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# ERP Training and User Satisfaction

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## ABSTRACT

This paper investigates the relationship between training satisfaction and the perceptions of ease of use, effectiveness and efficiency in the implementation of an ERP system at a higher education institution. The relationships between training and user satisfaction are also explored. Our research hypothesis is that training level prior to implementation, current training level, understanding of features and functions, and the availability of technical support are factors contributing to perceived ease of use and usefulness. 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. Training satisfaction was different based on job type and gender but not education level. Multiple regressions found current training satisfaction related to ease of use and current training satisfaction and user participation related to efficiency and effectiveness.

## Keywords

ERP, training, user satisfaction, ease of use, user participation.

## INTRODUCTION

Enterprise Resource Planning (ERP) systems are complex off-the-shelf 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 press.

In today's constantly changing business world, many organizations are implementing ERP systems. Global expenditures for ERP systems amounted to \$10 billion annually in the late 1990s and an additional \$10 billion to consultants to install the software (Davenport, 1998). Cotteleer (2002) cites an AMR study that indicates ERP spending at \$47 billion in 2001. ERP expenditures are expected to remain the biggest segment of large and mid-sized IT budgets through 2004 (Seewald, 2002). ERP systems allow separate business functions to be put together into one compact function. 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.

Higher education institutions are not exempt from implementation difficulties. Universities often suffer lost revenue, wasted time, cost overruns and delays during ERP systems implementation.

Only a small number of studies have been conducted on 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 leads us to investigate further. The purpose of this paper is to explore the value of training and education when implementing an ERP system in a higher-education institution or large-scale organization.

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. The survey data is examined for differences in user satisfaction by gender, job type, education level and other factors using ANOVA. Multiple regression is used to determine the effect of training on user satisfaction.

## RESEARCH PROBLEM

This research examines the relationship between the users' perceptions of training adequacy prior to implementation and post implementation to the users' perception of ease of use and usefulness in doing their job after the implementation. Do

different groups perceive training adequacy differently? What factors are related to the perceived ease of use, effectiveness and efficiency of the ERP system?

## LITERATURE REVIEW

According to Buchner (1999) whatever your choice of an ERP solution, it should provide you with the ability to integrate your existing business applications and data libraries to ease the migration for users, avoid downtime due to training, and the costs associated with migrating data. Schaaf (1999) found that ERP systems have important implications for training. PeopleSoft announced plans to launch a satellite-based system for delivering live training to hundreds or even thousands of workers at companies that buy its ERP applications (Stedman, 1999), emphasizing the importance of training.

Training has a major role in their 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. These researchers also found that firms tend to cut training cost in adopting commercial packages resulting in “negative user attitudes and a low-integration equilibrium.” Lassila and Brancheau (1999) also found that training should involve “both the packaged systems features and related work processes.” Wheatly (2000) found that ERP training is frequently compressed as implementation projects are running out of time and money. Wheatly also found that ERP users would prefer allowing more time for training and providing training around their own business processes.

Ferrando (2001) declares that when organizations decide to use technology that will change their business processes, they must prepare their employees with comprehensive training. Employees have reported that training classes helped them feel more comfortable using the system and have 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 indicates that 25% of the ERP budget should be allocated to training users. (Coetzner, 2000) According to Stein (1999) ERP systems take a lot of 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.

Measuring the success in information science is difficult. DeLone and McLean reviewed 180 articles published between 1981 and 1987 and developed a taxonomy and model based on six dimensions of I/S success – systems quality, information quality, use, user satisfaction, individual impact and organizational impact. For this study we will focus on use and user satisfaction.

Doll and Tokzadeh (1988) propose a model of end-user satisfaction that consists of five factors - content, format, accuracy, ease of use, and timeliness - but do not discuss the effect of training on satisfaction.

Davis et. al. (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 user acceptance. 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.” 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 system, which in turn leads to the user's behavioral intention to use. The result is use of the system.

Venkatesh and Morris (2000) found gender differences in the individual adoption and sustained usage of technology in the workplace.

**Importance of Topic.** Organizations implementing ERP systems face considerable challenges based on the cost and complexity of these 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 PROJECT

The university is in the process of implementing PeopleSoft for all its information needs. The first modules implemented were in the area of 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 accounting requirements of the university. Training on this phase was conducted in a similar manner. The university is currently planning the implementing the academic record modules of PeopleSoft.

## METHODS

Every submission should begin with an abstract of no more than 150 words, followed by a set of keywords. The abstract should be a concise statement of the problem, approach, and conclusions of the work described. It should clearly state the paper's contribution to the field.

Possible reasons for implementation difficulties for large-scale information systems that may have a significant impact on the perspectives of users in the area of training are gender, job type, and education level. This paper investigates the following hypotheses:

Men and women may learn differently and have different perceptions of the adequacy of ERP training provided. We will use the null hypotheses.

H<sub>01</sub>: The quality of training prior to implementation is perceived equally by both genders.

H<sub>02</sub>: The quality of training during implementation is perceived equally by both genders.

H<sub>03</sub>: The quality of training in understanding features, functions, and abilities of ERP is perceived equally by both genders.

H<sub>04</sub>: The need for more training after implementation is perceived equally by both genders.

Job classification may also result in differing perceptions of the effectiveness of training.

H<sub>05</sub>: Clerical, technical and managerial personnel perceive equally the quality of training prior to implementation.

H<sub>06</sub>: Clerical, technical and managerial personnel perceive equally the current quality of training.

H<sub>07</sub>: Clerical, technical and managerial personnel perceive equally the quality of training in understanding features, functions, and abilities of ERP.

H<sub>08</sub>: Clerical, technical, and managerial personnel perceive equally the need for more training after implementation.

The educational level of the employee may affect the perception of the adequacy of training. Levels of education to be considered include some college, college graduate, and masters' degree.

H<sub>09</sub>: Employees of various educational levels perceive equally the quality of training prior to implementation.

H<sub>010</sub>: Employees of various educational levels perceive equally the quality of current training.

H<sub>011</sub>: Employees of various educational levels perceive equally the quality of training in understanding features, functions, and abilities of ERP.

H<sub>012</sub>: Employees of various educational levels perceive equally the need for more training after implementation.

To test each hypothesis, this study conducts hypothesis testing to determine whether there is a statistically difference in the perspectives of ERP systems implementation among members of different genders, job types, and levels of education. If statistical significance is found on each hypothesis, it leads to a conclusion that those independent variables had a significant impact on the perspectives of the ERP systems implementation and different training should be programmed for different group. Our data was taken from the PeopleSoft Implementation Survey, which was administered by Dr. Lee. We limited our data in this part of the project to four dependent variables, and three independent variables, to which we ran t-tests or one-way ANOVA tests on each independent and dependent variable.

**Questionnaire.** This research utilized a questionnaire with 26 questions. The first six questions were demographic and asked the respondents job type, gender, department, education level, years in current position and level of involvement in ERP. Questions 7 through 22 are seven point Likert scale questions asking about various aspects of the ERP implementation. Questions 24-26 were open ended questions soliciting the respondents' views about what was done well and what could have been done better in the project. Questionnaires were completed by 143 respondents, of which 32 indicated they were not exposed to the implementation, leaving 113 usable questionnaires.

Questions 11, 12, 14 and 20 relate to perceived usefulness of training. Question 15 represents perceived ease of use, and questions 21 and 22 relate to the perceived usefulness of the ERP system.

Please use a 10-point Times New Roman font or, if it is unavailable, another proportional font with serifs, as close as possible in appearance to Times New Roman 10-point. On a Macintosh, use the font named Times and not Times New Roman. Please use sans-serif or non-proportional fonts only for special purposes, such as headings or source code text.

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 lever 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 (achiever desired results).	4.12	2.19
Q22	PeopleSoft has helped or will help you perform your job more efficiently (faster).	3.98	2.14
All scores based on a scale range from 1=strongly disagree to 7=strongly agree			

Table 1. Survey Questions.

We will also perform multiple regressions for each of the outcome variable and several independent variables to examine the relationship of these variables.

### Statistical Results

No statistically significant differences were found based on education level sustaining hypotheses and H9-12. Gender and job type resulted in a statistically significant difference in means for prior training, current training and understanding as shown in Table 1.

Question 11 in the survey is used to test H1, H5, and H9. Question 12 in the survey is test H2, H6, and H10. Question 14 is used to test H3, H7, and H11. Question 20 in the survey is used to test H4, H8, and H12.

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). Each of the three independent variables was examined.

Ease of use. The regression model consisting of the independent variable, current training, predicts ease of use,  $R^2=.784$ ,  $R^2_{adj}=.781$ ,  $F(1, 93)=336.743$ ,  $p<.001$ . This model accounts for 78.4% of the variance in ease of use of the ERP system.

Efficiency. The regression model consisting of both current training and user participation predicts efficiency,  $R^2=.550$ ,  $R^2_{adj}=.540$ ,  $F(1, 90)=8.212$ ,  $p<.005$ . This model accounts for 55.0% of the variance in efficiency of doing the respondents job with the ERP system.

Effectiveness. The regression model consisting of current training and user participation predicts effectiveness,  $R^2=.518$ ,  $R^2_{adj}=.508$   $F(1, 90)=9.846$ ,  $p<.005$ . This model accounts for 51.8% of the variance in effectiveness of doing the respondents' job with the ERP system.

Gender	Male			Female							
t-test	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, etc.	18	3.00	1.68	96	2.75	2.01	-.50	112		.620	
Q20. Need for more training	16	5.94	1.48	96	6.5	.75	2.34	110		.021*	
Job Type	Technical Support			Clerical			Management				
ANOVA	n	mean	S.D	n	mean	S.D.	n	mean	S.D	F Ratio	Prob.
Q11. Training prior to implementation	22	2.41	1.593	48	2.10	1.60	31	4.355	2.214	15.45	.000**
Q12. Current level of training	23	2.83	1.946	54	2.48	1.81	35	4.771	1.848	17.10	.000**
Q14. Understanding of features, etc.	22	2.36	1.590	54	1.96	1.27	35	4.429	2.118	24.97	.000**
Q20. Need for more training	22	6.59	.959	56	6.39	.82	32	6.344	1.035	.52	.597
All scores based on a scale range from 1=strongly disagree to 7=strongly agree											
* $p<.05$ ** $p<.001$											

**Table 2: Mean Scores on Training Variables by Gender/Job Type**

## DISCUSSION

In analyzing the literature we found that articles are in agreement that training is important when implementing a new ERP system in a university or a large-scale organization. In our sample we found no difference in the perception of training quality prior to implementation, current training quality, understanding of the system and need for more training based on gender or education level. Job type did result in management level employees expressing higher levels of satisfaction with training levels both prior to and during implementation and higher levels of understanding of features. Technical employees also exhibited 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.

## SUMMARY AND CONCLUSION

This analysis of factors affecting training and the attitudes toward acceptance of technology leads to confirming the value of training when implementing an ERP system. The data analysis provides sufficient evidence that the perspectives of different genders and education levels on the quality of training prior to implementation, during implementation, understanding of features and functions, and the need for more training after implementation indicate a definite need for proper training when implementing an ERP system university.

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

Some limitations for our present study are as follows:

- Time constraints that restricted the amount of time available to research, prepare, and survey other samples such as other large organizations or universities. Since only one university was studied the results may not be generalizable.
- Self-reporting of perceptions has inherent limitations.

Further research is needed to explore why training was perceived differently by different groups and how training can be improved. Other university ERP implementations should be surveyed to investigate the generalizability of these findings.

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