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A Comparison of SAP ERP and Microsoft Dynamics (AX) in Teaching Workflow and Process Management Systems

A thesis submitted in partial fulfillment of the requirements for the degree of

Bachelor of Science in Information Systems and the Honors Program

by

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December, 2012
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be accepted in partial fulfillment of the requirements for the degree of

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Abstract

Teaching undergraduate students to use Enterprise Resource Planning (ERP) systems is important as over 60% of multinational corporations had implemented ERP systems by 1998 (O'Leary, 2004). By 2010 that number reached 84% among manufacturing corporations (Prouty & Castellina, 2011). Thus, universities must educate students to use, configure, and develop ERP system applications. This study proposes that learning outcomes are similar regardless of the ERP system used to teach enterprise processes. In this study, Microsoft Dynamics (AX) and SAP were compared to determine whether learning outcomes differed when different ERP systems were used to teach a specific skill (financial accounting). Students in a Management Information Systems class completed similar hands-on labs using Microsoft Dynamics (AX) and SAP. These students were then asked questions regarding their perceptions of the two ERP systems along with questions to assess learning outcomes. These questions were derived using the concepts of the generally accepted Technology Acceptance Model (TAM). Responses were then analyzed to provide an analysis of both ERP systems used. Results were fairly similar for both systems tested; thus leading to the conclusion that either ERP system could be used in the classroom.
Acknowledgements

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Chapter 1: Introduction

Background

Enterprise Resource Planning (ERP) systems integrate the recording and reporting of business transactions. The University of Nevada, Reno, like many other universities, utilizes the SAP ERP software, a widely used ERP system, to teach business students process management concepts. Students often find it difficult to learn the ERP software, and SAP specifically in one semester of instruction. By using a comparable ERP package called Microsoft Dynamics (AX), students may benefit from a learning environment that is simpler and more familiar.

In order to test how well the software was received by the students, students completed a lab package with a series of tasks regarding common financial accounting functions. The students then immediately completed questionnaires about their perceptions regarding ease of use and effectiveness of software. The questionnaires were distributed after lab activities that exemplify basic ERP functions. To set a control group, one class conducted the Microsoft Dynamics (AX) lab and questionnaire, while another class conducted the SAP ERP lab and subsequently answered similar questions to those of the Microsoft Dynamics AX lab. For details concerning the research, please see Chapter 5.

The study was conducted to gauge students’ perceptions of whether one software system provided a more effective learning experience of ERP systems and whether that perception is supported by participants ability to repeat specified steps of
given tasks. Thus, there were two questions this study sought to answer. Question one: Is either SAP ERP or Microsoft Dynamics (AX) more accepted by participants in the study? The definition of acceptance is discussed further in Chapter 2 with the Technology Acceptance Model. And question two: Did participants recall more information from the ERP system that was found to be more accepted?

It may be likely that students are more familiar with Microsoft interface and products in general, and this familiarity makes learning the new software simpler. However, SAP holds the largest market share of all ERP systems (Pang, 2010). Thus, balancing industry standard with acceptance of the technology (the Technology Acceptance Model will be used to assess this) is an important consideration. The overwhelming use of SAP as an ERP system lends itself to the hypothesis that it is better to teach SAP ERP even though it is harder because students are more likely to use it in industry.

Objectives

The purpose of comparing the two ERP systems (SAP ERP and Microsoft Dynamics (AX)) is to determine if one software system is more accepted and whether the learning outcomes differ when used in teaching students about the basic functions of ERP systems. By comparing these two systems, universities offering ERP classes can make a more objective choice about which software system they use to teach students. Thus, the main objective for this study is to provide a comparison of these two systems for the purpose of education.
Scope & Constraints

This study compares two ERP systems: SAP ERP and Microsoft Dynamics (AX). This study does not look at other ERP systems such as Oracle, Great Plains, etc. A constraint on this study includes the limitations that perceptions present. For example, since students might be more comfortable with Microsoft products, a bias might be present in their perception of Microsoft Dynamics (AX) over SAP ERP. Thus, questions in the study are designed to determine the existence of certain biases to decide if their presence influences the results of student’s perceptions. For example, to determine if there might be a bias toward Microsoft products, a question in the questionnaire regarding level of comfort with Microsoft products was administered.

Importance of the Study

With over 60% of multinational corporations implementing ERP systems by 1998, the skills necessary to operate within an ERP system are becoming necessary for employees to have (O’Leary, 2004). The findings of this study can be beneficial to universities teaching ERP systems to their students, as well as to students learning ERP systems who will use their knowledge in the work environment. Thus, it is important that ERP systems are included in information systems curriculums, for students to be successful in the workplace.

Explanation of Terms/Definitions

ERP: Enterprise Resource Planning systems (ERP) are comprehensive, packaged software solutions that seek to integrate the complete range of a business’s processes and functions in order to present a holistic view of the business from a single
information and IT architecture (Klaus, Rosemann, & Gable). In other words, ERP systems integrate financial and managerial accounting, sales, procurement, production, and other business functions. ERP works like an information lubricant and facilitates the exchange of information within the enterprise by unifying key business processes (Khosrow-Pour, 2009).

**SAP:** SAP, the world leader in enterprise resource planning software, is headquartered in Walldorf, Germany, with locations in more than 130 countries (About SAP). The SAP R3 software is an integrated modular system that comprehensively encompasses all business processes encountered in all departments (accounting, supply chain, IT, etc.).

**Microsoft Dynamics (AX):** Microsoft Dynamics is another ERP system that offers an end-to-end integrated business solution composed of workload services that are designed together but can be deployed independently. Dynamics supports nearly the same business functions and process (purchasing, posting, paying) as SAP (About Microsoft Dynamics).

**Personal Experience and Input**

While collecting study data during the Summer of 2012, I worked at a company that had migrated to the Ellipse legacy system to the SAP ERP system. As an intern, I gained experience with SAP and saw how changes in systems affected business processes and company culture. Overall, the change in systems created tension among employees and between levels of management. Per my conversations with management, employee morale decreased and some employees chose to seek
opportunities elsewhere. Furthermore, problems affecting production and distribution were costing the company a significant amount of money as many vendors were receiving double payments and others who were not receiving payments on time were refusing to continue selling to the company.

I spoke to management in the supply chain department about implementation problems, and they said that the project was rolled out entirely too fast without enough end-user training. They noted additional and changed features were implemented in SAP system beyond those implemented in the last one. Also, proper business processes were not explained properly. Thus, end users tried to bypass steps in the system that were input as constraints to ensure business rules were followed. Because protocol was not followed, the system often locked up without allowing business processes to be carried out. These problems created bottlenecks in many different areas of the company. The accounting department was bogged down trying to pay old purchase orders from the old legacy system that were not transferred correctly to SAP; the supply chain department tried to sort out duplicate orders and unfulfilled orders that weren’t completed through an intermediary software system used to communicate with vendors; and the information technology department tried to fix many different bugs and problems/disparities between the regional office and the corporate headquarters, all of this was happening simultaneously.

These many problems prompted my interest in the Technology Acceptance Model, a useful model to measure employee acceptance of the new system before trying to rush into the implementation of the new system. In my opinion, employee
morale toward the system had an impact on the outcome of this implementation, which could have been significantly improved with further exposure before going live with the software and more extensive training. My personal observations are relevant because one of the ERP systems in this study is SAP.
Chapter 2: Review of Literature and Studies

There are many articles that examine the subject of ERP systems. Some articles discuss the growing need for ERP skills in the workplace, while others study the methodology for teaching these skills to students who will comprise the future workforce.

Ilinca Hotăran and Maria-Gabriela Horg (2011) argue that the movement toward ERP systems is crucial to businesses today. Markets are increasingly difficult to forecast, and it is necessary to respond faster to changes in business conditions and subsequent issues that arise. When separate departments within a single company are segmented, responding to changes requires large amounts of time and energy to ensure all parts are cooperating. Integration of business processes into an enterprise-wide system increases the efficiency and effectiveness with which an entity can conduct business. The article goes on further to promote Microsoft Dynamics as a very viable ERP solution and provides a comprehensive example of its successful implementation in a real-world business environment (Hotaran & Horg, 2011). The article stresses that learning ERP systems is absolutely essential for information systems graduates; also, it provides a concrete example of the value of Microsoft Dynamics as an enterprise-wide software solution. It demonstrates that the use of Microsoft Dynamics could extend far beyond the classroom; thus, reinforcing the argument that using it for educational purposes over the SAP system could be a viable solution for colleges and universities.

Another study discusses the positive implications of ERP integration and of using SAP as curriculum. It discusses the challenges of fast-changing technology
presented by using ERPs as teaching devices. The study further discusses what skills and benefits students receive from learning ERPs when out in the work force, such as early exposure, additional understanding from that early exposure, and an ability for faster-paced training. This article discusses the process of teaching ERP systems using SAP but does not discuss Microsoft Dynamics (AX). The information is older and of a narrowed perspective; the only software it refers to is SAP ERP without taking into consideration other ERP systems (George & George, 2002).

According to Ming Wang (of the department of information systems at the California State University in Los Angeles), information systems education is being transformed by the current movement within the business world to implement integrated enterprise-wide system software rather than segmented applications for separate business processes. The paper presents a comprehensive approach and methodology to teaching Enterprise Resource Planning (ERP) software through the use of SAP (Wang, 2011).

Although the article describes a complete course on the delivery of SAP education, it focuses primarily on the technical skills required to navigate through the system, execute tasks, and manage the software. It provides students with no understanding of why tasks are being performed. The hands-on computer laboratory manual emphasizes the step-by-step instruction needed for task completion, not on the business logic that lies behind those tasks. The SAP system is so complicated that it requires the length of the entire course just to teach the technical implementation.
Thus, teaching using this methodology has limited educational value and leaves a large gap for a simpler ERP system, such as Microsoft Dynamics, for educational purposes.

Christian Leyh (2011) discusses the importance of ERPs’ educational value in today’s classrooms. The article focuses on the lack of empirical insights on system usage in academia. Thus, the study was conducted to determine the status and system usage in courses taught in German-speaking universities. It sought to find which ERP systems are used in teaching and which teaching methods are employed in presenting those ERP systems. The results were that nearly two-thirds of universities use ERP systems practically in their courses. Of these, almost all provide practical courses for students using at least SAP ERP as an ERP system. The large shift that this study shows is the move from transactional ERP functionalities to more modular-based functionalities or even complete ERP system core.

The article provided helpful graphs as visual aids. The purpose was clear and the research well laid-out. The number of participants was significant considering the topic and its specificity. The article suggests that teaching several ERP systems in addition to working with ERP manufacturers gives students a more comprehensive understanding of ERP concepts. The final recommendation of the article states that it would also be very beneficial to transfer knowledge between universities themselves in order to provide students with the best education possible regarding ERP systems (Leyh, 2011).

The Technology Acceptance Model (TAM) is a theoretical model that attempts to explain end-user behavior and information technology usage. TAM was developed
in 1985 by Fred Davis, and states that perceived usefulness (PU) along with perceived ease of use (PEOU) are what influence a person’s intention to use a particular system. The main intent of TAM is to present a foundation for tracking the effect of external components on internal beliefs, intentions, and attitude. Please see figure 2.1 below.

The model shows actual system use being affected by several factors, starting with external variables and leading to both perceived ease of use and perceived usefulness (perceived usefulness is also believed to be affected by perceived ease of use), both of these factors lead to attitude towards the system, which leads to behavioral intention to use (also affected by perceived ease of use). (Legris, Ingham, & Collerette, 2003). Simply put, this model is a theory for explaining acceptance or rejection of technology.

The article, “Why do people use information technology? A critical review of the technology acceptance model” described the origins of TAM, how it evolved, and when it is used. The description of the origin of TAM is detailed in explaining how Fred Davis (original creator of the TAM) derived TAM from another theory. Davis added more factors to the previous theory and determined that the factors affecting user behavior are perceived ease of use and perceived usefulness. The objective of the
The article was to provide a critical analysis of the research methods by conducting a meta-analysis of empirical research done with TAM. The article discusses the evolution of TAM to different models, such as TAM2. The study used factors in TAM and included other variables such as time and other environmental factors to ensure its accuracy. The article concluded that TAM has been useful in explaining information technology user behavior and provides a good starting point, but can only be a guide. The later models can account for better predictability (Legris, Ingham, & Collerette, 2003). The article gave an overview of how TAM should be used. The study itself was completed with in-depth research and thus, provided very credible results as far as TAM and other models go.

Didem Pasaoglu (2011) uses TAM to study companies that do not use ERP systems and see whether it would be beneficial for them to try to implement ERPs based on how their employees would response to it. The results concluded that most companies in the study had not yet implemented ERP systems but that it would be beneficial for them to do so. The article was very relevant to the topic at hand; however, the author’s first language was not English, which meant that at times the meaning was hard to grasp and the writing hard to understand. Furthermore, the topic was narrowed to the usage of ERP systems in Turkey. Although the article contained information regarding factors of the TAM, the focus was limited. Furthermore, the analysis of results and conclusions was difficult to follow. The most useful part was key facts and references to other works (Pasaoglu, 2011).
TAM has been modified over time. The main reason for the modification is the methodology used for testing included self-reporting, a subjective measure that can be undependable and incorrect, furthermore, the variables in the model do not include all the variables that other models take into consideration. The next version of the Technology Acceptance Model is TAM2 and was completed in 2000 by Venkatesh and Morris. TAM2 incorporates more factors into the model and includes time, social norms, relevance, etc. TAM2 seeks to explain user behavior while including more factors than the original TAM. Please see figure 2.2 below.

Subsequent models of the Technology Acceptance Model include TAM3 and the Unified Theory of Acceptance and Use of Technology (UTAUT). UTAUT attempts to explain user behavior in a more involved form involving more factors then those in TAM, please see figure 2.3 below. Furthermore, the factors in UTAUT are
interrelated, such as gender and age both affecting performance expectancy, or experience and voluntariness of use affecting social influence. Thus, not only does UTAUT involve more factors, but more relationships among those factors as well.

Figure 2.3—UTAUT

Validation of UTAUT found it accountable for 70% of the variance in usage intention (Venkatesh, Morris, Davis, & Davis, 2003). However, this result was achieved in a longitudinal study that would involve more time and resources to use for this study. Thus, the tool used in this study is the original Technology Acceptance Model.

A review of existing literature on ERP systems reveals a few conclusions. First, the use of ERP systems in business is expanding. Therefore, it is essential that students entering the work force learn the skills necessary to operate and manage these systems. One issue that the articles are able to agree upon is that teaching these skills is difficult. Therefore, when teaching, it is important to use the system that will yield
the highest acceptance among students. Finally, the TAM provides us a guide by which to ascertain which will be the most accepted ERP system.
Chapter 3: Enterprise Resource Planning (ERP)

General Information

In 1990, the Gartner Group, an information-technology advisory firm, introduced the first concept of Enterprise Resource Planning (ERP) to market as an extension of the existing Manufacturing Resource Planning (MRP) systems. Manufacturing requires multiple departments and processes such as warehousing, production, procurement, and sales. Each of these departments has their own separate needs and functions; thus, there existed many discrete, individual software systems operating concurrently within a single manufacturer. MRP systems were presented as an alternative that integrated each individual department into a single software system. This integration allowed outputs from every step in the manufacturing process to communicate, which, in turn, allowed the manufacturer to operate much more effectively and efficiently. ERP systems built upon this idea by extending the software to include each department within an entire company. In this sense, the operations of every division, even within large corporations, were integrated into a single software system (Wylie, 1990).

With this new application that extended beyond manufacturing, ERP systems experienced rapid adoption throughout the decade. Not only did ERPs offer a much more efficient solution, but also, the corporate environment at the time was advantageous to software developers. Many large corporations were replacing older software systems due to the uncertainty related to Y2K and the adoption of the Euro
within the European Union. Thus, it was a good occasion to take advantage of the opportunity by replacing old software with ERP systems (Monk & Wagner, 2009).

It is important to also note the difficulties in adopting an ERP system. ERP systems (relative to other software implementations) are expensive and can take years to implement. Furthermore, companies who implement ERP systems force their employees to undergo extensive training; this disruption causes a negative response and a temporary impediment in company culture. Furthermore, customers’ perceptions are swayed in an unfavorable light due to mistakes in data transfer and delays in business processes as employees become accustomed to new systems.

Today, ERP systems are the accepted standard for managing business processes and data in mid-size to large companies. SAP, one of the two ERP systems used in this study, is the market leader. According to Pang, in 2010, SAP controlled 25.3% of the market, while Oracle, their largest competitor, had only a 12.3% market share. Microsoft, the other company involved in this study, had a smaller 4.5% of the ERP market, making it the fifth largest ERP provider worldwide. Microsoft Dynamics experienced more than double the rate of revenue growth of SAP from 2009 to 2010 – 10.5% to 4.6%, respectively (Pang, 2010).

To understand the differences between the ERP systems developed by SAP and Microsoft, it is important to understand ERP systems in general and common functionalities that exist amongst all companies. Enterprise resource planning (as a process) existed long before software systems were developed and occurs whether or not a formal ERP software system has been installed. At its most basic level,
enterprise resource planning takes business objectives and matches them to business processes. Every company that is currently in business must allocate their resources in order to stay in business. For smaller companies, this allocation means managing all of the small operational processes. For larger corporations, it means managing the activity of each division. This is why ERP software is beneficial. ERPs integrate all departments into a single system that streamlines communications among all activities within the company. Structurally, ERP systems are centered around a data repository. This repository acquires information and supplies that information to the individual divisions operating within an organization on a standardized computing platform. Before ERPs, functions such as marketing, accounting, information systems, human resources, finance, customer relations, manufacturing, warehouse management, and logistics were all previously stand-alone software applications that were generally housed within their own applications, databases, and networks. Today, they can all work under a single umbrella – the ERP architecture (ERP (enterprise resource planning)).

One of the departments that benefit most from ERP implementation is the accounting division. Much of the original research regarding ERP was centered on the accounting side of ERP systems. Accounting is the department connected to all others; the need for purchases to be funded and reported by the accounting department make ERPs useful because ERPs can perform many functions automatically without need for a manual transaction to occur with each reporting. Furthermore, ERPs help enforce accounting regulations, which are automatically regulated in the system rather than
required by people to monitor individual transactions. The accounting profession is itself undergoing a change due to ERPs; ERPS have taken over many tasks that accountants were previously in charge of doing, such as posting to ledgers and creating reports. The establishment of these efficiencies in the systems creates a call for the accounting profession to search further for ways to benefit companies, such as reporting on non-financial matters, implementing management internal controls with information systems, and providing management consulting. Thus, as accounting functions are becoming more and more interconnected with every other department, the need for information systems is ever-growing. (Grabski, Leech, & Schmidt, 2011).

ERP systems’ importance is growing in the educational system due to their increase in the business world. More universities have implemented some form of ERPs classes. Some ERP manufacturers even co-operate closely with these universities to ensure proper training of their systems. Another goal of teaching ERP systems is to prepare students for their careers. If they use their previously acquired ERP knowledge, they can make informed decisions that influence ERP systems. Through its University Alliance program, SAP is the leader in ERP systems in the classroom. SAP has 400 partner universities. However, research is gravitating toward the importance of using multiple ERP systems for educational purposes. The caveat is to choose the right ERP systems and the right number. Too many ERPs in the classroom can lead to confusion. A study conducted in Germany asked participants who either did not teach any ERP or who wanted to add another ERP to their curriculum which ERP they would choose. SAP ERP was the most popular choice.
with 21 out of 31 respondents saying they would implement it; the second most popular answer was Microsoft ERPs (Dynamics NAV or Dynamics AX), with 5 out of the 31 respondents saying they would like to implement it. The results of this study show that 30% of participants of both surveys are not satisfied with the ERP systems used, usually because of high maintenance costs and little tech support from the respective companies (Leyh, 2011).
Chapter 4: Comparison of Two Software Systems

SAP ERP

An article by Joseph George refers to the importance of learning ERPs in a “community” where interaction with other students represents a “nervous system” in which the students can voice ideas and help each other, regardless of which software system is used. This need for a community is due to the complexity of ERP systems (George & George, 2002). The most popular of the ERP systems taught in universities is SAP. This is in some way due to its popularity in industry; however, it is also due to the SAP University Alliance Program. The SAP University Alliance Program was created for students to graduate with a basis of SAP training. The first university to enter this alliance was Chico State University (CSU) in 1995. By 1999, 62 schools in the USA alone were a part of this alliance (Corbitt & Mensching, 2000).

SAP’s nature is modular; it can be scaled up or down depending on the need of the company. If a company does not need all of the functions of SAP to be included in their implementation of the software, they do not have to include it. This applies to educational institutions as well, which means that these institutions can select the extent of implementation and ensure consistency with the curriculum (George & George, 2002). This is important considering the complexity of learning SAP is challenging for not only students, but also for instructors to teach (Wang, 2011).

Ming Wang discusses different approaches to teaching SAP ERP: case teaching and a comprehensive approach. While case teaching achieves high order reasoning skills by use of hands-on experience, it also gives students a narrow
perspective because the students rarely experience all of the challenges associated. Thus, students can be left without an understanding of why certain tasks are performed. However, taking a more comprehensive approach can lead students to confusion and a dislike for the system. The article discusses the approach, and though it can be more challenging for students, it is the preferred approach for teaching students ERP—or more specifically, SAP—implementation (Wang, 2011).

**Microsoft Dynamics (AX)**

Microsoft Dynamics (AX) 2012 is fairly new in ERP systems; it was released in February 2011. Because it is new, Dynamics does not hold as much market share as SAP ERP. However, revenues have been on the rise for Dynamics. Dynamics is marketed by Microsoft as a simpler solution to ERP because of the familiarity with Microsoft products that many people are exposed to (About Microsoft Dynamics). Dynamics offers midsize and enterprise specialty retailers point-of-sale, store management, supply chain, merchandising, etc. The four main enhancements Microsoft wanted to offer with this version of AX include insight, loyalty, simplicity, and global availability. Companies who undertook Dynamics AX as their ERP of choice include businesses in Europe and China, such as Paul Boulangeries and China Horizon (Microsoft Brings Retailers, 2011).

The ERP software system uses a very similar interface to other Microsoft Products. Thus, the click-ability along with the ribbons is a familiar concept to Microsoft users. To some companies, this feature proved to be very important, as is seen with the adaptation of Dynamics AX by the company Lattice, a semiconductor
company that produces a wide range of products. The reasons the company was cited as adopting the system for were the improved functionality it provided, single platform architecture, and familiar business interface. The familiar interface can prove to be a big selling point for Dynamics in comparison to the SAP software system, which is less counter-intuitive for Microsoft users (Lattice Semiconductor Selects Microsoft Dynamics AX to Improve Supply-Chain Efficiency, 2010). How does this affect education of ERP systems?

According to Ilinca Hotaran and Maria-Gabriela Horga, the need for education in ERP systems is not optional but rather crucial. ERP systems are here to stay, and are especially helpful in large companies. Its integrative technology allows for a large increase in efficiencies, and in this communication era, it is inevitable. Furthermore, the case study conducted in this article explains integration of Microsoft Dynamics. The system worked well for the company in the case study, its functions are described as: “Microsoft Dynamics includes management, production, distribution, relationship management, services, e-commerce and analysis applications, which can be adapted according to requirements of each company.” The implementation of an ERP system, Microsoft Dynamics, in this case led to solutions to many problems, including coordination difficulties between different departments. The company had to customize the software to its specific needs, but ultimately was satisfied with the implementation of Dynamics (Hotaran & Horg, 2011).
Chapter 5: Research

Methodology

Using the basic concepts of the generally accepted Technology Acceptance Model (TAM), which states that, perceived usefulness and perceived ease of use directly influence user behavior, questionnaires were developed to conduct this study. These questionnaires asked questions regarding students’ perception of the software and their preference for that software in terms of familiarity and ease of use. Questions also included students’ perceptions on user interface, and level of comfort with Microsoft products to test whether that comfort had a correlation with a higher preference for the Dynamics software. Please see Appendix 1B for the Microsoft Dynamics questionnaire and Appendix 2B for the SAP ERP questionnaire. There were also a series of demographic questions on the questionnaires regarding students’ previous exposure to ERP systems, whether it was with SAP ERP, Microsoft Dynamics (AX), or any other ERP software.

To conduct the study, two different groups were tested at the University of Nevada, Reno. These were two different sections of the Management Information Systems course from the summer semester 2012. Due to time constraints, the study was altered to accommodate the arrival of the Microsoft Dynamics servers that allow students to access the software on campus. Since students in this class had only been exposed to a maximum of two other information systems classes, the chance of having any previous knowledge of either ERP system was diminished. This considerably eliminates any bias towards either software because of less exposure to either ERP
system. However, this also poses the problem that students know less about ERP systems in general, which means that students did not always have the capacity to complete the lab exercise.

The following is a chronological breakdown of how the study was completed:

- Questionnaires were developed with the thesis question in mind of whether one system would result in a higher acceptance level.
- The SAP ERP lab exercises were attained as part of the University Alliance program of which the University of Nevada, Reno is a part of. This particular lab incorporated eight accounting tasks to be completed by the participants.
- The Microsoft Dynamics lab exercises were created to mirror the tasks of the SAP ERP lab; thus, the lab included eight accounting tasks.
- During the summer of 2012, the two sections of the Management Information Systems classes (the only difference between the two sections was time of class) were asked by their instructor and mentor for this study, Michael Ekedahl, to participate by picking up a lab packet from Professor Ekedahl’s office with the instructions attached to access either the Microsoft Dynamics (please see appendix 1A) or SAP (please see appendix 2A) software systems. Packets were handed out in an alternating pattern (one Microsoft Dynamics, then one SAP, etc.). Also attached was the questionnaire for the respective lab exercises (please see appendix 1B and 2B), which participants were asked to complete immediately after the lab exercises. Participants used the College of Business Administration computer labs and were allotted a two-hour period for
completion, then returned the completed packets and questionnaires to Professor Ekedahl’s office.

In order to statistically determine the significance of the data collected, the student’s t-test was used. The student t-test is an approach to testing the hypothesis regarding the means (averages) of two relatively small sample sizes that are normally distributed and have unknown standard deviation. This test is usually performed by stating a null hypothesis that there is no significant difference between the two means tested. Stating this null hypothesis says that the results are explained purely by chance. P-values (p stands for probability of the results being reached by chance) are the critical benchmark values to compare t-stat values to. If the t-statistic results more extreme than the critical value, which is usually a p-value of .05, this means there is fair statistical significance, and the null hypothesis is rejected; otherwise, the tester fails to reject the null hypothesis, which means there is a significant probability that the null is true, and consequently that there is no statistical difference between the two sets of data tested (Student's t-test, 2012). Thus, when we search for t-stats in this study, we are testing to see if there is a significant difference between the two data sets tested. For a detailed explanation of the results of the questions, please see Chapter 6.
Chapter 6: Results

Results

Question 1 – Respondents Major Area of Study

SAP

- Three Information Systems Majors (9.68%)
- Four Accounting Majors (12.90%)
- Four Multiple Majors (12.90%)
- 13 Other Business Majors (41.94%)
- Seven Non-Business Majors (22.58%)

Microsoft Dynamics

- Five Information Systems Majors (12.20%)
- Seven Accounting Majors (17.70%)
- Seven Multiple Majors (17.70%)
- 18 Other Business Majors (43.90%)
- Five Non-Business Majors (9.76%)

Question 2 – College classes involving the use of ERP before the current class

SAP

- Zero had prior classroom experience with ERP (0.00%)
- 31 did not have prior classroom experience with ERP (100.00%)

Microsoft Dynamics

- Four had prior classroom experience with ERP (9.76%)
- 31 did not have prior classroom experience with ERP (90.24%)

T-Test Result

- At an alpha of 0.05, result was 0.044

Question 3 – Prior experience involving the use of ERP outside the classroom

SAP

- One had prior experience with ERP outside the classroom (3.23%)
• 30 did not have prior experience with ERP outside the classroom (96.77%)

Microsoft Dynamics

• Six had prior experience with ERP outside the classroom (9.76%)
• 31 did not have prior experience with ERP outside the classroom (90.24%)

t-Test Result

• At an alpha of 0.05, result was 0.082

Question 4 – Comfort level with computer software in General

SAP

• Zero rated their comfort level at one – really uncomfortable (0.00%)
• Four rated their comfort level at two – uncomfortable (12.90%)
• 21 rated their comfort level at three – somewhat comfortable (67.74%)
• Five rated their comfort level at four – comfortable (16.13%)
• One rated their comfort level at five – really comfortable (3.23%)
• Mean Comfort Level rated at 3.10

Microsoft Dynamics

• Three rated their comfort level at one – really uncomfortable (7.32%)
• Five rated their comfort level at two – uncomfortable (12.20%)
• 14 rated their comfort level at three – somewhat comfortable (34.15%)
• 12 rated their comfort level at four – comfortable (29.27%)
• Seven rated their comfort level at five – really comfortable (17.07%)
• Mean Comfort Level rated at 3.37

Question 5 – Experience level with Microsoft Products

SAP

• Zero rated their experience level at one – completely unfamiliar (0.00%)
• One rated their experience level at two – fairly unfamiliar (3.23%)
• Six rated their experience level at three – somewhat familiar (19.35%)
• 19 rated their experience level at four – fairly familiar (61.29%)
• Five rated their experience level at five – extremely familiar (16.13%)
• Mean Experience Level rated at 3.90

Microsoft Dynamics

• Zero rated their experience level at one – completely unfamiliar (0.00%)
Two rated their experience level at two – fairly unfamiliar (4.88%)
Eight rated their experience level at three – somewhat familiar (19.51%)
21 rated their experience level at four – fairly familiar (51.22%)
10 rated their experience level at five – extremely unfamiliar (24.39%)
Mean Experience Level rated at 3.95

**t-Test Result**

- At an alpha of 0.05, result was 0.788

**Question 6 – Difficulty level of learning ERP using each respective system**

**Using SAP**

- One rated the difficulty level at one – Not Difficult at All (3.23%)
- 10 rated the difficulty level at two – Not Very Difficult (32.26%)
- 12 rated the difficulty level at three – Neutral (38.71%)
- Eight rated the difficulty level at four – Somewhat Difficult (25.81%)
- Zero rated the difficulty level at five – Difficult (0.00%)
- Mean Difficulty Level rated at 2.87

**Using Microsoft Dynamics**

- Two rated the difficulty level at one – Not Difficult at All (4.88%)
- 10 rated the difficulty level at two – Not Very Difficult (24.39%)
- 13 rated the difficulty level at three – Neutral (31.71%)
- 11 rated the difficulty level at four – Somewhat Difficult (26.83%)
- Five rated the difficulty level at five – Difficult (12.20%)
- Mean Difficulty Level rated at 3.17

**t-Test Result**

- At an alpha of 0.05, result was 0.1940

**Question 7 – How easy to learn ERP using each respective system**

**Using SAP**

- Zero rated the level of ease at one – Not Easy at All (0.00%)
- Five rated the level of ease at two – Not Very Easy (16.13%)
- 12 rated the level of ease at three – Neutral (38.71%)
- 12 rated the level of ease at four – Easy Enough (38.71%)
- Two rated the level of ease at five – Very Easy (6.45%)
- Mean Level of Ease rated at 3.35
Using Microsoft Dynamics

- Three rated the level of ease at one – Not Easy at All (7.32%)
- 11 rated the level of ease at two – Not Very Easy (26.83%)
- 14 rated the level of ease at three – Neutral (34.15%)
- 13 rated the level of ease at four – Easy Enough (31.71%)
- Zero rated the level of ease at five – Very Easy (0.00%)
- Mean Level of Ease rated at 2.90

**t-Test Result**

- At an alpha of 0.05, result was 0.048

**Question 8 – Likelihood to recommend an ERP class that uses each respective system**

**Uses SAP**

- One rated the likeliness at one – Not at All (3.23%)
- Seven rated the likeliness at two – Somewhat (22.58%)
- Nine rated the likeliness at three – Neutral (29.03%)
- 12 rated the likeliness at four – Likely (38.71%)
- Two rated the likeliness at five – Very Likely (6.45%)
- Mean Likelihood to Recommend rated at 3.23

**Uses Microsoft Dynamics**

- Three rated the likeliness at one – Not at All (7.32%)
- Six rated the likeliness at two – Somewhat (14.63%)
- 13 rated the likeliness at three – Neutral (31.71%)
- 15 rated the likeliness at four – Likely (36.59%)
- Three rated the likeliness at five – Very Likely (7.32%)
- Mean Likelihood to Recommend rated at 3.15

**t-Test Result**

- At an alpha of 0.05, result was 0.966

**Question 9 – Likelihood to choose another ERP system over the respective system used**

**Used SAP**
Zero rated the likeliness at one – Not at All (0.00%)
Six rated the likeliness at two – Somewhat (19.35%)
19 rated the likeliness at three – Neutral (61.29%)
Six rated the likeliness at four – Likely (19.35%)
Zero rated the likeliness at five – Very Likely (0.00%)
Mean Likeliness to Recommend rated at 3.00

Used Microsoft Dynamics

One rated the likeliness at one – Not at All (2.44%)
Six rated the likeliness at two – Somewhat (14.36%)
25 rated the likeliness at three – Neutral (60.98%)
Seven rated the likeliness at four – Likely (17.07%)
Two rated the likeliness at five – Very Likely (4.88%)
Mean Likeliness to Recommend rated at 3.07

At an alpha of 0.05, result was 0.663

**Question 10 – Level of preparedness to use ERP professionally**

Used SAP

Six rated their preparedness at one – Not at All (19.35%)
11 rated their preparedness at two – Somewhat (35.48%)
Seven rated their preparedness at three – Neutral (22.58%)
Five rated their preparedness at four – Well (16.13%)
One rated their preparedness at five – Very Well (3.23%)
Mean Level of Preparedness rated at 2.39

Used Microsoft Dynamics

Five rated their preparedness at one – Not at All (12.20%)
13 rated their preparedness at two – Somewhat (31.71%)
11 rated their preparedness at three – Neutral (26.83%)
12 rated their preparedness at four – Well (29.27%)
Zero rated their preparedness at five – Very Well (0.00%)
Mean Level of Preparedness rated at 2.73

At an alpha of 0.05, result was 0.279

**Question 11 – Rate the forms in each of the respective ERP system**

Used SAP
- Zero rated the forms at one (0.00%)
- Four rated the forms at two (12.90%)
- 11 rated the forms at three (35.48%)
- 11 rated the forms at four (35.48%)
- Three rated the forms at five (9.68%)
- Mean Forms Rating was 3.23

Used Microsoft Dynamics

- Two rated the forms at one (4.88%)
- Seven rated the forms at two (17.07%)
- 11 rated the forms at three (26.83%)
- 17 rated the forms at four (41.46%)
- Three rated the forms at five (7.32%)
- Mean Forms Rating was 3.22

**t-Test Result**

- At an alpha of 0.05, result was 0.518

**Question 12 – Rate the fields in each of the respective ERP system**

Used SAP

- Zero rated the fields at one (0.00%)
- Two rated the fields at two (6.45%)
- 15 rated the fields at three (48.39%)
- Eight rated the fields at four (25.81%)
- Four rated the fields at five (12.90%)
- Mean Fields Rating was 3.26

Used Microsoft Dynamics

- Two rated the fields at one (4.88%)
- Three rated the fields at two (7.32%)
- 11 rated the fields at three (26.83%)
- 18 rated the fields at four (43.90%)
- Six rated the fields at five (14.63%)
- Mean Fields Rating was 3.49

**t-Test Result**

- At an alpha of 0.05, result was 0.679

**Question 13 – Rate the menu in each of the respective ERP system**

Used SAP
- Zero rated the menu at one (0.00%)
- Three rated the menu at two (9.68%)
- Seven rated the menu at three (22.58%)
- 13 rated the menu at four (41.94%)
- Six rated the menu at five (19.35%)
- Mean Menu Rating was 3.52

Used Microsoft Dynamics

- Zero rated the menu at one (0.00%)
- Five rated the menu at two (12.20%)
- Eight rated the menu at three (19.51%)
- 20 rated the menu at four (48.78%)
- Seven rated the menu at five (17.07%)
- Mean Menu Rating was 3.63

**t-Test Result**

- At an alpha of 0.05, result was 0.880

**Question 14 – Rate the user interface in each of the respective ERP system**

**Used SAP**

- Two rated the user interface at one (6.45%)
- Five rated the user interface at two (16.13%)
- Five rated the user interface at three (16.13%)
- 12 rated the user interface at four (38.71%)
- Five rated the user interface at five (16.13%)
- Mean User Interface Rating was 3.23

**Used Microsoft Dynamics**

- One rated the user interface at one (2.44%)
- Seven rated the user interface at two (17.07%)
- 16 rated the user interface at three (39.02%)
- 13 rated the user interface at four (31.71%)
- Three rated the user interface at five (7.32%)
- Mean User Interface Rating was 3.17

**t-Test Result**

- At an alpha of 0.05, result was 0.456
Question 15 – Rate the overall satisfaction for each of the respective ERP system

Used SAP

- One rated the overall satisfaction at one (3.23%)
- Two rated the overall satisfaction at two (6.45%)
- 10 rated the overall satisfaction at three (32.26%)
- 13 rated the overall satisfaction at four (41.94%)
- Three rated the overall satisfaction at five (9.68%)
- Mean Overall Satisfaction Rating was 3.29

Used Microsoft Dynamics

- One rated the overall satisfaction at one (2.44%)
- Two rated the overall satisfaction at two (4.88%)
- 20 rated the overall satisfaction at three (48.78%)
- 17 rated the overall satisfaction at four (41.46%)
- Zero rated the overall satisfaction at five (0.00%)
- Mean Overall Satisfaction Rating was 3.24

\textbf{t-Test Result}

- At an alpha of 0.05, result was 0.419

Question 16 – Time needed to complete the laboratory exercise

Used SAP

- Three needed less than 30 minutes – Response 1 (9.68%)
- Nine needed 30 to 45 minutes – Response 2 (29.03%)
- 16 needed 46 to 60 minutes – Response 3 (51.61%)
- Three needed 60 to 75 minutes – Response 4 (9.68%)
- Zero needed more than 75 minutes – Response 5 (0.00%)
- Mean Time was between 30 and 60 minutes. (Mean Response 2.61)

Used Microsoft Dynamics

- Three needed less than 30 minutes – Response 1 (7.32%)
- 19 needed 30 to 45 minutes – Response 2 (46.34%)
- 12 needed 46 to 60 minutes – Response 3 (29.27%)
- Five needed 60 to 75 minutes – Response 4 (12.20%)
- Two needed more than 75 minutes – Response 5 (4.88%)
- Mean Time was between 30 and 60 minutes. (Mean Response 2.61)

\textbf{t-Test Result}
• At an alpha of 0.05, result was 0.988

**Question 17 – Required number of steps to complete a specific given task (Post a purchase to the general ledger)**

Used SAP

• Two remembered using less than three steps – Response 1 (6.45%)
• Eight remembered using three steps – Response 2 (25.81%)
• 12 remembered using four steps – Response 3 (38.71%)
• Three remembered using five steps – Response 4 (9.68%)
• Six remembered using more than five steps – Response 5 (19.35%)
• Mean Steps Taken was between 4 and 5. (Mean Response 3.10)

Used Microsoft Dynamics

• One remembered using less than three steps – Response 1 (9.68%)
• Two remembered using three steps – Response 2 (9.68%)
• Eight remembered using four steps – Response 3 (9.68%)
• 10 remembered using five steps – Response 4 (9.68%)
• 11 remembered using more than five steps – Response 5 (9.68%)
• Mean Steps Taken was between 4 and 5. (Mean Response 3.02)

**Question 18 – Redundant number of steps to complete given task**

Used SAP

• Two remembered less than three redundant steps – Response 1 (6.45%)
• Eight remembered three redundant steps – Response 2 (25.81%)
• Eight remembered four redundant steps – Response 3 (25.81%)
• Seven remembered five redundant steps – Response 4 (22.58%)
• Six remembered more than five redundant steps – Response 5 (19.35%)
• Mean Redundant Steps was between 4 and 5. (Mean Response 3.23)

Used Microsoft Dynamics

• Two remembered less than three redundant steps – Response 1 (4.88%)
• 19 remembered three redundant steps – Response 2 (46.34%)
• 13 remembered four redundant steps – Response 3 (31.71%)
• Three remembered five redundant steps – Response 4 (7.32%)
• Four remembered more than five redundant steps – Response 5 (9.76%)
• Mean Redundant Steps was between 3 and 4. (Mean Response 2.71)

**t-Test Result**

• At an alpha of 0.05, result was 0.311
**Question 19 – Perception of time taken to complete lab**

Used SAP

- Two remembered a very short amount of time – Resp. 1 (6.45%)
- Four remembered a short amount of time – Resp. 2 (12.90%)
- 16 remembered a regular amount of time – Resp. 3 (51.61%)
- Nine remembered a long amount of time – Resp. 4 (29.03%)
- Zero remembered a very long amount of time – Resp. 5 (0.00%)
- Mean Amount of Time was between regular and long. (Mean Resp. 3.03)

Used Microsoft Dynamics

- Zero remembered a very short amount of time – Resp. 1 (6.45%)
- Eight remembered a short amount of time – Resp. 2 (25.81%)
- 19 remembered a regular amount of time – Resp. 3 (25.81%)
- 13 remembered a long amount of time – Resp. 4 (22.58%)
- One remembered a very long amount of time – Resp. 5 (19.35%)
- Mean Amount of Time was between regular and long. (Mean Resp. 3.23)

**t-Test Result**

- At an alpha of 0.05, result was 0.475

**Question 20 – Recalling specific tasks – Display chart of accounts**

Used SAP

- 22 were able to roughly recall how to complete this task (70.97%)
- 9 were unable to roughly recall how to complete this task (29.03%)

Used Microsoft Dynamics

- 37 were able to roughly recall how to complete this task (90.24%)
- 4 were unable to roughly recall how to complete this task (9.76%)

**Question 21 – Recalling specific tasks – Display the general ledger**

Used SAP

- 21 were able to roughly recall how to complete this task (67.74%)
- 10 were unable to roughly recall how to complete this task (32.26%)

Used Microsoft Dynamics
34 were able to roughly recall how to complete this task (82.93%)
7 were unable to roughly recall how to complete this task (17.07%)

**Question 22 – Recalling specific tasks – Post purchases and other transactions**

Used SAP

- 18 were able to roughly recall how to complete this task (58.06%)
- 13 were unable to roughly recall how to complete this task (41.94%)

Used Microsoft Dynamics

- 30 were able to roughly recall how to complete this task (73.17%)
- 11 were unable to roughly recall how to complete this task (26.83%)

**Question 23 – Recalling specific tasks – Transfer funds to an alternate bank account**

Used SAP

- 17 were able to roughly recall how to complete this task (54.84%)
- 14 were unable to roughly recall how to complete this task (45.16%)

Used Microsoft Dynamics

- 30 were able to roughly recall how to complete this task (73.17%)
- 11 were unable to roughly recall how to complete this task (26.83%)
Chapter 7: Analysis and Conclusions

Analysis

Participants who performed the laboratory exercise for Microsoft Dynamics answered with a higher percentage that they had experience with ERP systems and software in general than did those who performed the exercise for SAP (figure 7.1 below).

![Prior Classroom Experience with ERP Systems](image)

Figure 7.1

Since the results of the t-stats were .044, and .08, respectively, we reject the null hypothesis that there is no difference between the two data sets for question two, this means there is less of a probability that the results were due to chance. Thus, students who performed the Microsoft Dynamics lab were more experienced with ERP systems a significant amount because of previous class experience with ERP systems.
However, there is no statistical difference between the two data sets for question three, and thus, no difference between SAP and Microsoft Dynamics for prior experience with ERP systems outside of the classroom. The t-stat for question three was considerably higher than the critical value, whereas the t-stat for question two was barely under the threshold. The results of the t-stats indicate that while the students who performed the Microsoft Dynamics lab were slightly more familiar with ERPs, the significance of that is minimal to their responses on the questionnaire.

As for comfort levels with software in general (represented by question five), respondents from both groups responded closest with the “Somewhat Comfortable” on the question regarding use of computer software (3.10 out of 5 for the SAP group versus 3.37 for the Microsoft Dynamics group, see Figure 7.2 below).
The result for the t-stat for this question was .21, which is significantly higher than the critical value of .05; thus, the probability of the null being true are very high, and we conclude that there is no difference between the two datasets. When asked about experience with products specifically developed by Microsoft, participants from both groups put down a higher level of familiarity than with other software in general. However, both groups were again consistent, stating that they are “fairly familiar” with such software (3.90 out of 5 for the SAP group versus 3.95 for the Microsoft Dynamics group, see figure Figure 7.2 on page 38).

The t-stats for this question yielded a score of .80, which is higher than the critical value of .05, which means again, there is no significant difference between the two means. Thus, the two groups who performed the SAP and the Microsoft Dynamics exercises were starting with a near equal level of experience with computer software and Microsoft products.

Participants rated multiple aspects of the system they used. The questionnaire had a total of 23 questions. The first question established whether the participants’ area of study was Information Systems, Accounting, or some other major. The next four, having to do with prior experience with ERP systems and software in general, was summarized in the previous paragraph. Questions six through 19 had the respondent answer in the form of a rating on a scale from one to five. For questions seven, eight, and 10-15, a score of one would signify an unfavorable response while a score of five would be the most favorable. For questions six, nine, and 16-19, a score of one would be most favorable and a score of five would be least favorable. This
design was introduced in an effort to propose duplicate questions in different forms to verify responses. Questions 20 through 23 required that the user recall steps required to perform specific tasks within the system used for the exercise they had just completed. Results as to whether they could successfully recall these steps were recorded as another facet illustrating the usefulness of each system for teaching purposes. These questions were coded as either pass or fail; that is, whether participants answered the question correctly or not.

Question one, concerning participants’ areas of study showed that the SAP group was comprised of three Information Systems majors (9.68%), four accounting majors (12.90%), four multiple majors (12.90%), 13 other business majors (41.94%), and seven non-business majors (22.58%). For each of those who listed multiple majors, at least one of the majors listed was in the college of business (please see Figure 7.3 below). The Microsoft Dynamics group was comprised of five Information Systems majors, seven accounting majors, seven multiple majors, 18 other business majors, and five non-business majors. Again, all respondents claiming multiple majors listed at least one business related field. Please see Figure 7.4 on page 41.

![Majors Chart](Figure 7.3)
Questions six through 19 all aimed to gauge the usefulness of each system in teaching ERP software. However, as stated above, there were some that were rated on a scale from one to five with five being the most favorable and some where the opposite was true. For example, question six asked the participant to rate the difficulty level of learning ERP using the indicated system while question seven inquires as to the ease of learning ERP using that system. Question seven is really the same as question six, just reversed. The purpose of including duplicate questions is to test the reliability and repeatability of users’ responses. One would expect, for example, that the responses for question seven would mirror those of question six, and, as expected, this was the case. The average responses from the SAP group for questions six and seven were 2.87 and 3.35. For the Microsoft Dynamics group, the average responses for these questions were 3.17 and 2.90. The respective t-stat scores for questions six and seven were .19 and .05, rounded respectively. Again, both of these were significant enough to fail to reject the hypothesis, thus, the difference between the two is not large enough to account for chance.
To look beyond methodology, the responses to questions six through 19 (excluding 17) illustrated that the hypothesis that SAP would be more useful in teaching ERP was incorrect. The participants’ answers regarding the perceived usefulness of the two differing systems all yielded t-stats that were not significant. Ratings given for each of the two systems by participants of the study were nearly identical for each of the two separate systems (see Figures 7.5 below and 7.6 on page 43).

**Figure 7.5**
Furthermore, the t-stat score for questions six through 19 (excluding 17) all ranged from .05 to .99. All of these t-stats do not satisfy the critical condition of less than .05; therefore, there is no statistically significant difference between the two systems. This would indicate that from the perspective of the student, either of the two systems could be used in a teaching environment and the results would be the same.

However, that result is based upon user perception. Questions 17 and 20 through 23 required that the participant recall from memory the steps involved to complete specified tasks within each of the systems. The success or failure of respondents to recall this information would give a more objective perspective as to whether the student had actually learned from performing the exercises using the given system. For question 17, 49% of the Microsoft Dynamics questionnaires were answered correctly, whereas only 39% of the SAP ones were answered correctly.
The results of these questions reinforced our previous finding that SAP was not more useful for the purpose of teaching SAP. In fact, questions 20 through 23 indicate that Microsoft Dynamics is slightly more useful in that regard. For SAP, 70.97% or respondents were able to recall the steps required to display a chart of accounts. This results is in contrast to the 90.24% of Microsoft Dynamics respondents who were able to do the same. Similarly, for questions 21, 22, and 23, 67.74%, 58.06% and 54.84% of the SAP group was able to recall the steps necessary to complete the given tasks while 82.93%, 73.17%, and 73.17% of the Microsoft Dynamics group was able to complete the same tasks (See figure 7.7 below).

Figure 7.7

Figure 7.7 above graphically shows how participants who completed the Microsoft Dynamics questionnaire were consistently better able to recall how to
perform the recall questions, which were coded as successful or unsuccessful at answering the question.

The final analysis of these results incorporates fitting the Technology Acceptance Model into this study. Because it is perceived that there was no difference found between perceived ease of use and usefulness for both Microsoft Dynamics and SAP ERP, the results are inconclusive to one being more accepted than the other. Thus, both systems (based on previously mentioned results and t-stats) were equally accepted among participants.

**Conclusion**

Based on the results and findings sections, the following conclusions can be made. For educational purposes of ERP systems, both systems resulted in fairly the same results; thus, this study rejects the hypothesis that SAP ERP is a better learning tool for ERP systems over Microsoft Dynamics (AX). Furthermore, Microsoft Dynamics participants recalled steps at a better rate. However, because perceived usefulness and perceived ease of use resulted in insignificant differences based on the results of the t-tests, then the Technology Acceptance Model would infer that either system would be acceptable. Thus, either one could be used for teaching ERP systems and result as effective as the other in acceptance terms. The choice of which ERP system to teach is thus a choice that universities must choose based on availability of the software to them and the resources they have.
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APPENDIX A

Appendix 1A—Microsoft Dynamics Lab
MICROSOFT DYNAMICS-LAB EXERCISE

Note: to sign into the Remote Desktop, you must be at the COBA labs.

To begin, press Start Menu, search for Remote Desktop (you may use the search field), and click on it to run the program. The following screen will appear:

Enter AX2012-A.rd.unr.edu for the computer host. Then click Connect.

In the next screen, use the following information to login:

Login: CONTOSO\administrator

Password: pass@word1
Click OK to connect.

In the next screen, press OK to allow entrance to the remote desktop.
DISPLAY GENERAL LEDGER

Exercise: Display the general ledger transactions

Task: Use the navigation pane and Area page to view the chart of accounts.

When you first sign in-this is the screen (or some similar version) of what you will see:

To view the general ledger, in the navigation pane, click general ledger. Then, under the periodic section in the main section of the window, click on journals to expand the menu, and then click periodic journals. This will bring up a separate window:
Subsequently, press “journal lines” next to the file menu, this should display the lines of the general journal-most current transactions:
**CHART OF ACCOUNTS**

**Exercise:** View the chart of accounts.

**Task:** Use the navigation pane and Area page to view the chart of accounts.

To view the chart of accounts, choose the general ledger tab in the navigation pane, then under the setup section, press chart of accounts to expand the folder, then click chart of accounts. The following shows the different accounts, split up by the categories on the left hand navigation pane.

![Chart of Accounts Interface](image)

Double clicking on any account details the account information:
**CHART OF ACCOUNTS II**

**Exercise:** View the chart of accounts using the Navigation Pane and the Main Screen.

**Task:** View the main accounts in the chart of accounts and their details.

Under general ledger, expand the common section, and double click main accounts. This displays all accounts and details pertaining to that account.
ACCOUNTS PAYABLE

Exercise: Navigate the Accounts Payable by completing a couple tasks.

Task: Create a purchase order, confirm it, and then create an invoice for that purchase order to create a new journal entry for that accounts payable.

Start by double clicking the Accounts Payable section in the Navigation Pane. In the main screen, under the Common section, expand the Purchase orders section. Select All purchase orders. See screen below.

Next, on the action pane click Purchase order which will bring up a separate window. In this new window, click on the down arrow for the vendor account, and select 1202, Fabrikam Electronics. A message box will appear asking to auto-fill the rest of the fields, click yes. The screen should then look as follows:
From this window, click the **General** heading to expand that field. Then click on the currency field, this will bring up a window. Double click the **USD** to choose US Dollars. Then click **OK** to accept. See next image for details.

In this next window, click on the drop down menu of the highlighted field of **Item Number** and select **#9: Custom High End Speaker**, and then scroll to the right and change the quantity to **20.00**.
Click on the **Purchase** tab at the top along the File menu:

Click **Confirm** on the action pane:

Then, on click the **Receive** tab and click **Product Receipt** on the action pane:
Make sure that under Parameters, the Quantity field says **Ordered Quantity**. Under the Product Receipt field, enter “**PR###**”-keeping in mind that ### stands for the number generated for the purchase order, i.e., if the purchase order number is 00419, product receipt should then be “PR419.” Then click **OK**.

Next, click on the **Invoice** tab, and select **Invoice** from the action pane, it will produce the following screen, where you should first double check the default quantity for lines, above the “Fabrikam Electronics” in green. The value should be **Product receipt quantity**
If the value is not already that, changing it will produce the following error message:

Select Yes.

Then, input in the number field “INV###” where ### is the number representing the purchase order. Then, double check that the unit price shows up in the line item display. If not, enter 100.00.
Click the financials tab, and select **Maintain Charges** from the action pane. That will produce the following screen:

![Maintain Charges Screen](image)

Click on the drop down of the charges code in the left navigation pane. Choose **01-Freight**, and then input **150.00** in the charges value. **Close** the window.

Click on the review tab, and choose **Matching Details**.

![Matching Details Screen](image)

After reviewing the information, close the window. Under the **Vendor Invoice** tab, select **Post**. A window will appear saying to select settings, press **Post**. This completes the invoice posting process.
POSTING A TRANSFER OF FUNDS BETWEEN BANK ACCOUNTS

Exercise: Transfer funds to another bank account.

Task: Use the Navigation Pane and General Journal to create a journal entry to transfer funds between two different bank accounts.

Click General Ledger in the navigation pane, then under Journals, select General Journal. Click New from the action pane and in the highlighted field of the Name, click the drop down menu and select General Journal (GenJrl). Then click the check mark before the name field and click Lines in the action pane. See screen below:
In the next screen that appears, click the **General** tab and edit the following fields, see screen below:

**Under Account selection:**
- leave Company Accounts as CEU
- Account Type is Bank
- Description is correction

**Under offset account**
- leave Offset Company Accounts as CEU
- Offset Account type is Bank
- Offset account is USAPAYROLL
- Offset-transaction text is correction

**Under Amount:**
- Debit is 5000.00
- leave currency as USD
Click **Validate** at the top (action pane) and select **Validate**. You should receive the following message:

Click Close.

Under **Post**, click **Post and Transfer**:

You should then see the following message:

Close out the message box—your transfer has been posted.
**POST PURCHASE OF OFFICE SUPPLIES**

**Exercise:** Post a purchase of office supplies.

**Task:** Use the Navigation Pane to generate a journal entry to purchase office supplies.

Under the **General Ledger** tab in the Navigation Pane, select **General Journal** under the Journals section. Click **New**, and with the new record generated, check the box before the Name field. Then click **Lines**.

Input the following information for the **General** tab, compare with the screen below:

Under Account selection:
- leave Company Accounts as **CEU**
- Account Type is **Ledger**
- Description can be left blank

Under offset account
- leave Offset Company Accounts as **CEU**
- Offset Account type is **Bank**
- Offset account is USA OPER
- Offset-transaction text can be left blank

Under Amount:

- Debit is 175.00
- Leave currency as USD

Click **Validate** at the top of the page. The following screen will appear:
-Click Close.

Under the Post tab, click Post and transfer.

The following screen will appear:

Click Close.
You have successfully posted the purchase of supplies and completed this Microsoft Dynamics (AX). PLEASE MAKE SURE TO LOG OFF the remote server upon completion. Then, answer the attached questionnaire and return the packet.

Thank you for your time and cooperation.
Appendix 2A—SAP ERP Lab

SAP ERP Lab

Note: to sign into the Remote Desktop, you must be at the COBA labs.

To begin, click the SAP Logon desktop icon. A screen similar to the one below will appear, click Log On:

The following screen will appear: fill the fields with the following information and compare to the screen below:

Client: 245
User: GBI-083
Password: IS301PASS (case sensitive)

Hit the Enter key or the check button.
Welcome to the SAP Easy Access Menu:

To complete the tasks that follow in this packet, please follow the instructions given. Then, complete the attached questionnaire and return the packet.

Thank you for your time and cooperation.
**Exercise** Display a chart of accounts.

**Task** Use the SAP Easy Access Menu to review a listing of the General Ledger (G/L) accounts that are part of your chart of accounts. For each G/L account, the chart of accounts contains the account number, the account name, and additional technical information.

A chart of accounts may be shared by many company codes. Each company code must be assigned a chart of accounts. Once a chart of accounts is assigned to a company code, it becomes the operative chart of accounts for that company code and it is used to capture information for both Financial Accounting (FI) and Controlling Accounting (CO).

Other possible charts of accounts may be required to capture additional information to support international business accounting purposes including:

- Country-specific charts of accounts - This is structured in accordance with legal requirements of a specific country.
- Group chart of accounts - This is structured in accordance with requirements pertaining to consolidated financial statements.

In order to display a chart of accounts, follow the SAP Easy Access menu path:

**Accounting ► Financial Accounting ► General Ledger ► Information System ► General Ledger Reports (New) ► Master Data ► Chart of Accounts**
Next to many fields, there appears a lookup box with which you select data. The following figure shows the lookup box for the Chart of accounts field:

In the chart of accounts field, click the lookup box to display the chart of accounts available in the SAP system. Note that there are charts of accounts for various countries. These COAs correspond to their respective accounting systems. Global Bike has its own custom chart of accounts. In the following dialog, select the chart of accounts for Global Bike.
In the Chart of accounts field, use the F4 key to find and select the global GBI chart of accounts (GL00) and enter 1 for Charts of accts not assigned.

Then, click on ☀ (Execute).

The chart of accounts appears as follows:
From the above list, double-click the account **100000 Bank Account**. You will see the following screen that describes the details of the Bank Account as follows:

Note that the account belongs to a required account group. The account group is used to classify
the GL account into balance sheet and P/L accounts. It is also used to determine the numeric interval for the account numbers.

Click on the exit icon until you return to the SAP Easy Access Screen.

**FI 2: Display Chart of Accounts II**

**Exercise** Use the SAP Easy Access Menu to display a chart of accounts.

**Task** Review a listing of the General Ledger (G/L) accounts that are part of your chart of accounts and that has been made operative for your company code.

Each G/L account being used by a company code has both chart of account and company code specific information. In this way, a chart of accounts may be used by several company codes with each having their own unique information and settings.

To do this, follow the menu path:

**Accounting ► Financial Accounting ► General Ledger ► Information System ► General Ledger Reports (New) ► Master data ► G/L Account List**

Enter GL00 for Chart of accounts. Again this is the chart of accounts for Global Bike
Then click on (Execute).

The chart of accounts appears. Note that there are three cash accounts. One for the German division company, one for the US company, and a grouping account.

Note that accounts belong to an account group. The account group LA is short for Liquid asset.

Return to the SAP Easy Access Screen.
**Task** Use the SAP Easy Access Menu to display a General Ledger account in your chart of accounts (alternative bank account). Businesses commonly maintain several bank accounts (e.g. payroll, general checking and money market) that are listed on their balance sheet.

To do this, follow the menu path:

**Accounting ➤ Financial Accounting ➤ General Ledger ➤ Master Records ➤ G/L Accounts ➤ Individual processing ➤ Centrally**

In the G/L Account field, use the F4 key to open the search window (make sure to select the G/L account description in chart of accounts tab). Enter **Alternate** for G/L long text and write **GL00** in the Chart of Accounts field.
Then, press Enter or click on ✔. On the result screen, double-click on the Alternate Bank Account row to select G/L account 101000.

After the account number (101000) is populated into the G/L Account field, find and select Company Code US00. Then, press on the (Display) button to display the G/L account data.

The account is displayed in the Display G/L Account Centrally screen as follows:
• Note that the account belongs to the group “Liquid Assets”
• The account is a balance sheet account.
• Click on the **Control** Data tab. Note that the account’s currency is US Dollars.
• Repeat the same procedure for the same G/L account, but for the German GBI Company Code (**DE00**).
Exercise Transfer funds to Alternate Bank Account.

Task Use the SAP Easy Access Menu to generate a journal entry for the US GBI company to transfer funds from your current bank account to your alternate bank account.

To do this, follow the menu path:

**Accounting ► Financial Accounting ► General Ledger ► Posting ► Enter G/L Account Document**

If Company Code **US00** is not displayed use the Menu Entry **Edit ► Change company code (F7)** to select your US GBI company (US00).

In the Document Date field, use F4 and Enter to select today’s date from the calendar and choose USD as Currency.

For the Reference field, enter your three-digit user number (##) and as Doc. Header Text **Transfer of Funds**. Your screen should look like the following:
In the next set of steps, you will enter the debit and credit amounts for the two bank accounts involved in the transaction.

- On the first line, enter 101000 (Alternate Bank Account) as G/L acct, choose Debit as D/C and enter 5000 as Amount in doc.curr.
- On the second line, enter 100000 (Bank Account) as G/L acct, choose Credit as D/C and enter 5000 as Amount in doc.curr.

Then click on (Enter).

When you click Enter, note that the account information is completed. The amounts are equal so the transaction is OK.

Changed one of the amounts from $5,000.00 to $4,000.00 and press the Enter key again. Note that the transaction amounts are out of balance and the following error indicator appears.
Change the values back to their original values and press the Enter key again. The error should be correct.

Click the [Simulate] button to see if the postings are correct. The following dialog box should appear:

![Amount Information]

- **Total deb.**: 5,000.00 USD
- **Total cred.**: 4,000.00 USD

Note that the document type is SA, This is the code for a G/L Account document.

Click on [Back] once and accept any warning messages by clicking Enter.

Then, click on [Post]. The system will create a unique G/L account document number. Your document number will differ.

*Make sure that you do not click the park button*

Click on the exit icon [Exit] and acknowledge the warning message by choosing [YES] – there will be no data lost. This brings you back to the SAP Easy Access menu.
**Exercise** Post a purchase of office supplies.

**Task** Use the SAP Easy Access Menu to generate a journal entry for your alternate bank account to purchase office supplies.

The business scenario is that you need some office supplies immediately. You drive down to Office Supply Depot and buy $175 of supplies (paper, folders, and a software package) and pay for the purchase with a company check drawn on your alternate bank account.

To do this, follow the menu path:

**Accounting ► Financial Accounting ► General Ledger ► Posting ► Enter G/L Account Document**

In the Document Date field, use F4 and Enter to select today’s date from the calendar and choose USD as Currency. In the Reference field, enter your three-digit user number (###) and as Doc. Header Text Purchase of Supplies. If Company Code US00 is not displayed, use the Menu Entry Edit ► Change company code (F7) to select the US GBI company.

On the first line, in the G/L acct field use F4 help to find the account number for Supplies Expenses. To do so, select the G/L account description in chart of accounts tab enter Supplies* in the G/L long text. Then, press Enter.
Then, double-click on the result row to select G/L account number 740000.

For this posting, you will apply the transaction to a cost center. A cost center is an organizational unit to which costs are allocated. Cost centers were discussed in the previous lab.

Back on the first line, choose **Debit** as D/C and enter 80 as Amount in doc.curr. Then, scroll to the right until you see the Cost center column and enter NAIS1000 (Internal Services). *Note that you looked up this cost center in the preceding lab.*

On the second line, enter 740000 as G/L acct again, choose **Debit** as D/C and enter 95 as Amount in doc.curr. Then, scroll right until you see the Cost center column again and enter NAIT1000 (IT costs).

*Here, you have applied purchase to the same G/L expense account. However, the purchase has been applied to two different cost centers for CO purposes.*

On the third line, enter 101000 (Alternate Bank Account) as G/L acct, choose **Credit** as D/C and 175 as Amount in doc.curr. Then, click on (Enter).
Click the **Simulate** button to see if the postings are correct.

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</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>740000</td>
<td>Supplies Expense</td>
<td>Deb.</td>
<td>90.00</td>
<td>AAA</td>
<td>A100</td>
<td>NAIT1000</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>740000</td>
<td>Supplies Expense</td>
<td>Deb.</td>
<td>95.00</td>
<td>AAA</td>
<td>B100</td>
<td>NAIT1000</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>101800</td>
<td>Alt Bank</td>
<td>W Crec.</td>
<td>175.00</td>
<td>AAA</td>
<td>AAA</td>
<td>NAIT1000</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Then, click on (Post) and record the document number. *Again, use care not to park the document but to actually post it.*

*Again, note that that you have created another G/L document. This is the unique identifier assigned to the transaction that you just posted.*

Return to the SAP Easy Access menu.
Exercise Use the SAP Easy Access Menu to display G/L account balances.

Task Use the SAP Easy Access Menu to display and confirm by individual account number the activity and associated balances for several accounts in the general ledger of the US GBI company.

To do this, follow the menu path:

**Accounting ► Financial Accounting ► General Ledger ► Account ► Display Balances (New)**

Enter **101000** as Account Number, **US00** as Company Code and the **current year** as Fiscal Year.

Then, click on (Execute). The system should display a table similar to the one shown below.
Double-click on the debit amount of the current month. The system displays all documents that make up the total amount. Find your document number in the list.

**Note:** The screen shot below displays one document as the author has posted debits in one G/L account document only.

In your case, there might be multiple versions of the same posting. Remember that similar to a real company you are posting to the same G/L accounts together with your fellow students.

Return to the SAP Easy Access Screen.
APPENDIX B

Appendix 1B—Microsoft Dynamics Questionnaire

**MICROSOFT DYNAMICS (AX) QUESTIONNAIRE**

1. What is your major(s)?

<table>
<thead>
<tr>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
</tr>
</thead>
<tbody>
<tr>
<td>Information Systems (IS)</td>
<td>Accounting</td>
<td>Multiple Majors</td>
<td>Other Business</td>
<td>Non-Business</td>
</tr>
<tr>
<td>(Please list below)</td>
<td></td>
<td></td>
<td></td>
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</tr>
</tbody>
</table>

Multiple Majors: ____________________________

2. Are there any classes other than IS 301 you have taken that deal with ERP systems? If so, which?

<table>
<thead>
<tr>
<th>1</th>
<th>2</th>
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</thead>
<tbody>
<tr>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>(Please list below)</td>
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</tr>
</tbody>
</table>

Classes: ____________________________

3. Have you ever dealt with ERP systems before outside of this class? If so, which one(s)? Where? What kind of experience have you had with them?

<table>
<thead>
<tr>
<th>1</th>
<th>2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>(Please explain below)</td>
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</tr>
</tbody>
</table>

Prior Experience: ____________________________

4. How would you describe your level of comfort with computer software in general?

<table>
<thead>
<tr>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
</tr>
</thead>
<tbody>
<tr>
<td>Really Uncomfortable</td>
<td>Uncomfortable</td>
<td>Somewhat Comfortable</td>
<td>Comfortable</td>
<td>Really Comfortable</td>
</tr>
</tbody>
</table>

5. Rate your experience with Microsoft products.

<table>
<thead>
<tr>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
</tr>
</thead>
<tbody>
<tr>
<td>Completely Unfamiliar</td>
<td>Fairly Unfamiliar</td>
<td>Somewhat Familiar</td>
<td>Fairly Familiar</td>
<td>Extremely Familiar</td>
</tr>
</tbody>
</table>

6. Rate the difficulty level of learning ERP systems using Microsoft Dynamics (AX).

<table>
<thead>
<tr>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
</tr>
</thead>
<tbody>
<tr>
<td>Not Difficult At All</td>
<td>Not Very Difficult</td>
<td>Neutral</td>
<td>Somewhat Difficult</td>
<td>Difficult</td>
</tr>
</tbody>
</table>

7. Rate how easy it is to learn ERP systems using Microsoft Dynamics (AX).

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<tr>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
</tr>
</thead>
<tbody>
<tr>
<td>Not Easy At All</td>
<td>Not Very Easy</td>
<td>Neutral</td>
<td>Easy Enough</td>
<td>Very Easy</td>
</tr>
</tbody>
</table>
8. How likely would you be to recommend an ERP class that uses the Microsoft Dynamics (AX) system to a friend?

1 2 3 4 5
Not at all Somewhat Neutral Likely Very Likely

9. If another option were available, how likely would you be to take that option over Microsoft Dynamics (AX)?

1 2 3 4 5
Not at all Somewhat Neutral Likely Very Likely

10. How prepared do you feel to enter a professional environment using ERP systems after having learned them using the Microsoft Dynamics (AX) system?

1 2 3 4 5
Not at all Somewhat Neutral Well Very Well

Rate the following aspects of SAP ERP:

<table>
<thead>
<tr>
<th></th>
<th>Rate 1</th>
<th>Rate 2</th>
<th>Rate 3</th>
<th>Rate 4</th>
<th>Rate 5</th>
</tr>
</thead>
<tbody>
<tr>
<td>11.</td>
<td>Forms:</td>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>12.</td>
<td>Fields:</td>
<td></td>
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<tr>
<td>13.</td>
<td>Menu:</td>
<td></td>
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<tr>
<td>14.</td>
<td>User Interface:</td>
<td></td>
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<tr>
<td>15.</td>
<td>Overall Satisfaction</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

16. How much time did it take you to complete all tasks?

1 2 3 4 5
Under 30 30 - 45 Minutes 46 - 60 Minutes 61 - 75 Minutes Over 75 Minutes

17. How many steps do you remember taking in order to post a purchase to the General Ledger?

1 2 3 4 5
Less than Three Three Four Five More than Five

18. While completing this lab, how many times do you remember having to complete similar steps for different tasks (redundant steps)?

1 2 3 4 5
Less than Three Three Four Five More than Five
19. Do you think it took a short, regular, or long amount time to complete the given tasks in this lab?

<table>
<thead>
<tr>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
</tr>
</thead>
<tbody>
<tr>
<td>Very Short</td>
<td>Short</td>
<td>Regular</td>
<td>Long</td>
<td>Very Long</td>
</tr>
</tbody>
</table>

20. Do you remember how to display the chart of accounts? Roughly outline the steps and what is displayed:

________________________________________________________________________
________________________________________________________________________
________________________________________________________________________
________________________________________________________________________

21. Do you remember how to display the general ledger? What is displayed on the general ledger?

________________________________________________________________________
________________________________________________________________________
________________________________________________________________________
________________________________________________________________________

22. Do you remember how to post purchases and other transactions? Roughly outline the steps:

________________________________________________________________________
________________________________________________________________________
________________________________________________________________________
________________________________________________________________________

23. Do you remember how to transfer funds to an alternate bank account? Roughly outline the steps:

________________________________________________________________________
________________________________________________________________________
________________________________________________________________________
________________________________________________________________________

Appendix 2B—SAP ERP Questionnaire

SAP QUESTIONNAIRE

1. What is your major(s)?

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Multiple Majors:__________________________________________

2. Are there any classes other than IS 301 you have taken that deal with ERP systems? If so, which?

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(Please list below)

Classes:__________________________________________

3. Have you ever dealt with ERP systems before outside of this class? Is so, which one(s)? Where? What kind of experience have you had with them?

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<tbody>
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<td>Yes</td>
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(Please explain below)

Prior Experience:__________________________________________

4. How would you describe your level of comfort with computer software in general?

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5. Rate your experience with Microsoft products.

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6. Rate the difficulty level of learning ERP systems using SAP ERP.

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7. Rate how easy it is to learn ERP systems using SAP ERP.

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<td>Neutral</td>
<td>Easy Enough</td>
<td>Very Easy</td>
</tr>
</tbody>
</table>

8. How likely would you be to recommend an ERP class that uses the SAP ERP system to a friend?
9. If another option were available, how likely would you be to take that option over SAP ERP?

1 2 3 4 5
Not at all  Somewhat  Neutral  Likely  Very Likely

10. How prepared do you feel to enter a professional environment using ERP systems after having learned them using the SAP ERP system?

1 2 3 4 5
Not at all  Somewhat  Neutral  Well  Very Well

Rate the following aspects of SAP ERP:

<table>
<thead>
<tr>
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16. How much time did it take you to complete all tasks?

1 2 3 4 5
Under 30 Minutes  30 - 45 Minutes  46 - 60 Minutes  61 - 75 Minutes  Over 75 Minutes

17. How many steps do you remember taking in order to post a purchase to the General Ledger?

1 2 3 4 5
Less than Three  Three  Four  Five  More than Five

18. While completing this lab, how many times do you remember having to complete similar steps for different tasks (redundant steps)?

1 2 3 4 5
Less than Three  Three  Four  Five  More than Five
19. Do you think it took a short, regular, or long amount of time to complete the given tasks in this lab?

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</thead>
<tbody>
<tr>
<td>Very Short</td>
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20. Do you remember how to display the chart of accounts? Roughly outline the steps and what is displayed:

________________________________________________________________________

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________________________________________________________________________

21. Do you remember how to display the general ledger? What is displayed on the general ledger?

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22. Do you remember how to post purchases and other transactions? Roughly outline the steps:

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23. Do you remember how to transfer funds to an alternate bank account? Roughly outline the steps:

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