The influence of multimedia training on users' attitudes: lessons learned

David S. McDonald*

Georgia State University, Robinson College of Business, Department of Computer Information Systems, 35 Broad Street, Room 934, Atlanta, GA 30303, USA

Abstract

The workforce within the US is increasingly culturally diverse and mobile. Rapid technological changes, coupled with cultural diversity and employee mobility, have created the milieu for critical issues in organizational training methods. Effective learning systems enable employees to adapt more easily to change, thereby increasing their effectiveness. Multimedia systems can be the solution to enhancing performance effectively and efficiently by accelerated learning. This paper examines such a system developed by Holiday Inn Worldwide for the implementation of a new information system. Individuals' performance and attitudes were tracked for two primary groups: those receiving training on a new information system using traditional training methods and those using a multimedia CDROM to acquire mastery of the same system. 826 employees participated, 467 of them were trained by the multimedia system. Attitude measures included attitudes toward self: job, training, and technology. Individual performance was measured by standardized tests on employees' knowledge of the new information system. Our findings demonstrated that users' attitudes were consistently poorer when trained at sites which employed multimedia training when compared with users trained in using a more traditional approach.

1. Introduction

Since the early days of computers, the presentation method of computer training material has been a topic of continued interest in the information system literature. Various research methodologies

* Tel.: +1-404-651-4613; fax: +1-404-651-3842.
  E-mail address: davemcdonald@gsu.edu (D.S. McDonald).

have been used in the study of the effectiveness of computer teaching methods (Bostrom & Heinen, 1977; Davis & Bostrom, 1993; Hon, 1989; Killion & Boyle, 1987; Sein & Bostrom, 1989) in information system use. Consistently, it has been demonstrated that interactive learning is a more effective approach than a passive, instructor-led approach (Marcoulides, 1990; Vlosky & Summers, 2000; Vogler, O'Quinn, & Paterson, 1991). Unfortunately, time, costs, and physical constraints often preclude organizations from any training method other than on-the-job training (Stamps, 1993). Now, as information technology pervades our society, the use of alternatives to on-the-job training, such as multimedia training systems, are possible.

There is an inherent benefit of being able to supply "training on demand," which, for many large organizations, is a conceptual shift away from their concentration on training "events" (i.e., the use of traditional classroom or workshop training sessions, scheduled at regular times) (Dobbelaere & Goeppinger, 1991; Fullerton, 1987; Lloyd, 1993; Loveman & Gabarro, 1991; Napier, Lane, Batsell, & Guandango, 1989; Pastore, 1993; Powers, 1992; Stamps, 1993; Tynain, 1993). Also, training and education improve the likelihood of greater customer satisfaction, leading to increased loyalty (i.e., gains in effectiveness) (Barney, 1991; Peters & Waterman, 1982; Rosenberg, 1990; Ulrich, 1991). Moreover, the greater the education and experience gained by the work force, the better an organization is able to adopt innovations, resulting in a greater ability to compete in a highly competitive global marketplace (Barney, 1991; Fiol, 1991; Ulrich, 1991).

New computer technologies, in the form of multimedia-based systems, may provide the tools necessary to formulate a learning environment that will encourage this education and training. There may also be added benefits not found in traditional learning systems in using this new technology. With *multimedia systems* (MMS), "safe" environments can be simulated which encourage individuals to explore and take chances (Forman & Kaplan, 1992; Ives, 1993). As change and innovation occur more frequently in the workplace, the dynamics of the workgroup are bound to change. Used appropriately, multimedia can introduce new avenues of workgroup communication and collaboration.

2. The purpose of the study

The integration of training and development methods with information systems should make it possible to produce qualified personnel who will be more responsive to environmental interactions, allowing for greater adaptability and increasing organizational performance. According to Parkhe (1991), "learning is the process of improving actions over time through adaptation resulting in better knowledge and understanding of internal and external mechanisms which help improve competitive conditions" (p. 591). For the individual, training can result in higher-performing employees, better able to adapt. It is our contention that well-trained employees, with a consequential feeling of empowerment, should be able to make beneficial use of a new information system, thus improving upon their own capabilities (i.e., raise their overall skill levels) and value to the organization. Additionally, the characteristics of MMS, such as interactivity, consistency, and availability can provide demonstrable improvement over traditional training methods. This is especially true for a workforce that is ever-more transient and culturally diverse, since an MMS can provide for just-in-time training, as well as accommodate users with different languages. However, to date, little research has examined the use of multimedia computer

technology in a training system. It is envisioned that such an examination can make a significant contribution to the training efforts of I/S departments. With improved training methods, organizations can rely on MMS to keep abreast of rapidly changing technologies. It is our contention that multimedia training systems impact individual attitudes, individual performance, and organizational performance.

The overall research effort examined the efficacy of training on a newly installed information system on both the organization and its employees.

3. Research questions

Results of MMS training on performance are reported in a previously published paper (McDonald, 1999). The focus of this paper is solely on how the use of a MMS affected employee attitudes.

The overriding research question is: *what is the effect of multimedia-based training on individuals' attitudes?* To address this question adequately, other antecedent questions must be considered first, including:

1. Will the training method change users' perceptions of their own capabilities?
2. Will better trained employees be more satisfied?
3. Will the manner in which users are trained affect their attitudes toward the information system?

It is notable that the new information system for which individuals will receive training was originally developed 10 years ago, and its most recent manifestation has been thoroughly tested and validated. As a consequence, the results of training interventions should not be confounded by the implementation of a system that is unreliable. The multimedia systems (MMS) has also undergone a similar validation process to ensure the quality and consistency of the MMS training. A further discussion of this system is detailed in a later section of this paper.

3.1. Theoretical background—individual behavior

According to Lewin (and later modified by Schein), changes in an individual's behavior, resulting in changes to organizational and performance characteristics, is a process comprised of three phases: (1) *unfreezing*—creating a climate for change by increasing the receptivity of the client system to accept the change; (2) *moving* or *changing*—altering the direction, magnitude, or number of driving and resisting forces, thereby establishing an equilibrium at a new level (i.e., a redistribution and balance of components within the organization); and (3) *refreezing*—reinforcing or institutionalizing the forces within the organization, thereby maintaining and stabilizing the new equilibrium (Lewin, 1951; Schein, 1987; Schein & Bennis, 1965).

In the research setting used for this study, technical change has already occurred through the installation of a thoroughly tested and validated information system. Of prime concern in this investigation is how training can enhance the implementation process by successfully institutionalizing the changes (i.e., refreezing) brought about by this new information system.

3.1.1. Training and attitudes

Training plays a key role in the refreezing process. Properly executed, training can provide the confirmation, psychological support, and confidence mentioned. However, with respect to attitudes toward the training process, it should be emphasized that the relevant refreezing occurs within the context of organizational subsystems. An individual is likely to get reinforcement, confirmation, and support from the staff members and other significant social group members, such as management and customers. If the individual values these social system relationships, then his or her new attitude toward learning will stabilize. The individual may also find an internal source of satisfaction from the successful attainment of knowledge provided by the training. As others have demonstrated (Baroudi, Olson, & Ives, 1986; Benbasat & Dexter, 1981; Davis, 1989; Doll & Torkzhdeh, 1989; Ives & Olson, 1984; Orr, Allen, & Poindexter, 2001), personal satisfaction can lead toward system success, also implying a successful refreezing of the system (i.e., changes have become institutionalized).

Inasmuch as training is a temporary system (Miles, 1964; Schein, 1972), one must also consider the long-run stability to be different from stability for the duration of the training sessions. It has long been known that training effects often tend to be temporary or, worse, that the person ends up being more committed to his original attitudes after training than he or she was before exposure to training (Schein, 1972). This phenomenon reflects the tremendous power of the organization to mold people to its own value system, either by failing to refreeze changes which have occurred during training, or by actually retracting these changes, setting a new cycle of attitude learning into motion. This phenomenon also reflects the necessity for a firm to provide *continuous* training if changes are to be institutionalized.

Successful refreezing ensures the system is used properly and thereby has a chance of attaining the performance gains for which it was designed (Barki & Huff, 1985; Keen, 1981). However, the difficulty in refreezing is that training is often temporary and can decay (Keen, 1981; Nader, 1981; Zierden & Robinson, 1983). Additionally, turnover problems can result in new employees joining the organization, who are inadequately trained, and therefore less likely to have the knowledge necessary to use new systems successfully. Management, generally, has two possible solutions; either to leave trainers on-site after an information system implementation, or for a project champion to reside within the business unit effected by the implementation (Jackson, 1985). In most cases, both these solutions are not practical, thus the need to investigate whether an MMS for training can provide a solution for increasing the probability of a successful information system implementation. Our investigation will endeavor to show that, with such systems, training becomes readily available to all present and future employees, with a concurrent increase in the mastery of the newly implemented information system (McDonald, 1999). With sustained, increased knowledge of the new information system, employees are more likely to demonstrate the attitudes and behaviors indispensable for solidifying the change effort.

4. A model for this research

For this research, the model in Fig. 1 depicts the impact of a new technological means for training individuals within an organization by comparing the technological training intervention with more traditional training approaches. A review of the literature has shown the importance of
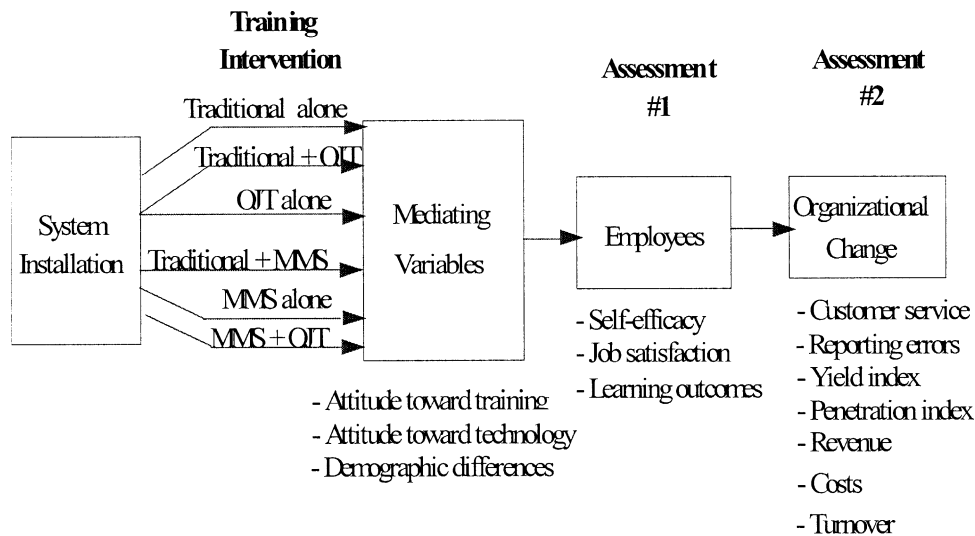
Fig. 1. Research model depicting the impact of MMS training.

social factors in institutionalizing change. Thus, the model includes employees' attitudes toward training and technology in the mediating variables section.

5. The hospitality industry

The hospitality industry is one that is distinguished by a culturally and socially diverse workforce. Owing in part to the diversity of this workforce, today's hotels are placing more emphasis on job satisfaction, employee retention, and productivity than ever before. As the availability of labor tightens, the focus is turning inward to organizational mechanisms which may increase worker knowledge and promote job satisfaction, thus reducing turnover and increasing productivity (Bard, 1993; Barrows, 1990; Eisen, 1993; Ivancevich, 1978; Koch & Steers, 1978).

5.1. The research setting—Holiday Inn Worldwide

Holiday Inn Worldwide (HIW) of Atlanta, Georgia, agreed to provide the research setting for this study. Holiday Inn Worldwide is a hotel chain comprised of approximately 2000 locations throughout the world. The bulk of locations were selected randomly from a pool of the 1558 hotels located within the United States. At the time of this study, there were no plans to implement the new systems in the remaining global locations.

In an effort to standardize all information systems throughout the organization, the Holiday Inn franchise association approved a plan to standardize each hotel's computer system with the Encore[TM] System, a new front desk information system.

5.1.1. The Encore[TM] system

The key component of the Encore[TM] operating system is the Front Office System. Its modules include a reservation system for a particular hotel, a front desk management system (or if a franchisee owns multiple hotels, a multiple property reservation and front desk system), an accounting system, a housekeeping maintenance system, an employee messaging system, a guest messaging system, and various utility programs, such as a currency conversion utility. The operating system also serves as a seamless interface to the two segments of WwHS (i.e., the Holidex reservation system and the HIRO yield management system). However, it is the Encore[TM] system that is the newly installed system for which the MMS was used to train employees.

5.1.2. The multimedia system

The multimedia training system deployed was designed to let managers and staff gain control over access to the instructional content. They can freely move from one topic to another, simply by clicking on an icon. Front desk personnel can learn better how to handle guests' complaints and problems or how a "check-out" can be a more efficient and pleasant experience for the customer. Managers, on the other hand, can key into the "Rate and Inventory Management" program, to improve their revenue enhancement skills.

The systems were developed, validated, and installed by IBM. A key concern of Holiday Inn Worldwide management was that the modules were sufficiently entertaining, while maintaining realism. This author used each of the modules that were available at the time of this study and can attest to the quality of the multimedia training developed thus far. The user is presented with an interface utilizing animation and interactivity in a novel approach. Similar to a computer game in appearance, an individual training scenario changes from one initialization to the next—challenging the user to employ his or her problem-solving skills to arrive at suitable solutions.

Employees are quizzed at the end of each training module. The MMS has the capacity to monitor each employee's utilization of the system and generate reports. Included in these reports was information about the date the employee logged onto the MMS, the duration of each session, and the score of each quiz completed. These reports provided managers with a useful tool to track their employees' progress through the training.

6. The hypotheses

Direct comparisons of training interventions yield many testable hypotheses. This research will focus on the issues that appear to be most central to an MMS approach: the effects of the method of training on individuals.

6.1. Independent variables

In this study, we examined the effects of multimedia training compared with traditional training on employee attitudes and performance. A full description of the six training groups defined for this study is given in the Appendix. The reader is strongly urged to view these groups for better clarity.

6.1.1. Training interventions

In this study, a unique condition occurs which will not allow the use of the simple pretest, posttest design. For the hospitality industry, the average annual turnover can be as high as 105%. It is quite possible, then, that an organizational unit can experience a 25% turnover in a 90-day period. Therefore, any study of the training interventions' effects must account for this predicted high turnover rate (see the model in Fig. 2).

The intervention of a multimedia computer system in this study results in the formulation of six distinct groups within which employees are classified. Please note that the use of the term ONLY in a group name indicates that group received only the initial certification exam and questionnaire. Similarly, the term FULL in a group name indicates that group received both the initial and follow-up certification exams and questionnaires (see Table 1). Again, the reader is urged to review the full description of these six groups found in the Appendix:

Corporate management charged with overseeing the Encore™ installation determined the use of the multimedia training. Although, individual hotel managers were allowed to volunteer for
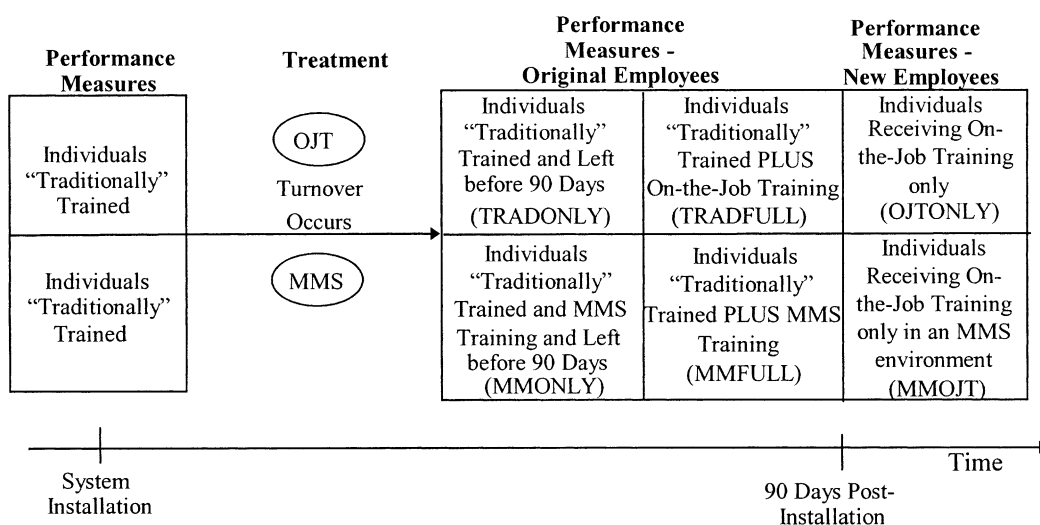

Fig. 2. Model for the individual performance over time (shown with cohorts coded).

Table 1
A general description of key groups in the study

Group	Initial certification exam/survey?	90-day follow-up certification exam/survey?	Initial classroom training?	On-the-job training before taking exam/survey?	MMS before taking exam/survey?
TRADONLY	X		X		
MMONLY	X		X		X
OJTONLY		X		X	
MMOJTONLY		X		X	X
TRADFULL	X	X	X	X	
MMFULL	X	X	X	X	X

the MMS, those who did not volunteer were assigned either traditional training or MMS training depending upon the availability of trainers or MMS hardware.

6.2. Dependent variables

The attitudinal variables consisted of four major groups—attitude toward self (self-efficacy), attitude toward the job (job satisfaction), attitude toward the technology, and attitude toward training.

6.2.1. Self-efficacy

According to Bandura (1977), *self-efficacy* refers to the perceived capabilities for the attainment of specific goals or task outcomes; in other words, an individual's perceptions of his or her work competence.

Self-efficacy was measured on a seven-item scale developed by Riggs (1989) based on the theoretical work of Bandura (1977, 1986). Riggs developed this instrument in an investigation of the relationship between the level of an individual's self-efficacy and the level of that person's performance.

The internal consistency of this scale was estimated at 0.87 (Cronbach α). The Riggs scale was used to test the following hypotheses:

H1a. Individuals in organizational units receiving MMS training and on-the-job training (MMFULL) will report more positive perceptions of self-efficacy than those receiving traditional plus on-the-job training (TRADFULL).

H1b. Individuals in organizational units receiving MMS training and on-the-job training (MMFULL) will report more positive perceptions of self-efficacy than those receiving on-the-job training alone (OJTONLY).

H1c. Individuals in organizational units receiving MMS and on-the-job training (MMFULL) will have a more positive *change* in the perceptions of self-efficacy than those receiving traditional plus on-the-job training (TRADFULL).

6.2.2. Job/task satisfaction

Hackman and Oldham, in their book *Work Redesign* (1980), assert that the keys to successful employees include the psychological state of the employee and the skills he or she possesses. High internal work motivation and satisfaction result from experiencing meaningfulness and responsibility from the work, and from obtaining knowledge about the actual results of work activities. Jobs which are designed to give the worker *autonomy* will produce the experience of responsibility, and designing in mechanisms to *provide feedback* from the job provides knowledge of the actual results of the work activities.

The measures for attitudes toward job (overall job satisfaction) were delineated into two key sub-constructs: *psychological state* and *affective outcomes*. The first of these, psychological state, taps into, among other things, internal motivation. According to Hackman and Oldham (1980), when someone has high internal work motivation, then feelings are closely tied to how well he or she performs a job. The second sub-construct, affective outcomes, further shows the strength of

the link to internal motivation. As previously mentioned, Hackman and Oldhani assert that performance outcomes are directly attributable to an individual's internal motivation to perform well.

Psychological states consist of three critical components: experienced meaningfulness of the work; experienced responsibility for outcomes of the work; and knowledge of the actual results of the work activities. The first of these, *experienced meaningfulness of the work*, is the degree to which a person believes a job that is being performed is not trivial; thus, work motivation is more likely to develop. The second, *experienced responsibility for the results of work activities*, is the degree to which one believes they are personally accountable for work outcomes; thus, a feeling that one's initiatives or efforts may have positive outcome results in internal motivation to perform well. Lastly, *knowledge of the results of work activities,* is the degree to which a person can find out whether they are performing well or poorly (Hackman & Oldham, 1980). It provides the basis by which an individual feels good about having done well, or unhappy about doing poorly. In this study, the variables for each of these three contributing factors for the psychological state construct were recorded.

The measurement of affective outcomes was the other key sub-construct used to measure the degree of a respondent's overall job satisfaction. When internal motivation is high, employees have enriched opportunities for learning and growth (Hackman & Oldham, 1980). Thus, learning potential should be higher for those more satisfied with their jobs. The affective outcome sub-construct consists of two variables: *general satisfaction* and *internal work motivation*. It should be noted that both these variables are a result of the factors present in the psychological state sub-construct.

Overall job satisfaction, then, is a measure of not only the psychological state resulting from individuals' concepts of the core characteristics of the job they perform. It is also a measure of their internal motivation, satisfaction, and beliefs as to the effectiveness of their performance.

For this research, satisfaction with the job was measured by an instrument from the Job Diagnostic Survey developed by Hackman and Oldham (1980). This instrument provides relatively high reliability with Cronbach alphas ranging from 0.76 to 0.88. Specifically, there are three constructs measured within this scale: *general satisfaction, internal work motivation,* and *growth satisfaction*. Together, these measures provide an accurate, reliable assessment of individuals' attitudes toward their job. The JDS was used to test the following hypotheses:

H2a. Individuals in organizational units receiving MMS and on-the-job training (MMFULL) will report greater job satisfaction than those receiving traditional plus on-the-job training (TRADFULL).

H2b. Individuals in organizational units receiving MMS and on-the-job training (MMFULL) will report greater job satisfaction than those receiving on-the-job training alone (OJTONLY).

H2c. Individuals in organizational units receiving MMS and on-the-job training (MMFULL) will have a greater *increase* in satisfaction with their jobs than those receiving traditional plus on-the-job training (TRADFULL).

6.3. Intervening variables

6.3.1. Individual's attitude toward the information system

Since the object of the training interventions is the mastery of a computerized information system, accompanied by positive changes in users' attitudes toward their jobs and capabilities, it is imperative to see if their attitudes toward technology in general possibly intervene in the successful use of such a system (Baroudi, Olson, & Ives, 1986; Davis, 1989; Davis, Bahozzi, & Warshaw, 1989; Ives & Olson, 1984). Perceived ease of use and perceived usefulness are two possible mediating variables that maybe used to measure the users' attitudes toward technology.

The perceived usefulness/ease of use scale, originally developed by Fred Davis (1989) was used. The Cronbach α (0.98) for this instrument was shown to be consistent and reliable in the original Davis study (1989) and then again, when it was reevaluated for use in an instrument developed by Moore and Benbasat (1991).

6.3.2. Attitudes toward learning

In addition to individuals' attitudes toward the job they perform, their feelings toward technology, and their attitude toward themselves, it is also believed that attitudinal measures must also include those of individuals' perceptions of the instruction method utilized.

For this study, employees' attitudes toward the training they have received might confound the results of the self-efficacy and satisfaction measures.

Therefore, this dimension will be controlled through the measurement of individuals' attitudes toward the instruction they have received. A four-item scale developed by Perez and White (1985) was used to determine individuals' predisposition toward the methods of instruction received.

7. Procedure

The above hypotheses were tested against data collected from Holiday Inn franchise hotels. Once a site was scheduled to have the Encore^TM system installed, their personnel underwent training utilizing either a traditional training method or a traditional method supplemented with the MMS. Regardless of which intervention was used, employees were required to fill out a brief questionnaire *prior to receiving any training* to gather demographic information such as their experience levels (hotel and computer). Then, after gathering demographic information, the two main measurement instruments were distributed. The first was designed to measure performance variables (known internally as a certification exam) and the other was designed to measure the behavioral variables.

All employees in the study took the Encore^TM system certification exam at the time of the system installation. After 90 days, follow-up certification exams were administered to those individuals still working on-site, as well as to new hires. To measure individuals' attitudes, employees from each of the hotels were given questionnaires to fill out at the time of the Encore^TM system installation and then again at the end of the 90-day period. Overall, data were collected from 826 Holiday Inn employees, 748 employees had filled in both the certification exam and the survey form and were considered usable. Most of those considered non-respondents did not complete the second certification exam (the first certification exam was a mandatory component of the

Encore™ system installation). Once a hotel's manager agreed to participate in the study, employee participation was ensured. The result was a 90% participation rate.

The study group was then divided into six sub-groups:

1. 128 individuals who received traditional training at the time of the Encore™ system installation and were still present 90 days later to take a follow up questionnaire (coded "TRADFULL" in the study);
2. 181 individuals who received modified traditional multimedia for their training and remained for the full 90-day period (coded "MMFULL" in the study);
3. 71 individuals who were hired *after* the Encore™ system installation and received on-the-job training from fellow employees as well as training on the multimedia system (coded "MMOJTONLY" in the study);
4. 50 individuals who received on-the-job training only from traditionally-trained fellow employees (coded "OJTONLY" in the study);
5. 103 employees who left *before the* 90-day period and who received traditional training only (coded "TRADONLY" in the study); and
6. 215 individual who *left before* the end of the test period and received only the multimedia training, since the instruments used for attitude and performance measurements were given when the MMS was their only form of training (coded "MMONLY" in the study).

A summary group was also used, dividing the population into two sub-groups; 467 employees who had utilized some form of an multimedia system (MMS) as a training tool, and the remaining 281 who had not.

One final note, the sample was not random, however, the research design employed should eliminate most validity problems associated with non-randomization. Prior to a training intervention, demographic data for that location and its employees were gathered.

8. Results

8.1. Between group comparison

Initial analysis began with paired *t*-tests to compare each group with one another. An example of the results of this analysis is shown in Table 2. Other paired *t*-tests details maybe found on the author's Web site at http://www2.cis.gsu.edu/dmcdonald/analysis.pdf. *Within* group analysis was performed for the TRADFULL and MMFULL groups. Lastly, the General Linear Model was used to test for a relationship between the attitudinal variables and the performance variables.

Only significant group differences were reported for each of the attitudinal variables. The variable used to test self-efficacy (EFFICACY), showed three significant group comparisons out of the possible fifteen (see Table 2).

They are MMONLY with MMOJTONLY (i.e., the MMOJTONLY group demonstrating a better sense of self-worth than the MMONLY group), OJTONLY with TRADFULL (i.e., the TRADFULL group reporting higher self-efficacy than the OJTONLY group), and TRADFULL with MMFULL (i.e., interestingly, the TRADFULL group had a higher self-efficacy

Table 2
Group comparisons for the "Self-Efficacy" construct

	TRADONLY ($n=103$)	MMONLY ($n=215$)	OJTONLY ($n=50$)	MMOJTONLY ($n=71$)	TRADFULL ($n=128$)	MMFULL ($n=181$)
TRADONLY ($n=103$)	–					
MMONLY ($n=215$)	$P=0.857$	–				
OJTONLY ($n=50$)	$P=0.240$	$P=0.519$	–			
MMOJTONL Y ($n=71$)	$P=0.072$	$P=0.017$	(MMOJTONLY group scoring higher)	$P=0.646$	–	
TRADFULL ($n=128$)	$P=0.500$	$P=0.372$	$P=0.046$ (TRADFULL group scoring higher)[a]	$P=0.175$	–	
MMFULL ($n=181$)	$P=0.636$	$P=0.450$	$P=0.861$	$P=0.302$	$P=0.005$ (TRADFULL group scoring higher)[a]	–

[a] Indicates P-values $\leqslant 0.05$.

rating than the MMFULL group). Only the last comparison was meaningful with regards to hypothesis 1.

8.1.1. Job satisfaction

Once again, details of the paired *t*-test comparisons may be found on the author's Web site at http://www2.cis.gsu.edu/dmcdonald/analysis.pdf. Table 3 shows all the significant score comparisons between the groups and attitude variables.

Each row label represents a higher level construct (in bold) or lower-level variables. Each column label represents the group that scored higher. The values in the cells include the average score for each group as well as the compared group. For example, for the efficacy construct, the average MMOJTONLY group score of 5.714 was significantly higher than the average MMONLY group score of 5.487 ($P=0.017$). From this data summary, it can be seen that the MMFULL group clearly lacked the statistical significance expected from testing H1a, H1b, H2a, and H2b. Therefore, there is no support to the claim that the multimedia trained group had better attitudes toward either themselves or their jobs than any of the other groups.

8.1.2. Within group comparisons

The analysis of the attitudinal differences continues by comparing the mean scores of employees in the TRADFULL and MMFULL groups during and after the Encore[TM] system installation. The paired t-test was used to compare the results of scores on the survey instrument given at the time of the Encorezbht system installation with those given after a 90-day period. The results indicate that there was a significant positive change in attitudes for the traditionally-trained group (Table 4), while the multimedia-trained group consistently showed a negative change in attitudes (Table 5).

Table 3
Data summary for between group analysis

Group scoring higher	TRADONLY	MMONLY	MMOJTONLY	TRADFULL
Construct				
Efficacy			5.714/5.487 w. MMONLY ($P=0.0l7$)	5.860/5.592 w. OJTONLY ($P=0.046$) 5.860/5.614 w. MMFULL ($P=005$)
Job satisfaction				5.852/5.671 w. MMFULL ($P=0.038$)
Responsibility				6.188/5.909 w. MMFULL ($P=0.005$)
Meaningfulness			5.910/5.532 w. TRADONLY ($P=0.034$)	
General satisfaction			5.821/5.387 w. MMONLY ($P=0.034$) 5.821/5.363 w. OJTONLY ($P=0.013$) 5.821/5.291 w. MMFULL ($P=0.001$) 5.82 1/5.429 w. TRADONLY ($P=0.017$)	
Training	5.434/4.780 w. OJTONLY	5.83 1/4.639 w. OJTONLY		

The scores shown are averages for each group. Higher level constructs are shown in boldface.

Table 4
Attitude changes in 90-day period for TRADFULL group ($n=128$)

	Mean change in score after 90 days	P
Self-efficacy	Improved by 0.555	0.000
Overall job satisfaction	Improved by 0.307	0.001
Psychological state	Improved by 0.361	0.001
Resultant knowledge	Improved by 0.560	0.001
Responsibility for job	Improved by 0.364	0.001
Affective outcomes	Improved by 0.240	0.017
Internal motivation	Improved by 0.255	0.014
Ease of use	Improved by 0.348	0.038

Higher level constructs shown in boldface. Only significant changes are shown.

Table 5
Attitude changes in 90-day period for MMFULL group ($n=181$)

	Mean change in score after 90 days	P
General satisfaction	Declined by −0.221	0.046
Usefulness	Declined by −0.268	0.047
Training method	Declined by −0.386	0.005

Higher level constructs shown in boldface. Only significant changes are shown.

These findings indicate an opposite outcome for the hypotheses originally postulated. The finding that most of the attitudes of employees indicated a significant improvement in the traditionally-trained sites, coupled with a significant decline in employees' attitudes toward the training they received in the multimedia-trained sites, initially leads one to believe that employees responded more favorably to the extra attention given to employees by traditional-training methods, since this type of training involved much more human contact. Possibly this extra contact imparted a greater sense of management concern to the employees, thus resulting in their improved attitudes. Nonetheless, the basis for H1c and H2c, i.e., employees would show improvements in their attitudes toward self-efficacy and job satisfaction, do NOT appear to be supported.

9. Conclusions

While the results of the traditionally-trained group's improvement may seem counterintuitive, an explanation may be found from past studies with similar results. One possible explanation for these outcomes can be linked to the work of Earley and Lituchy (1991). They tried to find empirical commonalties between three theoretical models of self-efficacy (Eden & Ravid, 1982; Garland, Weinberg, Bruya, & Jackson, 1988; Locke, Frederick et al., 1984; Locke & Latham, 1990). Their results show that personal traits and abilities influence an individual's self-efficacy, which then relates to his or her personal goals, in turn leading to performance gains. There was also less conclusive evidence that the valence of these goals also affected performance.

In our study, management paid more attention to employees at sites that used traditional training.

Employees worked more closely and for a longer period of time with the professional trainers. Additional monetary compensation was also provided for them to attend the training sessions. The trainer/trainee ratio was purposely kept low, thus giving each employee substantial amounts of individual attention. As a result, the increased quality time and the added monetary incentives could have provided motivation (personal trait) and enhanced the abilities of individuals at the traditionally-trained sites, thus leading to heightened self-efficacy.

In contrast, at multimedia sites employee contact with the trainer was minimal. As previously discussed, trainers primarily came on-site to insure the proper installation of the Encore™ system and answer any post-installation questions from management and employees. Management expected employees to familiarize themselves with the MMS while on-duty, during their spare time.

Apparently, the attention or lack of attention paid by management to their employees in the training process had an impact on employees' attitudes. This effect is not surprising and is well-documented in quality-of-work-life research dating as far back as the 1924 Hawthorne Studies (Anonymous, 1976; Ives, 1992; Rosow, 1979; Rosow & Zager, 1988). Furthermore, the empirically-established relationship between those employees traditionally-trained and an improvement in their attitudes testifies to the relevance of socio-technical systems development, with regards to both the Encore™ system and the MMS implementations.

Traditionally-trained individuals responded better to both the Encore™ system and the training they received; while the multimedia trained group's attitude toward training declined over the

90-day period, further justifying our belief that the installation and methods of use of the MMS was not handled as well as it might have been. Management should have had more personal contact with employees in introducing the MMS and provided more incentive for its use.

Moreover, on-the-job training appeared to contribute to higher self-efficacy for the subjects in this study. Heightened employee participation (thereby increasing lateral relations) in the change process, initiated by closer contact with the change agents (trainers and management), enhanced the attitudes of employees within an organization. This supports the contention that the establishment of relations is a viable strategy for improving the behavioral component of change participants (Baroudi, Olson, & Ives, 1986).

The direct implication is that use of participative strategies and processes, if implemented along with the installation of the MMS, can improve the overall training effort and may lead to improved organizational effectiveness. Furthermore, we contend that training should be structured, utilizing all three training methods; that is, on-the-job training, classroom session, and multimedia-supplementation. Moreover, our fmdings have provided evidence of an empirically-established relationship between participation and change theory that is a possible new avenue for future study.

Although, technology implies change, and change has often been associated with negative behavioral consequences (Barki & Huff, 1985; Keen, 1981; Orlikowski, 1993; Zierden & Robinson, 1983), the introduction of new equipment and software does not in itself lead to decreased feelings of satisfaction and perceived motivation (Joshi, 1990; Leonard-Barton, 1988; Phillips, 2001). This study provides evidence of an opposite effect, with some employees deriving greater meaning from their work and perceiving more responsibility after the introduction of the Encore^{TM} system.

Similar to the self efficacy findings, it appears then, that a greater impact occurred from the method used to train the employees, than from the installation of the Encore^{TM} system itself. Even though the employees did not report significantly poor attitudes toward their training, there were obvious differences in the respective organizational environments. With no basis for comparison, employees did not find fault with their particular training method. But, apparently, the method of training induced changes in employees' perceptions of themselves and their work.

In looking at this conclusion, there are a number of implications that need to be explored. First is the possibility that those who had the support of fellow workers, as well as the perception of organizational support, had improved overall attitudes. This research supports the claim by Brensema and Keen (1983) that education is a form of organizational support and should be a dominant concern in the implementation of an information system. Without proper education, the new system is often doomed to failure, either by lack of use or mis-appropriate use. The manner of training to provide for the educational needs of employees is also vital. Many of the MMS sites did not permit employees to take time off from their busy work schedules to use the MMS, resulting in negative job attitudes. Yet, our findings indicated that the use of formal classes improved most of the attitude measures used in this study. Thus, it may be that the perceived support from the organization increases the employee's affective attachment to the organization. The extent to which these factors influenced employee attitudes would depend on the strength of the employee's perception of gaining favorable personal benefits resulting from the training intervention.

Second, there is also the consideration that we are unable to measure attitude changes effectively and accurately that are affected by training. Details of the analyses (not presented here),

indicated low adjusted R2 values. While this study followed a careful empirical methodology in the construction of the experimental design and in the control of the variables within the experiment, it may be that, with the strictest of methodological designs and the best possible variable control, it still is impossible to measure accurately the training effects on human subjects' attitudes.

Even with the tremendous progress the social sciences have made in terms of testing, validation, and reliability of tools, it is possible that certain types of training effects are elusive to researchers. Only further research in the area of training evaluations of multimedia systems can help shed more light on this implication, and further the cause of empirical research in this area.

A third implication is that the MMS installation was an additional form of technological change. Although Holiday bin Worldwide acknowledged the need to prepare hotels for the radical change brought about by the installation of the Encore™ system, they did not have the foresight to realize that the introduction of a new technology to supplement traditional training methods could also be considered a form of change, and thus the need to prepare the hotels better.

A final implication of the results from this study is the idea that there may have been insufficient amounts of support and reinforcement by management after the participants returned to the job environment, thus causing the appreciable differences in attitudes between the multimedia-trained groups and those traditionally trained. This is interrelated with job relationships both from superiors and peers alike. If these interrelationships did not change between the participants and their regular job environment (i.e., supervisor's leadership style, downward communication, work expectations, interpersonal skills that are not consistent with what was presented in the course), conflicts in the participants' attitudes could occur, thus confusing and frustrating the employee. This confusion could then turn to abandonment of the newly achieved skills and thus little or no improvement results on the measurement instrument.

Conversely, peer interaction can also stimulate and sustain intellectual development. This would tend to support the achievement of attitudinal benefits from on-the-job training coupled with the MMS. Apparently, peer groups can promote a positive, attitude within the work environment. Past research in collaborative learning environments lends support to these claims (Krendl & Lieberman, 1988).

Some evidence of this is provided in this study. The MMOJTONLY group showed significantly higher meaningfulness of work and general satisfaction scores when compared with many of the other groups. Since employees in this group are relatively new to the organization, it is plausible they felt extra management support when presented with the MMS training tool. Because they did not even know of the existence of the classroom training, they did not feel that they had missed anything. However, those employees in groups that had been there at the time of the initial training did not perceive the MMS as being supported by management. This is a key finding of this study. Over time, the largest cohort in this study would be those receiving OJT only. This is the norm for most service-oriented industries experiencing high turnover. The implication is that the MMS training can effectively and efficiently supplement traditional OFF training, providing employees with continuous training, a greater mastery of the target information system, and improving their general work attitudes, all with substantially greater cost savings to the organization.

Appendix. A full description of the six groups used in the Holiday Inn Study

1. A fully traditionally trained group (TRADFULL). These employees were trained in a typical classroom setting with an instructor presenting a pre-defined lesson plan. This training is termed the "traditional" method. All management, front desk, housekeeping, accounting, night audit, food and beverage, and sales personnel received this training. The focus for each group was how to use the components of Encore[TM] system with which they interacted. In the training sessions, individuals related to instructors in a conventional, teacher–student mode with, generally, a student/intructor ratio of 3:1. The classes were presented around the clock, in a 6-day period, prior to the installation of the new system. Each class session was approximately 2 h long. The classes were held either in a small conference room or in one or two vacant guest rooms. Employees were paid to attend the training sessions. Breaks were frequent, with the hotel management supplying beverages and snacks. For 4–6 days following the system installation, the trainers remained available for on-site support. For the next 90 days, on-the-job training (OFF) was the primary method used for reinforcing the training on the Encore[TM] system. This group received the certification exam and attitude questionnaire twice; once, during the initial installation, and again, 90 days later.
2. A traditional training alone group (TRADONLY). The same group as above; however, they have not remained at the site for the full 90-day test period. This group received only the initial certification exam and attitude survey instrument. This group received the classroom training sessions. It should be noted that no determination was made as to the reasons for the employee's departure.
3. An on-the-job training alone group (OJTONLY). This group was hired at a "traditional" *site* after the installation of the Encore[TM] system. Thus, these are newly-hired employees who have never received the benefits of the classroom instruction. As time passed, this group became much larger and therefore, more significant. In fact, in the long run, it will be the largest group of employees. This group received only one certification exam and attitude measure at the end of the 90-day period.
4. "Traditional" training, reinforced with a multimedia system, group (MMFULL). In other words, the MMS training supplemented the "traditional" training each hotel received. It should be noted that the traditional training sessions were greatly reduced (from 2 weeks to 4 days) for this group. The Cyntergy trainers main purpose at these sites was to confirm that the multimedia system was being used (by administering the Certification exam) and to provide a source for employees to ask questions. All applicable hotel employees had unlimited access to the multimedia system. Lessons were presented using a combination of video, animation, graphics, sound, and text. Hypermedia was also supported; i.e., an employee could fully explore the material by clicking a mouse on various objects on the screen, linking to other related subject matter. The MMS supported random exploration in a non-linear manner. It encouraged employees to rediscover how procedures are accomplished that were either not learned initially in the "traditional" training sessions or were subsequently forgotten. However, employees were expected to use the system as part of their normal work duties (i.e., no extra compensation or time was given for training with the MMS). Holiday Inn Worldwide did not suggest nor provide instructions for training

employees on how to use the MMS. This group was present for the entire 90-day period and thus, received initial and follow-up certification exams and attitude surveys.

5. A mulitmedia alone group (MMONLY). This group received the initial classroom instruction for sites that had the supplemental MMS. However, these employees left before the end of the study period and therefore received only the initial certification exam and attitude survey.

6. A multimedia system plus OJT group (MMOJTONLY). This group was for newly-hired employees at what was termed a "multimedia" site. The MMS provided the training of these employees who did not have the benefit of the initial "traditional" classes. Rather than having to rely solely upon the strengths and weaknesses of fellow employees (for OFF), the MMS allowed for "learning-by-discovery" in a consistent, validated, and well-designed tutorial. This group received only the certification exam and survey instrument at the end of the 90-day period.

References

Anonymous (1976). *Directory of labor management committees*. Washington, DC. National Center for Productivity and Quality of Work Life.

Bandura, A. (1977). Self Efficacy: Toward A Unifying Theory of Behavior Change. *Psychological Review*, *84*, 191–215.

Bandura, A. (1986). *The Social Foundations of Thought and Action*. Englewood Cliffs: Prentice-Hall.

Bard, S. M. (1993). Checklist assists in reducing turnover. *Hotel Business*, *2*(1), 19.

Barki, H., & Huff, S. (1985). Change, attitude to change, and decision support system success. *Information and Management*, *9*, 261–268.

Barney, J. (1991). Firm resources and sustained competitive advantage. *Journal of Management*, *17*(1), 99–120.

Baroudi, J. J., Olson, M. H., & Ives, B. (1986). An empirical study of the impact of user involvement on system usage and information satisfaction. *Communications of the ACM*, *29*(3), 232–238.

Barrows, C. W. (1990). Employee turnover: implications for hotel managers. *FIU Hospitality Review*, 24–28.

Benbasat, I., & Dexter, A. S. (1981). An experimental study of the human/computer interface. *Communications of the ACM*, *24*(11), 752–762.

Bostrom, R. P., & Heinen, J. (1977). MIS problems and failures: a socio-technical perspective: part 1: the causes. *MISO*, *1*(3), 17–32.

Brensema, G., & Keen, P. G. W. (1983). Education Intervention and Implementation of MIS. *Sloan Management Review*, *24*(4), 35–43.

Davis, F. (1989). Perceived usefulness, perceived ease of use, and user acceptance of information technology. *MISO*, *13*(3), 319–340.

Davis, F., Bahozzi, R. P., & Warshaw, P. R. (1989). User acceptance of computer technology: a comparison of two theoretical models. *Management Science*, *35*(8), 982–1003.

Davis, S. A., & Bostrom, R. P. (1993). Training end users: an experimental investigation of the roles of the computer interface and training methods. *MISO*, *17*(2), 61–85.

Dobbelaere, A. G., & Goeppinger, K. H. (1991). Demographic changes. *Employee Benefits Journal*, 7–13.

Doll, W. J., & Torkzhdeh, G. (1989). A discrepancy model of enduser computing involvement. *Management Science*, *35*(10), 1151–1171.

Earley, P. C., & Lituchy, T. R. (1991). Delineating Goal and Efficacy Effects: A Test of Three Models. *Journal of Applied Psychology*, *76*(1), 81–98.

Eden, D., & Ravid, O. (1982). Pygmalion vs. self-expectancy: effects of instructor- and self-expectancy on trainee performance. *Journal of Applied Psychology*, *69*, 78–94.

Eisen, J. M. (1993). Reducing turnover and increasing profits. *Hotel & Resort Industry*, 24–26.

Fiol, C. M. (1991). Managing culture as a competitive resource: an identity-based view of sustainable competitve advantage. *Journal of Management*, *17*(1), 191–211.

Forman, D. C. & Kaplan, S. J., (1992). *Benefits and value of multimedia learning systems*)pp 1–13). National Education Training Group (NETG).

Fullerton, H. N. (1987). Labor force projections: 1986–2000. *Monthly Labor Review*, 19–29.

Garland, H., Weinberg, R., Bruya, R., & Jackson, A. (1988). Self-efficacy and endurance performance: a longitudinal field test of cognitive mediation theory. *Applied Psychology: An International Review*, *37*, 381–394.

Hackman, J. R., & Oldham, O. R. (1980). *Work redesign*. Reading: Addison-Wesley.

Hon, D. (1989). In *CHI '90 Conference Seminar*, *Computer–human interaction*, Seattle.

Ivancevich, J. M. (1978). The performance to satisfaction relationship: a causal analysis of stimulating and non-stimulating jobs. *Organizational Behavior and Human Performance*, *22*, 350–378.

Ives, B. (1992). Education, a sustainable national competitive advantage. *MISO*, *16*, xliii–xlv.

Ives, B., & Olson, M. H. (1984). User involvement and mis success: a review of the literature. *Management Science*, *30*(5), 586–603.

Ives, W. (1993). *Computerizing the development of interpersonal skills*. Bedford, MA: National Education Training Group (NETG).

Jackson, C. N. (1985). Training's role in the process of planned change. *Training and Development Journal*, 70–75.

Josbi, K. (1990). The role of systems designers in organizations. *Omega*, *18*(5), 463–472.

Keen, P. G. W. (1981). Information systems and organizational change. *Communications of the ACM*, *24*(1), 24–32.

Killion, T. H., & Boyle, G. H. (1987). *Common computer-based training system: a recommended approach*. Wahington, DC: US Air Force.

Koch, J., & Steers, R. (1978). Job attachment, satisfaction, and turnover among public sector employees. *Journal of Vocational Behavior*, 119–128.

Krendl, K. A., & Lieberman, D. A. (1988). Computers and learning: a review of recent research. *Journal of Educational Computing Research*, *4*(4), 367–389.

Leonard-Barton, D. (1988). Implementation as mutual adaptation of technology and organization. *Research Policy*, *17*, 251–267.

Lewin, K. (1951). *Field theory in social sciences*. New York: Harpers & Row.

Lloyd, P. (1993). Efficiency now comes off-the-shelf. *Multimedia Training*, 22–24.

Locke, E. A., Frederick, E., Lee, C., & Bobko, P. (1984). Effect of self-efficacy, goals, and task strategies on task performance. *Journal of Applied Psychology*, *69*, 241–251.

Locke, E. A., & Latham, G. P. (1990). *A theory of goal setting and task performance*. New York: Prentice-Hall.

Loveman, O. W., & Gabarro, J. J. (1991). The managerial implications of changing workforce demographics: a scoping study. *Human Resource Management*, *30*(1), 7–29.

Marcoulides, G. A. (1990). Improving learner performance with computer based programs. *Journal of Computing Research*, *6*(2), 147–155.

McDonald, D. S. (1999). Improved training methods through the use of multimedia technology. *Journal of Computer Information Systems*, *39*(4), 5.

Miles, M. B. (1964). *Innovations in education*. New York: Columbia University Press.

Moore, G. C., & Benbasat, I. (1991). Developing An Instrument To Measure the Perceptions of Adopting An Information Technology Innovation. *Information Systems Research*, *2*(3), 192–239.

Nadler, D. A. (1981). Managing organizational change: an integrative perspective. *Journal of Applied Behavioral Science*, *17*, 191–211.

Napier, H. A., Lane, D. M., Bastell, R. R., & Guadango, N. S. (1989). Impact of a restricted natural language interface on ease of learning and productivity. *Communications of the ACM*, *32*(10), 1190–1198.

Orlikowski, W. J. (1993). Case tools as organizational change: investigating incremental and radical changes in systems development. *MISO*, *17*(3), 309–341.

Orr, C., Allen, D., & Poindexter, S. (2001). The effect of individual differences on computer attitudes: an empirical study. *Journal of End User Computing*, *13*(2), 23–39.

Pastore, R. (1993). Training on tap. *CIO*, 56–62.

Perez, E. C., & White, M. A. (1985). Student Evaluation of Motivational and Learning Attributes of Microcomputer Software. *Journal of Computer Based Instruction*, *12*(2), 39–43.

Peters, T. J., & Waterman, R. H. (1982). *In search of excellence: lessons from America's best-run companies*. New York: Harper & Row.

Phillips, J. T. (2001). Embracing the challenge of leadership. *Information Management Journal*, *35*(3), 58–61.

Powers, T. F. (1992). The standard world of 2005: a surprise-free scenario. *Hospitality Research Journal*, *16*(1), 1–19.

Riggs, M. L. (1989). The Development of Self-Efficacy and Outcome Expectancy Scales for General Applications. *The annual Meeting of the Society of Industrial-Organizational Psychologist*, Boston, MA

Rosenberg, M. J. (1990). Performance technology: working the system. *Training & Development*, *44*(1), 43–48.

Rosow, J. M. (1979). quality-of-work-life issues for the 1980s. In J. M. Rosow (Ed.), *Work in America: the decade ahead*. New York: Van Nostrand.

Rosow, J. M., & Zager, R. (1988). *Training—the competitive edge*. San Francisco: Jossey-Bass.

Schein, E. (1972). *Professional education*. New York: McGraw-Hill.

Schein, E. (1987). *Process consultation*. Reading: Addison-Wesley.

Schein, E., & Bennis, W. G. (1965). *Personal and organizational change through group methods*. New York: Wiley.

Sein, M. K., & Bosirom, R. P. (1989). Individual differences and conceptual models in training novice users. *Human–Computer Interaction*, *4*, 197–229.

Stamps, D. (1993). Stalking the elusive technology payoff. *Training*, 47–53.

Tynam, D. (1993). Multimedia goes on the job: just in time. *New Media*, 39–47.

Ulrich, D. (1991). Using human resources for competitive advantage. In I. Kilmann (Ed.), *Making organizations competitive*. San Francisco: Jossey-Bass.

Vlosky, R. P., & Summers, T. A. (2000). Computer technology in the College of Agriculture classroom at Louisiana State University. *Bradford*, *17*(3), 81–84.

Vogler, C., O'Quin, K., & Paterson, W. (1991). Grade and knowledge improvement as a result of computer-assisted instruction. *Journal of Educational Technology Systems*, *19*(3), 201–213.

Zierden, W. E., & Robinson, K. M. (1983). Smartprocess: a practical training program and a tool for organizational change. *Training and Development Journal*, 62–67.