

UC Irvine
I.T. in Business

Title

End users ICT Training Preferences Within the Technology Environment

Permalink

<https://escholarship.org/uc/item/88s816mn>

Authors

Danziger, Jim
Yee, Eric

Publication Date

2000-06-01



**CENTER FOR RESEARCH
ON INFORMATION
TECHNOLOGY AND
ORGANIZATIONS**

University of California, Irvine
3200 Berkeley Place
Irvine, California 92697-4650

and

**Information
and Computer Science**

JUNE 2000

ENHANCING END USERS' ICT SKILLS IN THE NEW ECONOMY

STUDY 5: END USERS' ICT Training Preferences within the Technology Environment

**Author: James Danziger and Eric Yee
Information and Computer Science
University of California, Irvine**

Acknowledgement:

This research has been supported by grants from the CISE/IIS/CSS Division of the U.S. National Science Foundation and the NSF Industry/University Cooperative Research Center (CISE/EEC) to the Center for Research on Information Technology and Organizations (CRITO) at the University of California, Irvine. Industry sponsors include: ATL Products, the Boeing Company, Bristol-Myers Squibb, Canon Information Systems, Conexant, IBM, Nortel Networks, Microsoft, Seagate Technology, and Sun Microsystems.

ENHANCING END USERS' ICT SKILLS IN THE NEW ECONOMY

A linked series of papers

Contributors:
James N. Danziger
JoAnne S. Jennings
Eric Yee
Suzanne Hull
Yu-Chun Wang

STUDY 5:

END USERS' ICT TRAINING PREFERENCES WITHIN THE TECHNOLOGY ENVIRONMENT

**James N. Danziger
Eric Yee**

**Center for Research on Information Technology and Organizations
University of California, Irvine**

General Introduction

Clearly, the most widely perceived trend today is the increased need for computer skills training. As information technology becomes an integral part of more jobs, more employees need the skills to use information technology effectively (1997 National HRD Executive Survey: 1).

This set of papers explores empirically the effectiveness of computer skills training in the “new economy.” The above quote is from a 1997 national survey of Human Resources Development executives which concludes that additional training for employees in the use of information and communication technologies (ICTs) is the most critical need in today’s evolving American workplace. Indeed, ICTs and effective end user training are arguably the two most critical success factors for many contemporary organizations. Why is this the case?

- First, most analysts assert that people are an organization’s most valuable asset. As such, top executives and managers might assume that appropriate investments in human capital, such as programs that insure employees understand how best to use available resources (e.g. other people, technology, and information), should yield high dividends for their companies. A crucial means for achieving such employee expertise is the provision of appropriate support for training and learning.
- Second, information and the information systems are a vital strategic resource in most organizations. Many organizations commit substantial resources to information and ICTs on the reasonable assumption that these allocations will generate favorable impacts in achieving their organizational goals, whether profit, market share, productivity gain, or some other measure of efficiency or effectiveness.

While these ICTs are powerful tools, the benefits of using many of these ICTs are closely linked to the behaviors and skills of the organizational personnel who use them. Consequently, managers face the challenge of maintaining an appropriate balance between investments in ICT resources, on the one hand, and investments in the training of and assistance for ICT users, on the other hand. It is this strategic blend of information technology capabilities and skilled end users of information systems that supports the competitiveness and success of firms in the new economy. Thus the core of our analyses is an exploration of the nature and assessment of such training and assistance, based on survey and interview data from end users in a large, high-tech company.

There is widespread lip service paid to the homily that people are typically an organization’s most valuable resource. However, in many (perhaps most) organizations, a thorough and sustained program for the initial and especially for the continuing ICT training and assistance for those people is not among the top action priorities. Indeed, most firms do not even engage in serious, periodic assessment of the extent to which their personnel are satisfied with the ICT training and support provided.

These papers report on field research exploring such issues, undertaken in a progressive, high-tech manufacturing company which we call “TechMark”. This multinational company is very much part of the new economy, in which firm performance is based on a high technology infrastructure, work flexibility, and speedy adaptation to change. Our data are especially grounded in the responses of almost 400 sophisticated end users who are engineers, planners, managers and others in key positions. They report on their own training and learning experiences regarding the key information system with which they work. These “mission critical” systems include forecasting and marketing systems, supply chain systems, SAP systems, and so on.

STUDY 5:

END USERS' ICT TRAINING PREFERENCES WITHIN THE TECHNOLOGY ENVIRONMENT

James N. Danziger

Eric Yee

**Center for Research on Information Technology and Organizations
University of California, Irvine**

INTRODUCTION

A company that aims to take full advantage of its workforce in the new economy needs to establish viable training plans for its current employees and new hires and when it rolls out a new system. Many factors need to be considered before pursuing this endeavor.

Three of the most immediate concerns that management faces are: (1) which methods of training seem to produce/improve end users' skills and abilities most fully?; (2) which methods are cost effective to implement?; and (3) which methods are most preferred by employees within a given company culture? By properly assessing these factors, managers are able to better design training programs that will achieve the goals and objectives of their company.

The preferences and attitudes of employees will especially affect a company's ability or inability to implement a training program, due to the possible enthusiasm for or resistance to learning and training that might occur. In this study, we examine the attitudes and preferences of end users at TechMark regarding their desires for future training on key information systems. Also, we identify the indicators that help predict these predispositions. This study aims to answer three major questions:

- 1) Does skill level with information systems affect the employee's desire for further training?**

- 2) What characteristics of employees best predict their attitudes regarding future training?**

3) In the context of a high-tech company such as TechMark, what modes of training do employees prefer?

DATA and METHODS

The data reported here were gathered primarily from self-administered, web-based surveys completed by 398 ICT end users in TechMark, a large, multinational company engaged in the fabrication of high technology products. The survey was distributed by the company itself, which explained to its employees that it was interested in learning more about the effectiveness of the company's training approaches. Our interpretations of the survey data are enhanced by onsite interviews with end users and with those in the training unit of the organization.

These end users, whose anonymity was assured, responded to an array of questions. Among other questions, they reported their levels of use and evaluation of various modes of ICT training (initial and ongoing) for the specific information system with which they work. The respondents also indicated the extent to which various sources are used to seek answers to questions about the information systems and the usefulness of those sources. They characterized the nature of their knowledge-sharing activities regarding the key information system and their preferences regarding further training. Some personal data were also collected, such as the end user's years of experience with the system and a self-assessment of his/her competency in using the system.

The coded data are analyzed using SPSS, a standard statistical analytic tool. Most tables report the distribution of responses by category and the mean scores on interval- or ordinal-level variables. The statistical significance of between-group differences is assessed by calculating the analysis of variance between group means.

ANALYSIS AND FINDINGS

Traditionally, there has been a negative connotation in many companies associated with workers who require extensive ongoing training. This stigma arises from the belief that workers should be able to master their job duties independently. However, these attitudes have begun to change as technology use has become more pervasive in work. As more

extensive technological skills are required for workers to adapt to the demands of the new economy and to keep pace with changes in ICTs, the organization’s commitment to continuing skills development has also increased.

Training and skill development are perpetual goals that seem to be of high value to the employees at TechMark. More than seven out of ten workers express a clear interest in more training on the systems with which they work, and an additional 19.4% indicating that they “possibly” want further system training (Table 1). Only a very small percentage (10%) do not want future training. Unlike traditional companies, where job duties remain relatively constant, high tech workers in “new economy” companies seem to understand the importance of future training on key information systems.

The culture of TechMark is a good example of this new context. Most employees are not given specific job descriptions and they work in an environment of continuous change. Most employees are expected to participate in several different functional areas while performing a variety of job tasks. The rapid pace of change and the reliance on increasingly complex information systems cause most employees to desire more training to improve their skills. Thus a company that aims to encourage learning among its personnel must address these desires in an efficient manner. Failure to be responsive will result in a stagnant work force and might lead to defections by the company’s most dynamic employees.

Table 1 Interest In Future Training

Interest Level	% of End Users
Definitely	43.7%
Likely	26.9%
Possibly	19.4%
likely not	7.5%
Definitely not	2.6%
Total	100.0%

N=387

Interest in further training is not identical among all employees. This might be attributable in part to individual personality. Other systematic factors (e.g., the

employee’s prior training experiences, current level of skill, and length of experience working with the system), might also provide insight into the differences between TechMark employees. These factors are explored in Tables 2-8.

Table 2 examines the linkage between level of interest in further training and the employee’s level of experience working with the system. There is a decrease in the desire for further training among employees as their level of experience with the system increases. It appears that the **workers’ increased familiarity and experience with the system results in a decreased desire for further training.** The end users with the least system experience have the highest level of interest in future training while the workers with most experience have the least interest. The biggest differences regarding interest in more training exist between those with least and those with most experience with the system.

Table 2 Interest In More Training, Based On Experience With System

Length of Tenure	Level of interest in further training (mean) ^a
Less than Six months	3.17
Six Months to one year	3.03
One to two years	3.04
More than two years	2.84
Total	3.01

^a **Definitely=4, Likely=3, Possible=2, Not Likely=1, Definitely not =0**

The next aspect of TechMark employees we examine is whether their current self-assessments of their ability to use the system is associated with their interest in further training. We examined end users’ ratings of their skills on both data entry tasks and analysis/reporting tasks. The group with the lowest assessment of their data entry skills had the highest desire for more training (Table 3). Those with relatively low analysis and reporting skills also indicated a strong desire for training. This is a positive sign, since the workers with the most deficient skills seem to recognize their problem and desire further training to improve their performance. It would be extremely problematic if the workers with deficient skills did not want additional training.

Interestingly, workers with good (but not “very good”) skills assessments also have a higher desire for more training. This is particularly evident on analysis and reporting tasks. Since TechMark employees generally believe that more training leads to better job skills and promotional opportunities, they seem eager to receive more training in order to move their skills to the top category.

Another intriguing group of end users are those who rate themselves to have “satisfactory” skills. Except for users with the highest skills ratings on analysis and reporting, this group with satisfactory skills is the least likely to want additional training. There are several possible explanations why this group is less oriented to future training. The fast pace of work at TechMark leaves employees with little time to refine their overall ability to use the system. Within such an environment, some employees might feel overwhelmed, and might attempt to learn the system just well enough to complete their job function. This possible explanation is consistent with the theory called “satisficing.” Associated with Herbert A. Simon (1956), this theory assumes that “one aims at a tolerable level of satisfaction rather than at maximization” in one’s work and decisions. Such satisficers are an interesting group, given TechMark’s supposed “hero” mentality, where everyone is expected to work at the very peak ring of performance. Yet this group of the workers seems to have adopted a view that it is acceptable to develop system skills that “satisfice” -- that is, that are merely satisfactory and sufficient.

Table 3 Interest In Training Based On Assessment Of Data Entry Task Skills

Data Entry Skills	Interest in further training ^a
Unsatisfactory	3.52
Satisfactory	3.00
Good	3.10
Very Good	3.01
Total	3.09

^a **Definitely=4, Likely=3, Possible=2, Not Likely=1, Definitely not =0**

Table 4 Interest In Training Based On Assessment Of Analysis And Reporting Task Skills

Analysis and Reporting Skills	Interest in further training ^a
Unsatisfactory	3.19
Satisfactory	2.97
Good	3.28
Very Good	2.76
Total	3.09

^a **Definitely=4, Likely=3, Possible=2, Not Likely=1, Definitely not at all=0**

In this section, we look at factors that might influence the specific methods of training that employees would prefer to experience in the future. Within TechMark, we identified the different methods of training that have been utilized, including instructor-led training, one-on-one training, computer-based training (CBT), video-conferencing, or printed materials, as well as a “no training” situation. One notable finding is that many employees prefer to have a bundle training methods in the future rather than only a single method. Table 5 indicates that more than half (51.4%) of the end users want two or more methods of training. The largest single group (46%) does indicate an interest in only one method for future training.

Table 5 Preferred Number Of Training Methods In The Future

Preferred number of methods	% of End Users
0	2.6%
1	46.0%
2	28.8%
3	13.9%
4	5.1%
5	3.6%
Total	100%

The number of training methods preferred in the future is positively associated with the number of training methods an end user has experienced in the past. As the number of methods experienced increases, the number of desired methods of future instruction also increases. This pattern is evident for initial training (Table 6) and is particularly strong for the number of ongoing training methods (Table 7). However, the pattern is different for the people that have received no training, who are actually more interested in multiple training methods than those who experienced only one mode of training.

The current training methods that employees use are a strong indicator of which methods they prefer to have in the future. Employees generally choose methods of future instruction that they have experienced in the past. We constructed a “consistency” table that measures the percentage of people who have a particular method of prior instruction and prefer that method of instruction in the future. Table 8 reveals that the majority of employees are generally consistent in either wanting a particular method they have experienced in the past or not wanting a particular method they have not experienced.

Since ongoing training methods are usually provided at the employee’s choice, it appears that employees are more willing to be trained in a learning method with which they have past experience. One partial exception relates to instructor-led training. Among employees who have not experienced instructor-led training in the past, a majority still desires to have instructor-led training in the future.

Table 6 Preferred Number Of Methods Of Training, Based On Breadth Of Initial Training

Number of initial methods of initial training	Number of methods of future training desired (mean)
0	1.87
1	1.78
2	1.92
3	2.00
4	2.33
Total	1.84

Table 7 Preferred Number Of Methods Of Future Training, Based On Breadth Of Ongoing Training

Number of initial methods of ongoing training	Number of methods of future training desired (mean)
0	1.79
1	1.66
2	2.30
3	3.21
Total	1.84

Table 8 Consistency Score ^a

	Consistency Score
Instructor Led	50.1 %
One-on-One	66.0
CBT Based	62.9
Printed Materials	64.4

^a Proportion of end users who are consistent in linking an ongoing method of instruction with a desire to use that method in the future – the sum of those who indicate yes/yes and those who indicate no/no.

Instructor-led training is clearly the most popular method of future training, selected by 59.4 percent of the end users (Table 9). In fact, instructor-led training, combined with another method, is the most popular combination among people who desire more than one more method of future training. Of the people who prefer more than one method of future instruction, an overwhelming 80.5% people specified instructor-led training as one of the methods. The structure and content of these classes seem to offer an approach that employees are comfortable with and which are perceived to provide useful training.

Table 9 Preferred Methods Of Future Training

	% Yes	% No
Instructor-led	59.4%	40.6%
I-on-1	42.2%	57.8%
CBT	37.5%	62.5%
Printed Materials	36.8%	63.2%
Video Conferencing	8.0%	92.0%
None	0.8%	99.2%

These data are germane to an interesting issue: whether workers at a high-tech company such as TechMark prefer to use "high-tech," computer-related training methods or more traditional "high-touch," personal methods of training (Naisbett 1985). The issue is particularly relevant at TechMark, where interviews suggest that there is an intention to increase substantially the emphasis on e-learning approaches, especially CBT and online help, as well as printed, self-help materials. This is understandable since such approaches seem well suited to providing more flexible and cost-effective end user support to a technologically sophisticated and motivated workforce.

However, our analyses suggest TechMark employees still prefer being trained with high-touch methods, such as instructor-led training or one-on-one training. Despite the growing trend and acceptance of employees of high tech training processes, the interaction with peers and instructors still seems to be a positive and desired element in the development of a training program that has high user acceptance.

This is not to say that CBT courses would not add value to TechMark's training regime. In fact, 37.5% of the end users surveyed do want CBT courses in the future (Table 10). However, only 26% of the people who selected CBT wanted it as the only method of instruction. Fully 74% of employees who are interested in future CBT prefer it in combination with another format. These data suggest that CBT, by itself, is not yet able to replace person-based training, but that CBT can be a good tool to reinforce development.

Table 10 Interest In Future CBT Training

Types of preferred training	Percent
CBT Only	9.8%
CBT w/ some other method	27.7%
Other type of training only	36.2%
Other multiple types of training w/o CBT	26.3%

Before proceeding with the implementation of a new training program, a company should carefully consider its employees' attitudes and preferences, as well as the company culture. Even among high tech companies that hope to reduce costs and emphasize its technology culture by providing more extensive e-training, employees might not be

satisfied with such training. Clearly, the ongoing methods of instruction that employees prefer in their current environment should be considered to help ease the transition to a new training regime. At TechMark, for example, it would seem wise to provide end users with system training that combines/requires both instructor-led training and CBT. This will favorably orient most end users to embrace CBT and other forms of high-tech end user assistance in the future.

CONCLUSIONS

Four broad generalizations emerge from our analysis of the information system training preferences of end users at TechMark.

- 1) **Employees who are new to a system are most enthusiastic about additional training.** As experience with the system increases, employees' interest in more training decreases steadily. Employers should be aware of these differences and should take full advantage of this early enthusiasm by creating an environment where initial training is quickly accessible, and possibly required.
- 2) **Among employees who have had previous training experiences, interest in further training increases steadily with a greater number of modes previously encountered.** Thus employers should realize that employees who have experienced several modes of prior training will probably be most satisfied if they engage in more modes of training in the future.
- 3) **Previous modes of training are excellent indicators of which modes employees prefer for future training.** Companies should realize that employees will tend to be most engaged with ongoing methods that correspond to those they have previously used and with which they feel most comfortable. Attempts to switch the end user to an entirely different training program without consideration of the previous training program can be a large source of frustration, since the program may not be what the employee prefers and there might be nonparticipation or low receptivity and effectiveness.
- 4) **Even among high tech companies experiencing continuous change, employees still prefer to be trained by "high-touch" methods.** Companies hoping to transition to

more “high-tech” methods such as CBT and videoconferencing must consider existing preferences before proceeding. Employees are not completely opposed to high tech training methods. However, they seem to find that these methods are more effective in conjunction with other training modes.

REFERENCES

- Allen, Rex J. (1996) “The ROI of CBT: Return on Investment from Computer-based Training,” CD-ROM Professional (9): 34-44.
- American Society for Training and Development (1998a). The 1997 National HRD Executive Survey. ASTD: Alexandria, VA. American Society for Training and Development
- ASTD (1998b) Measurement Kit: Tools for Benchmarking and Continuous Improvement. ASTD: Alexandria, VA.
- Barua, A., C. Kriebel, and T. Mukhopadhyay. (1995) “Information Technology and Business Value: An Analytic and Empirical Investigation,” Information Systems Research (6:1): 3-23.
- Bassi, Laurie J., Scott Cheney, and Mark Van Buren. (1997) “Training Industry Trends 1997.” American Society for Training and Development.
http://www.astd.org/virtual_community_trends/training_trends_td1197lhtm.
- Bassi, L. J., Cheney, S. “Benchmarking the Best.”
http://www.astd.org/CMS/templates/template_1.html?articleid=10697
- Brown, John Seeley and Estee Gray. (1998). “The People are the Company.” Fast Company (November 1995): 78-85.
- Compeau, D., Olfman, L., Sei, M., Webster, J. “End-User Training and Learning.” Communications of the ACM, (58:7), July 1995, pp. 23-39.
- Danziger, James N., JoAnne S. Jennings and Sung Chul Park. (1999). “Assessing the Value of Information and Communications Technology Training.” CRITO Working Paper.
- Danziger, James N. and Kenneth L. Kraemer. (1997) “Public Managers, Training and Help with Computing,” Unpublished manuscript. Irvine, CA: CRITO.
- Davis, S. A. and Robert P. Bostrom. “Training End Users: An Experimental Investigation of the Roles of the Computer Interface and Training Methods.” MIS Quarterly, March 1993, pp. 61-81.
- “Findings on Competencies.” (1995) Management Development Review 8 (4):

- Fitzgerald, E. P. and A. Cater-Steel. "Champagne Training on a Beer Budget." *Communications of the ACM*, (38:7), July 1998, pp. 49-50.
- Gardner, D. G. and J. L. Pierce. (1998). "Self-esteem and Self-efficacy within the Organizational Context: An Empirical Examination." *Group & Organization Management*, (23:1), March 1998, pp. 48-70.
- Grant, L. "Happy Workers, High Returns." *Fortune* (137:1), January 12, 1998:81.
- Hitt, Lorin M. and Erik Brynjolfsson. (1996) "Productivity, Business Profitability, and Consumer Surplus: Three Different Measures of Information Technology Value," *MIS Quarterly* (June): 121-142.
- "Information Technology Training: Teaching Computer Skills to American Workers," (1998) *Training Magazine* (October): 63-76.
- Kirkpatrick, Donald L. (1979) "Techniques for Evaluating Training Programs," *Training and Development Journal* 33 (6): 78-92.
- Kaplan, R.S. and D. P. Norton. (1996). *The Balanced Scorecard: Translating Strategy into Action*. Boston, MA: Harvard Business School Press.
- Lee, S. M., Y. R. Kim, and J. Lee. (1995) "An Empirical Study of the Relationships Among End-User Information Systems Acceptance, Training, and Effectiveness." *Journal of Management Information Systems* 12 (2): 189-202.
- Locke, E. A. "The Nature and Cause of Job Satisfaction." *Handbook Industrial and Organizational Psychology*. Chicago: Rand, 1976, pp. 1296-1349.
- Naisbett, John and (1985) *Megatrends*. New York: Warner Books.
- Olfman, Lorne and M. Mandviwalla. (1993) "Concept-based versus Procedure-based Training: A Longitudinal Field Experiment of Software Training Methods for Windows. Unpublished manuscript.
- Shayo, Conrad and Lorne Olfman. (1994) "A Three Dimensional View and Research Agenda for the Study of Transfer of Skills Gained from Formal End-User Software Training," *Proceedings of the ACM (SIGCPR-94)*: 133-141.
- Simon, Herbert. (1954). *Administrative Behavior*. Chicago, IL: Free Press.
- Violino, Bob. (1997) "The Intangible Benefits of Technology are Emerging as the Most Important Part of All," *InformationWeek* (June 30, 1997): 1-4.