



ERP Training and User Satisfaction: A Case Study

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ABSTRACT

Training is still a neglected part of most ERP implementation projects. This case study investigates the relation between training satisfaction and

- *the perceptions of ease of use,*
- *the perception of usefulness,*
- *effectiveness and*
- *efficiency*

in implementing an ERP system at a mid-sized organization. Training satisfaction is viewed as a necessary condition for technology acceptance. A survey of 143 employees involved in the implementation of ERP in a mid-sized university was conducted. ANOVA and t-tests were used to explore differences in training satisfaction among groups of users by gender, job type, and education level. We found that training satisfaction differed based on job type and gender but not education level. Multiple regression analysis found (1) post implementation training satisfaction related to ease of use and (2) current training satisfaction and user participation related to perceived efficiency and effectiveness of the ERP systems in doing respondents' jobs.

Keywords: ERP; ease of use; technology acceptance model; training; use

INTRODUCTION

Enterprise resource planning (ERP) systems are complex off-the-shelf IT solutions that promise to meet the information needs of an organization. ERP systems are frequently used to replace aging and difficult-to-maintain legacy systems. Despite ERP's promise, these systems are difficult and expensive to implement. Many failed implementation projects have been widely cited in the business and academic press.

In today's constantly changing business world, many organizations are implementing

ERP systems. Large sums are still being spent on ERP installations. A Forrester survey found that ERP and enterprise applications in general remain "the top IT spending priority for 2005" (Hamerman & Wang, 2006). A survey of Society for Information Management members conducted in the summer of 2005 concluded that ERP is among the top six application concerns of its members (Luftman, Kempaiah & Nash, 2006).

ERP systems allow separate business process to be put together into one compact software

system using what the vendors consider “best practices.” The integration of different information systems using off-the-shelf ERP solutions is predicted to reap benefits that will outweigh the costs involved with the implementation; however, practice has shown that ERP implementation is not an easy task. Davenport (1998) identified unsuccessful implementation efforts at Fox-Meyer Drug, Mobile Europe, Dell, and Applied Materials. Stedman (1999) found that after spending \$112 million on an ERP project, Hershey Foods was unable to fill Halloween candy orders in 1999, resulting in a 19% drop in quarterly profits. Wah (2000) observes that “ERP projects have snarled internal processes in big companies like Whirlpool, Hershey’s, Waste Management, Inc., and W.L. Gore & Associates.”

The case we report in this article deals with a university. Universities face many of the same problems as for-profit organizations in installing ERP such as coordinating resources, controlling costs, and “stimulating and facilitating enterprise among the staff (Pollock & Cornford, 2004).” In face of cut-backs in funding, many universities turned to ERP systems to improve efficiency and to become more responsive to student needs. Higher education institutions are not exempt from implementation difficulties. Universities often suffer lost revenue, wasted time, cost overruns, and delays during ERP systems implementations. For example, the state of Ohio sued PeopleSoft for \$510 million for fraud and breach of contract (Songini, 2004). The University of Massachusetts—Amherst experienced a “nightmare” at registration (Bray, 2004) and Indiana University experienced difficulties in financial aid payments (Songini, 2004b).

We know from the technology acceptance model (Davis, 1989) that successful implementation requires user acceptance. Since ERP systems are potentially a disruptive technology change, organizations undertake training as a way to gain technology acceptance. Only a small number of existing studies examined the effectiveness of training and education in ERP system implementation at higher-education institutions.

This lack of exploration of an important factor in successful ERP implementations is what led us to this study. The purpose of this article is to explore the relationship of training and education to ERP project success. We use:

- user perceptions of ease of use,
- user perceptions of usefulness,
- efficiency and
- effectiveness

as predictors of use, an important element of ERP project success.

The data collected is from a medium-sized public university in the northwestern region of the United States. The university experienced delays and unexpected costs during ERP system implementation. We use multiple regression analysis to determine the effect of training satisfaction on use and usefulness. We use ANOVA on survey data to look for differences in perception of training satisfaction by gender, job type, education level, department, and longevity in current position.

RESEARCH PROBLEM

This research examines the relation between the users’ perceptions of whether training is adequate before implementation and after implementation in terms of the users’ perception of ease of use and usefulness in doing their job after the implementation. We sought to find out (1) How does training impact the technology acceptance model? (2) Do different groups perceive training adequacy differently? (3) What factors are related to the perceived ease of use, effectiveness, and efficiency of the ERP system?

LITERATURE REVIEW AND HYPOTHESES

IS Success. User acceptance and use are key factors in the success of any new technology in information systems. An example of this can be found in the DeLone-McLean IS success model. Measuring the success in information systems is difficult. DeLone and McLean (1992;

2003) reviewed 180 articles published between 1981 and 1987 and developed a taxonomy and model based on six dimensions of IS success—systems quality, information quality, use, user satisfaction, individual impact, and organizational impact. The constructs of the model which interests us in this article are use and user satisfaction. Use is important in this model since “the amount of use can affect the degree of user satisfaction—positively or negatively—as well as the reverse being true (DeLone, 1992).” The DeLone-McLean model has prove very popular among IS researchers. In the period 1993 through mid-2002 “285 refereed papers in journals and proceedings” referenced the model. DeLone and McLean (2003) cite two studies, Seddon (1997), Kiew, and Rai, Lang, and Welker (2002), which empirically tested and validated the model. Many others have implicitly tested the model.

Another success model presented by Seddon (1997) respecifies and extends the DeLone-McLean model. In the area of IS use, Seddon argues that IS success results in IS use. IS use “must precede impacts and benefits, but it does not cause them” (Rai, Lang & Welker, 2002). Perceived usefulness and user satisfaction are both important constructs in the Seddon model.

Technology Acceptance Model

Davis, Bagozzi, and Warshaw (1989) develop the Technology Acceptance Model (TAM) based on the Theory of Reasoned Action. The

TAM uses two variables, perceived usefulness and perceived ease of use, as determinants of use. The perceived usefulness is based on the observation that “people tend to use or not use the application to the extent they believe it will help them perform their job better” (Davis, 1989). Even if an application is perceived as useful, it will only be used if it is perceived as easy to use, that is, benefits of usage outweigh the effort of using the system. These two determinants result in the user’s attitude toward using the software system, which in turn leads to the user’s behavioral intention to use. The result is use of the system, a construct in the DeLone-McLean success model.

Lee, Kozar, and Larsen (2003) summarize research studies of the TAM, including studies of 21 external variables affecting the model. Neither training nor training satisfaction are not included among these variables.

Our study examines the impact of training on the TAM model. We also examine impact of personal characteristics on perceived ERP training satisfaction and perceived usefulness of the ERP systems. The proposed model is shown in Figure 2.

Training and ERP

Buchner (1999) argues that whatever your choice of software, ERP should allow you to integrate your existing business applications and data libraries to make migration for users easy, avoid downtime due to training, and reduce the costs associated with migrating data. Schaaf

Figure 1. DeLone-McLean success model (Source: DeLone & McLean, 1992)

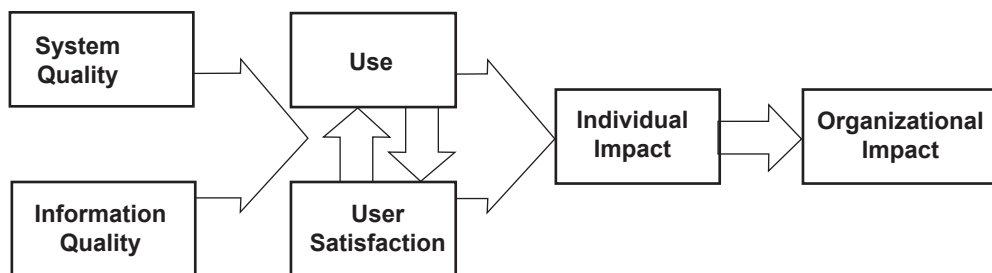
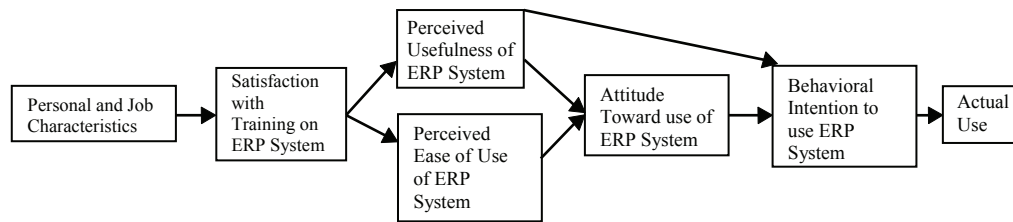


Figure 2. Proposed model



(1999) found that ERP systems create important implications for training. PeopleSoft (now a division of Oracle) launched a satellite-based system for delivering live training to hundreds or even thousands of workers at companies that buy its ERP applications (Spacenet, 2006; Stedman, 1999), emphasizing the importance of training.

Training plays a major role in ERP implementation and use, because ERP generally requires massive reengineering of the organization. Lassila and Brancheau (1999) investigated the implementation of new software packages and found that the initial user experience was important. This study also found that firms tend to cut training cost in adopting commercial packages, resulting in “negative user attitudes and a low-integration equilibrium” (Lassila & Brancheau). Lassila and Brancheau also found that training should involve “both the packaged systems features and related work processes.” Wheatly (2000) found that ERP training is frequently compressed if implementation projects are running out of time and money. Wheatly also found that ERP users would prefer allowing more time for training and obtain training around their own business processes.

Ferrando (2001) argues that when organizations change their business processes by the adoption of new technology, they must prepare their employees with comprehensive training. Employees reported that training classes helped them feel more comfortable using the system and helped reduce mistakes.

Brown (2001) expresses that budgeting for an ERP system should also include training and implementation time, not just the cost of purchasing the software and hardware. A Gartner Group study concluded that 25% of the ERP budget should be allocated to training users (Coetzer, 2000). Because ERP systems take a considerable time and money to implement, they can disrupt a company’s culture, create excessive training requirements, and even lead to productivity dips and mishandled customers orders (Stein, 1999). Grossman and Walsh (2004) refer to training as a “stepchild of most software implementations... which cannot be overlooked or underemphasized.” Training contributes to reducing operational and cultural issues encountered during an implementation project (Grossman and Walsh, 2004). Duplaga and Astani (2003) found in interviews conducted at 30 manufacturing firms of varying size that the implementation problem rated the highest is “lack of ERP training and education for affected employees.”

Training and TAM

Amoako-Gyampah and Salam (2004) studied the impact of a “belief construct” (described as “shared beliefs in the benefits of a technology”) and training and communication on perceived usefulness and perceived ease of use during an ERP implementation in a large global organization using SAP R/3. They found that training influenced both shared beliefs and perceived ease of use demonstrating the importance of

training in technology acceptance. Therefore we propose:

H₀1: Training satisfaction is not related to perceived usefulness of an ERP system.

H₀2: Training satisfaction is not related to perceived ease of use.

Personal and Job Characteristics

Okpara (2004) found that the personal characteristics of gender, age, education, income, and experience predict job satisfaction among Nigerian IT managers. We are interested in determining if such characteristics influence training satisfaction. The personal characteristics used in our study include gender and education level. Job characteristics include job type and longevity in the position.

Gender Differences. Venkatesh and Morris (2000) found gender differences in the individual adoption and sustained usage of technology in the workplace. Trauth (2004) identifies three theories to explain the under-representation of women in the IT profession. Trauth states that “the essentialist perspective dichotomizes gender based upon the presumption of significant inherent differences between men and women. The social construction perspective focuses on the social construction of IT as a male domain.” Trauth advances a third theory based on “individual differences among women as they relate to the needs and characteristics of IT work and the IT workplace.”

Harrison, Rainer, and Hochwarter (1997) examined gender differences in computer related activities in a large university setting. They found that

men had significantly more computer experience, less computer anxiety, and significantly higher computer self-efficacy than women. Men reported more successful computer-related outcomes than women in all organizational occupations except clerical. (Smith, 2005)

These findings are consistent with the social construction of computer-related differences. On the other hand, Busch (1995) found “no

gender differences in perceived self-efficacy regarding the completion of word processing and spreadsheet programs.”

Ray, Sormunen, and Harris (1999) found women (1) had “a more positive attitude toward the value of computers to productivity,” (2) “were more positive about the impact of computers on people and their work environment,” and (3) “displayed a greater level of comfort with technology than men” (Smith, 2005).

Pijpers and van Montfort (2006) investigated senior executives’ acceptance of technology using the TAM and found that gender has no effect on perceived usefulness or perceived ease of use, but also found that gender affects positively actual usage frequency.

Men and women may learn differently and have different perceptions of the adequacy of ERP training provided. The differences in the literature led us to question the role of gender in perceived training satisfaction. In this study we use the following null hypotheses about gender differences:

H₀3: The quality of training prior to implementation is perceived equally by both genders.

H₀4: The quality of training following implementation is perceived equally by both genders.

H₀5: The quality of training in understanding features, functions, and abilities of ERP is perceived equally by both genders.

H₀6: The need for more training after implementation is perceived equally by both genders.

Attitudes and Perceptions. Peppard and Ward (2005) observe that four factors influence individual attitudes and perception of enterprise systems: (1) implementation-roles and responsibilities, (2) information asymmetry, (3) professional background, and (4) personal interests. We use job classification and educational level as proxies for these differing perceptions of the effectiveness of training.

Amoako-Gyampah (2004), in a single case study, found significant differences existed

between the perceptions of user-managers (managers in this study) and end-users (clerical and technical support in this study.) Amoako-Gyampah states that “end users felt less confident about their ability to use the system after going through the program than user-managers did.” Amoako-Gyampah believes the different perceptions between user-managers and end-users are “the allegiance that end-users have toward the legacy systems that ERP systems are meant to replace.” Because of the detailed familiarity of these end-users with the legacy systems, it may take more effort to convince them of the superiority of the ERP system. User-managers are closer to the decision-making process and may have more “buy-in” to the new technology.

The foregoing findings in the literature led to the following hypotheses on attitudes and perceptions:

H₀7: Clerical, technical, and managerial personnel perceive equally the quality of training prior to implementation.

H₀8. Clerical, technical, and managerial personnel perceive equally the current quality of training¹.

H₀9: Clerical, technical, and managerial personnel perceive equally the quality of training in understanding features, functions, and abilities of ERP.

H₀10: Clerical, technical, and managerial personnel perceive equally the need for more training after implementation.

Education level. The educational level of the employee may affect their perception of the adequacy of training. Okpara (2004) found education to be a factor in job satisfaction. Bilgic (1998) found that there were fewer complaints about job related issue among employees with higher education level. We wanted to see if education level was a factor in training satisfaction. Pijpers and van Montfort (2006) found education level influenced both perceived usefulness and perceived ease of use among senior executives. Therefore, we propose the following hypotheses.

H₀11: Employees of all educational levels perceive equally the quality of training prior to implementation.

H₀12: Employees of all educational levels perceive equally the quality of current training.

H₀13: Employees of all educational levels perceive equally the quality of training in understanding features, functions, and abilities of ERP.

H₀14: Employees of all educational levels perceive equally the need for more training after implementation.

Proposed Model

Based on the above examination of literature, we propose an extension of the technology acceptance model for ERP projects incorporating satisfaction with training as a factor in perceived usefulness of ERP systems and perceived ease of use of ERP systems. Additionally, we propose that personal and job characteristics influence training satisfaction. Our proposed model is shown in Figure 2.

Importance of Topic. Organizations implementing ERP systems face considerable challenges based on the cost and complexity of implementing ERP systems. The knowledge that training favorably impacts intention to use the system and user attitude toward using the system may convince management to allocate more resources to training to enhance the probability of ERP implementation success.

THE ERP IMPLEMENTATION PROJECT

The university studied implemented PeopleSoft for all its information needs. The first modules implemented involve human resource management. This project began in 2000. Two HR executives were sent to PeopleSoft training and then trained the staff that would be using the system. The second phase of the implementation targeted the university's accounting requirements. Training on this phase was conducted in a similar manner with the university's Information Technology Services

conducting the training. Data was collected for this study in this time period. The university subsequently implemented the PeopleSoft academic records modules.

METHODS

Questionnaire

The instrument used in our survey is shown in Appendix I. The PeopleSoft Implementation Survey asks 26 questions.

- The first six questions are demographic. They asked the respondents job type, gender, department, education level, years in current position, and level of involvement in ERP.
- Questions 7 through 23 are seven-point Likert scale questions about aspects of the ERP implementation. Respondents were asked to indicate their agreement (on a 1 = strongly disagree to 7 = strongly agree scale) with statements about the PeopleSoft implementation project.
- Questions 24-26 are open-ended questions soliciting the respondents' views about what was done well and what could have been done better in the implementation.

We were interested specifically in the following questions because they relate to our hypotheses:

1. Questions 11, 12, 14, and 20 relate to perceived training satisfaction.
2. Question 15 represents perceived ease of use. A similar question is used by Davis (1989) to develop a valid measurement scale for predicting user acceptance.
3. Questions 21 and 22 relate to the perceived usefulness of the ERP system. Similar questions were used by Davis (1989) to develop a valid measurement scale for predicting user acceptance although Davis used the phrases "increased productivity" and "accomplish more work" rather than efficiency.

Table 1 lists the questions that were used in this study and the means and standard deviations of responses to non-demographic questions.

To test the relationship between user perceptions of ease of use and user perception of usefulness, we performed multiple regressions for each of the dependent variables—ease of use, efficiency and effectiveness—with the independent variables to examine the relationship among these variables.

Hypothesis testing was used to determine whether there are statistically significant differences in the perspectives of ERP systems implementation among members of different genders, job types, and levels of education. If statistical significance is found on any hypothesis, it leads to a conclusion that its independent variables significantly impacted the perspectives of the ERP systems implementation and, hence, training should be different for that group. Our data was taken from the PeopleSoft Implementation Survey (shown in Appendix I), which was administered by coauthor Lee. Questionnaires were completed by 143 respondents, 30 of whom indicated they were not involved in the implementation, leaving 113 usable questionnaires.

We performed t-tests or one-way ANOVA tests on each five independent with the four dependent variables used to measure training satisfaction, which are shown in Table 2. The reliability of the four variables used to measure training satisfaction was examined resulting in a Cronbach's alpha of 0.838, which exceeds the customary lower limit of 0.70 of reliability.

Statistical Results

Our first tests examine the relationship of training satisfaction to one variable representing perceived ease of use and two variables representing perceived usefulness—efficiency and effectiveness. In addition to the training success variables, we included in the regression analysis other variables collected in our survey, including personal and job characteristics.

Regression Analysis. To test H_01 , perceived usefulness, we included as variables the job and personal characteristics and other variables we

Table 1. Questions used in this study

Q1	Which of the following categories best describes your primary occupation? Technical Support Staff, Clerical, Middle Manager, Top Management, Other		
Q2	What is your gender? Female, Male		
Q4	Please indicate the highest level of education completed. High School, Vocational/Technical School, Some College, College Graduate, Master's Degree, Doctoral Degree, Professional Certification, Other		
Q5	How many years have you held your current position?		
Q6	What is your level of involvement in PeopleSoft implementation? Not Exposed, Planning, Training, Testing, or Using the System at Work.		
All scores below based on a scale range from 1=strongly disagree to 7=strongly agree, don't know or not applicable		Mean	S.D.
Q7	Do you feel you were a full participant in the design and building of the PeopleSoft system?	4.38	3.22
Q10	There are enough people in your workplace who are technically knowledgeable of computer programming.	3.84	2.64
Q11	Your level of training for the use of PeopleSoft was appropriate prior to the implementation.	2.84	2.03
Q12	Currently, your level of training for the use of PeopleSoft is appropriate.	3.24	2.08
Q14	You have gained a complete understanding of the features, functions, and abilities of PeopleSoft.	2.79	1.95
Q15	PeopleSoft is easy to use.	3.33	2.19
Q20	More training of PeopleSoft would help the implementation process.	6.42	.91
Q21	PeopleSoft has helped or will help you perform your job more effectively (achieve desired results).	4.12	2.19
Q22	PeopleSoft has helped or will help you perform your job more efficiently (faster).	3.98	2.14

Table 2. Dependent and independent variables: training satisfaction

<u>Dependent Variables-Training Satisfaction</u>		<u>Independent Variables-Personal Characteristics</u>
Q11. Training prior to implementation	Cronbach's Alpha =.838	Q1. Job Type
Q12. Current level of training		Q2. Gender
Q14. Understanding of features, and so forth		Q3. Department
Q20. Need for more training		Q4. Education Level
		Q5. Longevity at current position

had collected in our survey to determine if these variables related directly to usefulness without the training satisfaction variable. Standard multiple regression was conducted to determine the accuracy of the independent variables (training prior to implementation, current level of training, need for more training, technically knowledgeable people in workplace, participation in design and building of system, years in current position, education background, and gender) predicting the two variables related to perceived usefulness, efficiency and effectiveness. For efficiency, regression results indicate that the overall model significantly predicts efficiency in performing the respondent's job. The model accounts for 54% of the variance in efficiency. Only two (current level of training satisfaction and user participation in design and building of system) of the eight variables significantly contributed to the model. For effectiveness, standard regression results indicate that the overall model significantly predicts effectiveness in doing the respondents' respective jobs with PeopleSoft. The model accounts for 50.8% of the variance in efficiency. Only two (current level of training satisfaction and user participation in design and building of system) of the eight variables significantly contributed to the model. For usefulness, regression results indicate the overall model significantly predicts the usefulness of PeopleSoft. We had not anticipated in our model that participation

in the design and building of the system would directly influence usefulness.

To test H_{02} , ease of use, standard multiple regression was conducted to determine the accuracy of the independent variables (training prior to implementation, current level of training, need for more training, technically knowledgeable people in workplace, participation in design and building of system, years at work, education background, and gender) predicting ease of use. The model accounts for 78.1% of the variance in ease of use. Only one (current level of training satisfaction) of the eight variables significantly contributed to the model. For ease of use, regression results indicate that the overall model significantly predicts the perceived ease of use of PeopleSoft.

Table 3 presents the model summary statistics for these regression analyses.

We now examine the influence of personal and job characteristic on training satisfaction by comparing the mean of each characteristic with the appropriate demographic variables.

Gender. Questions 11, 12, 14, and 20 in the survey are used to test hypotheses H_{03} through H_{06} concerning gender. The data were analyzed by gender with the results shown in Table 4. The findings are based on t-tests:

- A significant difference was found for satisfaction with the level of training² prior to implementation (Hypothesis H_{03}). Male

Table 3. Results of regression for ease of use, efficiency, and effectiveness

Dependent Variable(s)	Perceived Ease of Use	Perceived Usefulness	
		Efficiency	Effectiveness
	Current training	Current training, user participation	Current training, user participation
R ²	.784	.550	.518
R ² _{adj}	.781	.540	.508
F	F(1,93)=336.743	(F1,90)=8.212	F(1,90)=9.486
P	<.001	<.005	<.005
% variance accounted for	78.4%	55.0%	51.8%

response mean was 3.77, while female response mean was 2.66). Female respondents were less satisfied with training than male respondents.

- Female respondents were significantly less satisfied with the current level of training (Hypothesis H₀4). Male response mean was 4.17, while female response mean was 3.07.
- No significant gender differences were found for understanding features, functions, and abilities of the software (Hypothesis H₀5).
- Female respondents significantly wished for more training (Hypothesis H₀6). Male response mean was 5.94, while female response mean was 6.50.

Job Type

Table 5 shows the results for job type. Questions 11, 12, 14, and 20 were used in an ANOVA analysis. The data were disaggregated into technical support, clerical, and management. Significant differences were found among the

three groups for training prior to implementation (Q11), current level of training (Q12), and understanding of features (Q14). Respondents classified as management exhibited a much more favorable view of the level of training than technical support personnel or clerical personnel. This finding is consistent with the case study described by Amoako-Gyampah (2004) where user-managers were consistently more satisfied for critical issues in ERP implementation.

Other Independent Variables

Education Level

Education levels ranged from high school through post-graduate university degrees in our sample. No statistically significant differences were found training level prior to or after implementation ("current"), the understanding of features, and so forth, or the need for more training based on education level. Hypotheses H₀11 through H₀14 are sustained.

Table 4. Results for gender differences

Gender	Male			Female					
	n	mean	S.D	n	mean	S.D.	t	df	Prob.
Q11. Training prior to implementation	17	3.77	2.05	87	2.66	1.99	-2.09	102	.039*
Q12. Current level of training	18	4.17	1.82	97	3.07	2.09	-2.08	113	.040*
Q14. Understanding of features, and so forth	18	3.00	1.68	96	2.75	2.01	-.50	112	.620
Q20. Need for more training	16	5.94	1.48	96	6.50	.75	2.34	110	.021*

All scores based on a scale range from 1=strongly disagree to 7=strongly agree
* $p < .05$ ** $p < .001$

Table 5. Mean scores on training variables by job type

Job Type	Technical Support			Clerical			Management				
	n	mean	S.D	n	mean	S.D.	n	mean	S.D	F Ratio	Prob.
ANOVA											
Q11. Training prior to implementation	22	2.41	1.59	48	2.10	1.60	31	4.36	2.21	15.5	.000**
Q12. Current level of training	23	2.83	1.95	54	2.48	1.81	35	4.77	1.85	17.1	.000**
Q14. Understanding of features, and so forth	22	2.36	1.59	54	1.96	1.27	35	4.43	2.12	25.0	.000**
Q20. Need for more training	22	6.59	.96	56	6.39	.82	32	6.34	1.04	.52	.597
All scores based on a scale range from 1=strongly disagree to 7=strongly agree * $p < .05$ ** $p < .001$											

Department and Longevity in Current Position

Preliminary screening of the data found that these variables presented no significant differences, as expected.

DISCUSSION

In analyzing the literature, we found agreement that training is important when implementing a new ERP system in a university or a large-scale organization. Yet practice does not follow this finding. Training budgets are frequently cut as implementation projects experience over-runs in cost and time.

Our examination of the relationship between training satisfaction and use supports the importance of training satisfaction to ERP system use which is an important factor in IS success models. The regression analyses for the dependent variables of perceived ease of use, perceived efficiency of the ERP system and perceived effectiveness of the ERP system showed these variables to be influenced by training satisfaction. Specifically:

- Satisfaction with the current level of training explained 78.4% of the variance in ease of use of the ERP system.
- Satisfaction with current training and user participation together explained 55.0% of the variance in ease of use in doing the respondents job with ERP.
- Satisfaction with current level of training and user participation accounted for 51.8% of the variance in effectiveness of doing the respondent's job with the ERP system.

In our regression models we included personal and job type characteristics as variables. None of these variables was included in the resulting models. This result shows that the characteristics do not directly influence ease of use or usefulness, further confirming our model.

The unanticipated result from our regression was the inclusion of participation in the design and building of the ERP system in the model for usefulness (efficiency and effectiveness). Our review of the literature did not lead us to anticipate this result. Participation

has been studied as a critical success factor in ERP implementations with mixed results, but has not been related to usefulness or use. The literature has focused more on participation to reduce user resistance to change.

Our examination of the personal and job characteristic which influence training satisfaction found that gender and job classification influence this construct. Education level, department, and longevity in current position did not show any difference in the perception of training quality prior to implementation, current training quality, understanding of the system, and need for more training.

Gender. Female respondents reported significantly lower levels of satisfaction with training prior to implementation, current level of training, and higher agreement with the need for more training than male respondents. Since both male and female employees experienced the same training, this finding raises the question of whether different training methods might be appropriate for male and female employees. Another explanation may be that female workers are heavier users of the ERP systems and might need more training than the university provided. Our survey did not capture how extensively respondents used the PeopleSoft system.

Job type. Management level employees expressed higher satisfaction with training levels both prior to and after implementation and higher levels of understanding of the features, functions, and abilities of PeopleSoft. Managers may not be as heavily involved in the use of the PeopleSoft system as clerical employees, especially in the data entry and file maintenance functions. Technical support employees also exhibited slightly higher levels of satisfaction than clerical personnel on these three variables. No difference by job type was shown for the need for more ERP training. All job types expressed the need for more training.

Responses to open ended questions at the end of the survey supported the importance of training. Responses to the question "how do you think the implementation process can be improved" included:

- Training and updating employees to the status of (implementation) process
- More training in all departments
- More training, more info to end users earlier in the process
- More training and more testing before putting this system on line.
- Training would be nice
- Don't implement a system unless you fell (sic) you will be able to ease the workload of those who are actual end users.
- Training...Instruction Manual...Something to help me learn this would be nice.
- More testing, training, and time before implementation.

These comments further confirm the importance of training to employees involved in the implementation process.

SUMMARY AND CONCLUSION

This analysis of factors affecting training and the attitudes toward acceptance of technology confirm the value of training when implementing an ERP system in a university or other large organization. The data analysis provides evidence that the perspectives of gender and job types affect the perception of the adequacy and completeness of training. This finding indicates the need for proper training when implementing an ERP system in a university.

The regression analysis shows that training satisfaction is a factor leading to usefulness, which we define as employee perceptions of the efficiency and effectiveness and ease of use of the ERP system in doing their job. The results confirm that practitioners should allocate ample budgets for training and measure training satisfaction as a predictor of employee attitudes toward the ERP system during and after implementation.

Limitations and Future Research

Limitations of the present study include:

- The results may not be generalized because only one organization was studied. ERP

training at additional organizations should be studied.

- Self-reporting of perceptions creates inherent limitations. However, these limitations are quite difficult to overcome.
- Our sample size was not large enough to study joint effects such as gender and job type. Studies of larger implementations could be of help in addressing these issues.
- The questionnaire design limited our ability to use additional analytical tools.

Further research is needed to explore why different groups perceive training differently and how training satisfaction can be improved among all groups. The extension of the TAM model to include the effect of training satisfaction should be studied in other ERP projects and in other large IS systems.

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ENDNOTES

¹ “Current quality of training” refers to the perceived state of training at the time of measurement after implementation.

² All means are based on a seven-point Likert scale.

APPENDIX A

PeopleSoft Implementation Survey

INSTRUCTIONS: This is an anonymous survey. Please identify your answer to each question by circling the appropriate letter or number corresponding with your choice. Please answer every question to the best of your ability.

1. Which of the following categories best describes your primary occupation?

- A) Technical Support Staff
- B) Clerical
- C) Middle Manager (analyze data and report to superiors)
- D) Top Management (administrators, decision-makers)
- E) Other_____

2. What is your gender?

- A) Female
- B) Male

3. What department do you work in?

- A) Human Resources
- B) Accounting
- C) Student Services
- D) Financial Aid
- E) Admissions
- F) Student Employment
- G) Payroll
- H) Registrar
- I) CTS
- J) Other_____

4. Please indicate the highest level of education completed?

- A) High School
- B) Vocational/Technical School
- C) Some College
- D) College Graduate
- E) Master's Degree
- F) Doctoral Degree
- G) Professional Certification
- H) Other_____

5. How many years have you held your current position? _____

6. What is your level of involvement in PeopleSoft implementation?

- A) Not exposed
- B) Planning

- C) Training
- D) Testing
- E) Using the system at work

For questions 7-23 please use this scale:

- 1 = Strongly Disagree**
- 2 = Disagree**
- 3 = Somewhat Disagree**
- 4 = Neutral**
- 5 = Somewhat Agree**
- 6 = Agree**
- 7 = Strongly Agree**
- [DK] = Don't Know**
- [NA] = Not Applicable**

7. You feel you were a full participant in the design and building of the PeopleSoft system.
1 2 3 4 5 6 7 [DK] [NA]

8. Enough time was allocated to the planning (vendor research, other end-users, etc.) of the implementation.
1 2 3 4 5 6 7 [DK] [NA]

9. Enough funding was allocated to the implementation of PeopleSoft.
1 2 3 4 5 6 7 [DK] [NA]

10. There are enough people in your workplace who are technically knowledgeable of computer programming.
1 2 3 4 5 6 7 [DK] [NA]

11. Your level of training for the use of PeopleSoft was appropriate prior to the implementation.
1 2 3 4 5 6 7 [DK] [NA]

12. Currently, your level of training for the use of PeopleSoft is appropriate.
1 2 3 4 5 6 7 [DK] [NA]

13. Sufficient research was conducted on PeopleSoft/ERP systems prior to implementation.
1 2 3 4 5 6 7 [DK] [NA]

14. You have gained a complete understanding of the features, functions, and abilities of PeopleSoft.
1 2 3 4 5 6 7 [DK] [NA]

15. PeopleSoft is easy for you to use.
1 2 3 4 5 6 7 [DK] [NA]
16. There is satisfactory internal (CWU personnel) technical support to handle problems experienced with PeopleSoft.
1 2 3 4 5 6 7 [DK] [NA]
17. Adequate service has been provided by outside consultants who are independent from PeopleSoft.
1 2 3 4 5 6 7 [DK] [NA]
18. You have received adequate service from PeopleSoft Inc.'s own consultants.
1 2 3 4 5 6 7 [DK] [NA]
19. The redesigning of business processes was completed effectively prior to the implementation.
1 2 3 4 5 6 7 [DK] [NA]
20. More training of PeopleSoft would help the implementation process.
1 2 3 4 5 6 7 [DK] [NA]
21. PeopleSoft has helped or will help you perform your job more effectively (achieve desired results).
1 2 3 4 5 6 7 [DK] [NA]
22. PeopleSoft has helped or will help you perform your job more efficiently (faster).
1 2 3 4 5 6 7 [DK] [NA]
23. You have been informed of the goals and progress of the PeopleSoft implementation.
1 2 3 4 5 6 7 [DK] [NA]

Written Comments:

24. What do you feel has been done well in the implementation process?

25. How do you think the implementation process can be improved?

26. Additional Comments:

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