfulfilled expectations?	-
37	Developer	The reasons can be unclear requirements, updating requirement frequently without proper planning, high expectations, especially from non-technical people, improper handling of change management. High expectations mean people tend to think that software will solve all their problems and will automate every and each process, they do, that is wrong and will always lead to project failure, on the other hand, we different stakeholders have different expectations, and most of the time their expectations doesn't fit with the cost, and time constraints of the project. Example: Paperless environment, stakeholders were expecting to have 100% paperless environment, that was a high expectation that doesn't fit with the project budget and time. Many of wrong assumptions are due to incompleteness of requirements, that way you would assume that it will take 2 months to deliver the Financial module, but you end up with 2-3 months extra to the incompleteness of requirements. In addition to this, sometimes, people refuse to use the system, or accept to work in the new created process, that will affect the expected results, take the inventory as an example, peoples' resistance is preventing us from fully activating the system. Knowledge sharing is so important to achieve any goal, that would include the knowledge of using the system and	DR AR

		knowledge of the processes and regulations, take the HR as an example, at the beginning they didn't have a proper knowledge sharing for using the system, we had to conduct several trainings each couple of months, and part of the system features are not fully utilized.	
38	Z	Do you think this system is already an adequate one according to your customers' requirements? Why?	-
39	Developer	Yes, of course. We know that system acceptance was based on the user's requirements. Eduwave automates most of the customer processes. At the same time, customers utilize most of its features effectively.	COM
40	M	Do you think the system needs any modification now? Which areas it needs modification?	-
41	Developer	We prefer to call them enhancements, we try to enhance EduWave as much as we can, that would include User Experience, Technology upgrades and New requirements and updates.	COM
42	M	Well, we think we've got enough information for our interview now. Thank you very much for your participation. You are very kind.	-
43	Z	Thank you very much. Your answers are very valuable for us. Nice to talk with you. Let's keep in touch and we will inform you before we publish our work.	-
44	Developer	Haha, thank you. Good luck with your thesis.	-
45	Z	Thank you. Have a nice day. Bye.	-
46	Developer	You too. Bye.	-

Appendix 3 Interview Transcription of Administrator

Interview with administrator- 20.04.2014

Zubaida (Z)

Mengmeng (M)

Index	Interviewer & Respondent's Titles	Questions & Comments	Code
1	Z	Hi.	
2	M	Hi.	
3	Administrator	Hi.	
4	Z	Can we start our interview now?	
5	Administrator	Yes, of course.	
6		Could you give us any information about your background?	
7	Administrator	I have been working at the university since 2006. I am an Acting Director of the Center for Information System at University of Nizwa. My main responsibilities in leadership are to maintain the enterprise system and application. My tasks include maintain the core infrastructure system, ERP system, library system and university website.	
8	Z	Please give us a brief description about the implementation of the Campus ERP?	
9	Administrator	The Campus ERP system is a user friendly web server's system used as the information management system that offer university with centralize system used by different users (students, teachers, administrators, finance) which help them to communicate and do their job in a proper way.	TCC
10	M	Who are the decision makers of adopting Campus ERP system?	
11	Administrator	We can say that, the decision to move to the Campus ERP system come from the feedback that we already get it from the users of university in regards to the work process and the waste of time until they reach to the end point. So after different meeting with the different people who involves in the work we decide to move forward to the new system, but the final decision making must have approve from the manager of the university to go forward.	ORA

12	M	Did you get any supports from UoN regarding to the campus ERP project?	
13	Administrator	When we are first thinking to move forward to the Campus ERP system, most of the staff in the different department (IT, register and record, Finance) accepts this move that helps them to improve their work performance and reduce the workload. Also, most of the teacher support this idea that helps them to save time and reduce the workload and have their information in secure place.	ORA
14	M	What is the reason of moving from your old system to the Campus ERP system?	
15	Administrator	We didn't have any system before, we just use a spreadsheet (Microsoft excel) to manage our work. As the university growing up and the number of students has increased, it becomes difficult to manage the data using spreadsheet and that own by one user and then they share it through email. The main reasons that have to move from the old system to Campus ERP system are: there is no central database that can manage all university work process such as student registration records, student personal information and student academic records, because of that we faced a lot of problems including loss of information as each person use their own spreadsheet, waste of the time as the work process take a long time until reach to the end point.	TCC OPE PER
16	Z	Have you researched cases of other universities that adopt this kind of campus ERP system previously? What's your opinion of these cases?	
17	Administrator	There are other universities used this system and we consider that when we choose the system. Also, we have been in contact with them to know how the system work with them and what is the effect of the system in their university. From the overall they suggest the system to us and told us to move forward to purchase the system.	ORA
18	M	How long you prepared to buy this system? How long does it take from your request to the implementation?	
19	Administrator	When we decide to buy a new system that improves our work process and performance, we take a lot of time to get to the final decision. As, we need to consider different things, including software budget, time required, requirement needs include IT infrastructure, hardware. I can	ORA

		say that, it took us around three years to start working with the system. First of all, we compare different software and we get that Campus ERP system is the suitable one for us. Second, we contact the supplier in order to show us the demo session about the system and how it work. They give us the whole structure of the system and what we required to have to start implementing the system at the university.	
20	Z	How long you prepared to buy this system? How long does it takes from your request to the implementation?	
21	Administrator	When we decide to buy new system that improves our work process and performance, we take a lot of time to get to the final decision. As, we need to consider different things including software budget, time required, requirement needs include IT infrastructure, hardware. I can say that, it took us around three years to start work with the system. First of all, we compare different software and we get that Campus ERP system is the suitable on for us. Second, we contact the supplier in order to show us the demo session about the system and how it work. They give us the whole structure of the system and what we required to have to start implement the system in the university.	ORA
22	M	Could you describe the preparations that you have made before the implementation of the campus ERP system?	
23	Administrator	The implementation of any system required various things to be done in order to get success with the system. Each system needs different specification, especially from the hardware side. After we get a discussion with supplier and we know what the specification of the hardware it needs, we start to purchase that hardware and configure it with suitable windows and software required. Furthermore, we inform our staff with the new system that will going to implement and give them a session on how the system look like and what they will get from the system in order to improve their work performance.	ORA COM
24	Z	Why you choose Campus ERP system? How you get to know Eduwave and cooperate with the ITG Company?	
25	Administrator	As I mention before that we have been analyses of different system before we choose Campus ERP system. We have conducted different research about different system and	ORA

		then we decide to get Campus ERP system. One of the main reasons that, the system has a multi language system and it reflected in each other. The system contains Arabic and English version, so the users can use one of them. The system has a proper customization. The system has integrated function that lets us to integrate a student model with their financial model, Academic and LMS.	
26	Z	So, can you list the benefits that university will have it from using Campus ERP system?	
27	Administrator	It has: (1) multi languages System, so the users have the flexibility to use Arabic or English language, (2) Proper customaization for the work, (3) It is integrated with other models such as financial and academic, (4) manage student registration records, (5) manage student personal information, (6) manages student academic records and provide statistical reports of any information that university need it in easy way.	TCC TCG
28	M	Please explain the aspects that you want to change by the Eduwave ERP system before it's implemented.	
29	Administrator	The main aspects that when need to achieve before implement Campus ERP system to change the whole work process from the manual used to the electronic used. Before the implementation of Campus ERP our work process done manually and over spreadsheets software with long and complex process. For example the registration period for the student, student need to take a paper form registration and records department and then fill it with the course she/he needs to register in that period and after that he/she take that paper to supervisor in order to sign it and accept their registration. Finally, the students return back to the register and record department to give them that paper and enter his/her data in spreadsheets. All of this process causes different problem, including losing of information, waste of time, and no proper follow progress.	OPE
30	M	How you describe your needs to the developers? Have you set priorities for your needs?	
31	Administrator	The development company has a proper form to follow a customer requirement. We usually follow the same form. The form contains a priority column that helps us to set the high, medium and low priority for each task.	TCC TCG

32	Z	Do you think the developer understood your needs?	
33	Administrator	As the developers had already experienced of how the system work in other university and what usually the need for them, he didn't get that difficult to understand us. Most of the time it gains will with all requirements. Some time, the developers need extra explanation on what we need in order to help them to provide us with all needs. Usually we contact them through email from any specific requirement and some time we have a call with them.	COM
34	M	What are the areas that you valued most to measure the quality of an ERP system?	
35	Administrator	I think from my point of view and also from the staff in UoN that, the quality of the system is very reliable and useful for all users. The information that we get from the system can be considered as the high quality. The system provides us with the complex static report that we spend a lot of time before to do it. In overall the system has a high quality, but some time we have some slowness in the system and that because of the high number of users access to the system at the same time especially in the registration period time.	TCG UR
36	M	How you perceive the Eduwave ERP system after it implemented? How you perceive the modules in the Eduwave ERP system?	
37	Administrator	The result of using the Campus ERP system has gone beyond management expected such as a better system for managing students information records and registration. Furthermore, the module in Campus ERP system can be described as student module, financial module and housing module and all of them connect together. So, students can check their registration and other academic things, check their financial statement, and also check their housing statement.	TCC TCG
38	Z	Please describe whether there are any changes in your daily work.	
39	Administrator	In overall, I can say that the whole daily work process has changed. By using Campus ERP system our work efficiency has increased, the workload reduce. As I give you two examples of the student registration process before it take a long time to reach to the end point. Now students can set behind the computer and do their registration and submit it	OPE PER

		to their supervisor. The help of system in getting a complex static report from one database has reduce a our workload.	
40	Z	Who are the aimed users of Campus ERP system in UoN? Who are the actual users in UoN?	
41	Administrator	I can say that the aimed users and the actual users in UoN that use Campus ERP are the same. The Campus ERP used by all students, faculty and administrator.	OPE
42	Z	Can you describe more how each user used the system and how it help them?	
43	Administrator	The student used Campus ERP system: (1) to access their learning materials and textbooks, (2) to interact with their teachers and other student, (3) to perform online tests, assignment and assessment, (4) to access to their grade, (5) online registration to add and drop courses, (6) to view their schedule and classes, and (7) view their financial statement. The teachers used Campus ERP system: (1) ability to manage their learning content and curricula, (2) interact with their student and other teachers, (3) create their own teaching materials, assessment, assignment, (4) enter grades and attendance for students, and (5) measure individual student performance and evaluate them. The administrator used Campus ERP system: (1) manage information, (2) monitor performance of work, (3) authorize and control access to users by giving them certain permission, (4) create a user's profile, (4) communicate with a different user's, (5) build schedules, (6) generate different reports depend to the request especially from the Ministry of Higher education (MoH), and (7) help them to get a better decision making. The financial used Campus ERP system: (1) manages a student finance profile, (2) track student finance statement, (3) communicates with other user's, (4) generate different finance report, and (5) manage scholarship and sponsor for students.	OPE
44	M	How long for the users to get used to this new system?	
45	Administrator	We usually do a training session at the beginning of each semester for all users in how to use the system and get a feedback from them. The users can immediately work in the system when they have a user name and password.	COM

46	M	Who are responsible for spreading the usage of the Eduwave?	
47	Administrator	The administrator users have ability to create a user and give them permission in the system. So, each user has own profile	
48	Z	Is the system easy to handle?	
49	Administrator	From our point of view as we are IT administrator, we say that the system is easy to handle and manage but some time we still have to get a help from the developer in some work. As we handle different training session for faculty and student, we get some different feedback from them. Some of them get difficult to use a system especially the people who don't like to work in the computer and just they need paper useds	TCC TCG
50	M	As an administrator of UoN, how you perceive your role in the campus ERP project?	
51	Administrator	As the administrator of the system, we force users in the university to use the system in the proper way. Because incomplete data in one department will affect the other related department and that will cause the functionality of the system. So, we enforce user to finish their job in time by configure a time limit for each job especially in grade enter period. For example the head of the department need to enforce teacher to enter the grade of the students in the specific time in order to them to check it, approve and submit to registration and record department. Otherwise, that will cause to the lack of the efficiency. The administrator in register and record department enforce the teacher to enter the grade by send email remind them with the period of enter mark and also the system show them what is the period of grade enter.	ORA
52	M	Did you get any comments from the staff of UoN about their perception towards the system?	
53	Administrator	Actually, we are in communication with the staff before we implement a system. We conducted a meeting to discuss what we needs (our requirement) and what type of system	COM

		can we bought and what are the main function that we need to get it from the system. Then after we get a decision to buy a Campus ERP system, we have to conduct a meeting with the manager in order to give us an approval to buy system and fund us for the project. After the implementation of the system, we are in contact with all users who used a system to get the feedback from them on how the system work with them. We conduct a survey to check the user acceptance of the use of the system. We usually get a positive feedback that most of the users accept the system. But also in other hand, we have some user who gets a difficulty on how to use a system and they always comply that the system is not good for them and not do the work properly. When we check that, the main reason is the misunderstanding of the use of the system and they get in their mind that the system does more than that. Different teacher has different opinion, all of them accept the system and they are happy with that, but still some of them give us a feedback to improve some function in the system especially with the attendant function. They ask us to get a way to integrate the attendace function in Campus ERP with the access card project and we are working on it now.	
54	M	Have you given feedbacks to the developer after the system implemented? Have you updated the system?	
55	Administrator	We are in contract with the developers to support us and update the system with the new update. Usually we get a feedback from the teacher for the specific function in the system that help them to do the work better and in the efficient way.	COM
56	M	Do you think the system matches your expectation?	
57	Administrator	The result of using the Campus ERP system has gone beyond management expected such as a better system for managing students information records and registration. But the system affects more than what we expect. It helps in building better networks with other responsible parties like ministry of higher education, center for research and statistics and higher education admission center. The Campus ERP system has provided an excellent working environment by following the governance task and	STA

		workflow to get accurate data and meets all university rules and regulations.	
58	Z	What's your opinion on the reasons that may lead to unfulfilled expectations?	
59	Administrator	The reasons can be the Faculty turnover is very high in the department, no proper handover is done, IT department is overburden with training new Faculty, frequent changes in the business rules give IT department problem by reconfiguring the system and this gives the impression that the system is not able to function properly, automated process are often overridden by manual intervention because rules and regulation are overruled by the management. So, this situation gives the impression that there is no integration between the various modules in the system. Incomplete data in one department will affect the other related department and giving the impression the system is not functioning properly.	TCG DR
60	M	We think we are going to end our interview now. Thank you very much.	
61	Z	Thank you very much for the interview.	
62	Administrator	You are welcome. Have a nice day.	
63	M	Have a nice day. Bye	
64	Administrator	Bye.	

Appendix 4 Interview Transcription of First Teacher

Interview with first teacher- 21.04.2014

Zubaida (Z)

Mengmeng (M)

Index	Interviewer & Respondent's Titles	Questions & Comments	Code
1	Z	Hi. How are you?	
2	Teacher 1	Hi. I'm fine, and you?	
3	Z	I'm fine, thank you very much. My partner and I are researching on campus ERP systems. My partner, Mengmeng is here, too, she is from China.	
4	M	Hi. Nice to meet you. I'm Mengmeng. We will be grateful if you can give us some information about your opinions towards the Eduwave software.	
5	Teacher 1	Nice to meet you, Mengmeng. I'd glad to.	
6	M	Thank you very much. OK, let's start our interview. Can you explain your educational background and what is your work at the university?	
7	Teacher 1	I have a master's degree in computer science. I have been working at university from about 6 years. I am working as the head of the computer science section in mathematics and physics section and also as a teacher for different courses in the department	
8	M	When you know your university would adopt this system?	
9	Teacher 1	We have already known that the university searching for the system that help them to improve our work process in an easy way as we are the one of the main users that the system will affect the work process of them.	OPE
10	M	Do you know why your university applied Campus ERP system?	
11	Teacher 1	The university has applied this system to electronically manage the whole educational process and to improve academic performance. So, that helps them to track the process and where it reaches. For example, teacher can	OPE TCC

		track student registration and follow them until the end of the registration. So it is easy for a teacher to advise students and help them in choosing their courses.	TCG
12	M	Are these reasons matching your willingness? How?	
13	Teacher 1	It matches our willingness. By using one central database that can be accessed by faculty and student at the same time will improve our daily work and it will save us time.	
14	M	Can you give us an explanation of your working process before the Campus ERP system implemented?	
15	Teacher 1	Our work process before using Campus ERP system is based on paper and excel sheets. We have to use a lot of papers to finish our work and spend a lot of time to complete all the work process. An example of the exam process, we need to print a lot of paper depend to the student number involved in the exam and then after the exam we need to enter the grade in the system and send it to the head of department to approve it. All this process takes a lot of time to finish.	OPE PER
16	Z	How you expect the Eduwave campus ERP system can work for you?	
17	Teacher 1	I think moving from manual process to electronic process in the academic work will help in the work. We expect that the system will reduce the use of papers, reduce the load of work, increase the efficiency of work and our data will be safe. So, instead of working with different papers and different spreadsheet and that may cause problems and loss of data, now working in one database will reduce all these challenges.	OPE
18	Z	What areas that you think might need to be changed in your previous work?	
19	Teacher 1	With the use of Campus ERP system in university, all our work process has changed to the better way and all of us work in the same system. The most area that change in our work are the registration process and grade enter. Before the system, it takes a long time to finish this process, but now with one system, there are saving time. Moreover, using Campus ERP system helps us in upload all course materials and share it with students, communicate with students and others collegous. Also, using Campus ERP system, can create our own exam, assignment, assessment and publish it	OPE PER

		to the students	
20	Z	Can you give us a brief description about impression of the Campus ERP system? How about the modules you used often?	
21	Teacher 1	The first impression that we get from the use of the system was very happy. The system gives us the flexibility to work and save us a lot of time that we spend it before to finish our work. Furthermore, the system includes different module that contains a different function to improve our work. Also, working on one system give us a good impression that our data and information are saved and centralize and can be used by different users in the department.	PER
22	Z	How you get used to the Eduwave system? How long it takes?	
23	Teacher 1	We have a several training session done by administrator on how to use the system and they go through all functions in the system that help us in our daily work process. Each training session takes around two hours and then we have to sit and work in the system and give them comments. Ah I remembered that… we got a user guide from the developer, but it contains more than one hundred pages and it need long time to read and understand.	ORA UR
24	M	Do you use this system often?	
25	Teacher 1	We usually use system in our daily work. We can say that, we always use the system in all day of work.	
26	M	Have you asked to give any feedbacks of the system?	
27	Teacher 1	There is a lot of communication between us and the administrator to give them a feedback in the system and also to share with them our opinion in certain function to improve the system in the more flexible way that help to improve our work process. Also, administrator conducted various surveys to all users to know their feedback of the system and their acceptance.	COM
28	Z	What are the aspects that you value most of the usage of Eduwave?	

29	Teacher 1	We like the way university think in replace the paper used to electronic use by implementing Campus ERP system to manage academic process. The use of Campus ERP reduce our workload and it helps us a lot. May I say that the flexibility of the system can be the most value that I like as I can work from home and finish all of my work and it saves automatically in the database.	OPE PER
30	Z	How you evaluate the quality of a Campus ERP system? Which parts are important to you?	
31	Teacher 1	From my point of view I can evaluate the quality of the system and quality of information that we get from the system are high. The information that we get from the system are accurate. The system in overall can be evaluated as the reliable and flexible system. I think all functions the system provides us to improve our work process is important and each one related to each other.	TCC TCG
32	M	How you perceive the current Eduwave campus ERP system in your daily work?	
33	Teacher 1	We think it is a good system and it is helpful for universities to manage their information process work in the student management system. Also, it helps us a lot in our daily work. It provides us with most functions that we need to do it in our work. And usually there are some update of the system depend to our needs and that help us a lot.	OPE
34	M	What are the aspects that you think can affect the desired effects of campus ERP systems most?	
35	Teacher 1	I think if you are clearly identified your requirement and what you need the system do for you will get what you expect from the system. But I can say that lack of communication aspect can be one of the reasons. Also, some people who do not have any IT background may affect the desired effect of the system.	COM DR
36	M	How do you think the campus ERP systems may have risks to realize your each desired effect?	
37	Teacher 1	I can say the high expectation that the user needs to get from the system can affect the expected result from the system. As there are a lot of people need the system to be smart enough in order to do their job.	DR

38	Z	OK. Thank you very much for your kind participation. We would like to send a manuscript of our thesis to you.	
39	M	Thank you very much. You are very helpful. Let's keep in contact.	
40	Teacher 1	Sure. Have a nice day. Bye.	
41	Z & M	Thank you. You too. Bye.	

Appendix 5 Interview Transcription of Second Teacher

Interview with second teacher- 21.04.2014

Zubaida (Z)

Mengmeng (M)

Index	Interviewer & Respondent's Titles	Questions & Comments	Code
1	M	Hi	
2	Z	Hi	
3	Teacher 2	Hi	
4	Z	Can you explain your educational background and what is your work at the university?	
5	Teacher 2	I have a PHD degree in business administration. I have been working at the university for about 5 years. I am working as the professor assistance in management and business department. I teach human resource management, international business management, business environment and business policies. I am interested in different research, including advertising ethics, human resources and international marketing management.	
6	M	When you know your university would adopt Campus ERP system?	
7	Teacher 2		
		How you know about the system for the first time?	
		As we are the teacher in the university, we have involved in any change will be done that affect our work. Our procedure in the university that we have a meeting with the head of the department to give him a feedback in our daily work and give him any suggestion to improve our work process. The head of department are the persons who involve talking with the administrator and giving them our suggestion. So, we know about this change from the beginning.	ORA
8	Z	Do you know why your university applied the Eduwave Campus ERP system?	

9	Teacher 2	The university has applied this system to manage a student information include student registration, student finance invoice, student schedule, attendance, grade and student academic progress. And all of these processes, manage by one database and centralize.	OPE
10	M	Are these reasons matching your willingness? How?	
11	Teacher 2	It is match our willingness as the system will help us to improve our work to be electronic work instead of using different spreadsheets. It provides us with the way to upload tutorial materials; to communications between students; to get a *output quality; knowledge creation,* marks submission, enters attendance and registration process.	OPE
12	M	Can you give us an explanation of your working process before the Campus ERP implemented?	
13	Teacher 2	Our work process before using Campus ERP system, based on the paper used and the used of spreadsheets (Microsoft Excel). The example of our manual work is grade enter period. We need to enter the grade of the students in the spreadsheet for each course. Then, we need to print it on paper and then send it to the head of department to approve it. After that, the head of the department sent to the registration and records department for final approval. The student is not involved in this process. The student needs to come to my office to check their grades.	TCC TCG
14	Z	How you expect the Eduwave campus ERP system can work for you?	
15	Teacher 2	Using one database and it is centralized and can be accessed by different users helps in our daily work. I think that, the use of centralize system instead of spreadsheets helps in improving our work to be more efficient and it will save us more time. As we get an introduction session from administrators about the system we get some information about the system and what it the functionality of the system. So, we expect the system will do a lot for us, especially in the registration process of the students.	PER
16	M	What areas that you think might need to be changed in your previous work?	

17	Teacher 2	If we compare how we have been doing in our work before and what we have done now, will be a lot of change that help in facility our daily work. The whole process of our work has changed to be in the proper and safe way. So using enterprise system will helps teachers to get different benefits in their work.	OPE
18	M	Can you give us a brief description about impression of the Campus ERP system? How about the modules you used often?	
19	Teacher 2	With the use of this system, we can upload our course materials, book and share it with student to be able to them to download it and put their comments. Also, we can communicate with our students and even with our colleagues. We can enter and check our student attendances, grade, check student progress and student registration. We can create our assignment, assessment and exam. And also our student can check their grade ones we enter it in the system and publish it. We can say that we receive more than what we expect as we know before that the system focus on the student management system, especially registration process and then after we use the system we experience that the system can do more than that for us. We are	PER
20	M	What are the aspects that you value most of the usage of Eduwave?	
21	Teacher 2	At the first time when we start the Campus ERP system, we can say that the system in overall helps us a lot. The most value that we use in Campus ERP system are the manage of student registration, grade enters and submission.	OPE
22	Z	Can we say that the Campus ERP reduce your workload?	
23	Teacher 2	Yes, it reduces our workload comparing to the system we use it before. Working on one system with the availability of data it will save us time, more flexible instead to use more than spreadsheets and move between them.	PER
26	M	How you get used to the Campus ERP system? How long it takes?	
27	Teacher 2	We are getting to use the system after the administrator conducted a different training session in each module and function of the system. Almost we spend around two	COM

		hours in each training session. The training session includes the demo of the system and we spend extra time to work on it and give administrators a feedback on that.	
28	M	Do you use this system often?	
29	Teacher 2	Mostly we use system in our daily work. All our data and information that we need in the system. All our daily work doing through the system. As the system reduces our workload comparing to the system we use it before. It saves us a lot of time and it is more flexible used.	PER
32	Z	How you evaluate the quality of a Campus ERP system? Which parts are important to you?	
33	Teacher 2	In overall the system, I think the system has a high quality based on the reliability and flexibility to use the system. The quality of information in the system is more important for us as it helps us to generate a lot of information in an easy way and we can perceive it as the accurate information. Furthermore, we some time face a slowness in the system performance but after we contact administrator in regards to this issue they are explaining that due to the a high number of users that work in the system in the same time. But moreover, the administrator has upgraded the server that manages the system with high feature that increase the performance of the system and now it is better than before.	TCC TCG DR
34	Z	How you perceive the current Eduwave campus ERP system in your daily work?	
35	Teacher 2	We have gained a lot of benefit from using this system and we have got more than what we expect. It manages the whole work process in one system and it is centralized and can be used by all users at the same time. It helps the university to improve the work efficiency and it saves a lot of time for us.	OPE PER
36	Z	Have you asked to give any feedbacks of the system?	

37	Teacher 2	Yes, there is a survey distributed through all the users to get a feedback of the system and evaluate it. In order to improve the system and if there any new update needs to be done. Also, we usually have a contact with the administrator for any issue and suggestions for the improving of the system and that affect our work to be in the good way.	COM
38	M	What are the aspects that you think can affect the desired effects of campus ERP systems most?	
39	Teacher 2	From my point of view, I think the misunderstanding of system function and how it is working can effect the desired effect of the system. Also, bad use of the system. Also, if the users in the university not accept to use the system and they still need to work in the old way, that will cause a negative effect to the system.	ORG DR
	Z	How do you think the campus ERP systems may have risks to realize your each desired effect?	
	Teacher 2	I will not say the system has a risk to release our desired effect. The system will design and it helps us a lot in our work. It is reliable and flexible to use. But we can say that the system needs some improvement in some function to be worked easier than now, especially in the attendance process and follow up warning.	TCG UR
40	Z	I think we already got enough information for our interview. Thank you very much for today.	
41	Teacher 2	You are welcome. Good luck.	
42	Z & M	Thank you. Have a nice day. Bye.	
43	Teacher 2	You too. Bye.	

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