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AUTHOR	Ellsworth, James B.
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ABSTRACT

This paper summarizes the results of a study examining the implementation of a computer-based trainer in a U.S. Army Advanced Individual Training center. Interviews, document analysis, and participant-observation were used to identify factors that influenced potential adopters to accept or resist the new trainer. Comments from planners and administrators, technical support personnel, subject-matter experts (instructors), instructional developers, and students were analyzed for common themes affecting the adoption/rejection decision. Nineteen factors were identified, focusing on different situational entities (i.e., other participants, the system itself, external organizations, leaders of the implementation, and the bureaucracy). Results suggest four critical issues for planners to consider to maximize the positive impacts of each factor throughout the dissemination process. Recommendations for addressing these issues are offered to administrators, instructional technologists, and change agents. (Contains 14 references.) (Author/AEF)

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Planning for Success: Considerations for Managing Dissemination of Training Technology

Author:

James B. Ellsworth
United States Army
Fort Huachuca, AZ

ABSTRACT

This paper summarizes the results of a study examining the implementation of a computer-based trainer in a US Army Advanced Individual Training center. Interviews, document analysis, and participant-observation were used to identify factors that influenced potential adopters to accept or resist the new trainer. Comments from planners & administrators, technical support personnel, subject-matter experts (instructors), instructional developers, and students were analyzed for common themes affecting the adoption/rejection decision. Nineteen factors were identified, focusing on different situational entities (i.e., other participants, the system itself, external organizations, leaders of the implementation, and the bureaucracy). Results suggest four critical issues for planners to consider to maximize the positive impacts of each factor throughout the dissemination process. Recommendations for addressing these issues are offered to administrators, instructional technologists, and change agents.

INTRODUCTION

United States Army training centers have used instructional technology throughout their curricula for many years. This was a natural development in an organization dealing with many technical disciplines rooted in electronics. Frequently, dissemination of this technology proceeded smoothly, and promoted more effective learning. Sometimes, however, it produced failures as spectacular as any in the private sector. Likewise, as in business and academe, initial attributions of these failures to poor system quality or incompetent personnel ultimately fell under the onslaught of contrary data. Since previous research focusing on instructional effectiveness and other system characteristics was often inconclusive (sometimes giving high marks to a system that failed miserably), another approach was needed.

The approach selected, diffusion research, recognizes that even innovations of proven effectiveness can fail if their intended users will not commit to their success (Wellin, 1955; Mosteller, 1981; Rogers, 1983). Thus, it is concerned with the human factors which facilitate or hinder this commitment.

The diffusion paradigm breaks down some of the philosophical barriers between qualitative and quantitative methods. Its roots are qualitative, and it often makes use of in-depth interviews, document analysis, or participant-observation (Rogers, 1983). These tools are especially useful in this context, since the objective is to gain insight into the concerns of the individuals who interact with the innovation. At the same time, diffusion research does not dismiss quantitative measures, often using correlation to associate independent variables with innovativeness, rate of adoption, etc. Likewise, diffusion scholars may use statistical techniques to analyze possible trends represented by their data (Fullan and Pomfret, 1977; Berman, 1981).

Many studies of both types have been conducted, providing a rich framework for comparison that can help overcome the weak generalizability associated with case st do the key factors in a military training setting differ from those of the civilian educational settings explored in past research? This required comparison of the findings to existing frameworks.

METHOD

This study employed a qualitative perspective. The adoption/rejection decision is one that is intensely personal (Rogers, pp.20, 21). Even if it is assumed that the same set of factors underlies it for all people, the way each individual perceives those factors is likely to vary considerably. Since it is ultimately the potential adopter, not the change agent, who will decide whether to adopt or reject an innovation, this study had to examine these individual perceptions to offer meaningful guidance to future dissemination efforts (Burkman, pp.439, 440, 442).

Unfortunately, a quantitative approach to this examination was problematic. Statistical measures of observed behaviors or results are almost certain to be more representative of the researcher's cognitive structure than the subjects' because it is the researcher who selected the variables to be measured. Similarly, surveys may pose questions in a way that does not correspond to the subjects' way of thinking about such things, and may have difficulty detecting behaviors that the subjects would not be inclined to brag about. Perhaps most important, for the study to identify interrelationships between factors, it was essential that factors be described in the potential adopters' own terms, as the relationships of interest were those that existed in their minds. A qualitative approach offered the most effective means of accomplishing this end (Martin, 1988, pp.3, 4).

Participant Selection

One might imagine that what is important might vary, depending on each individuals' role relative to the trainer. To test this hypothesis (and to protect reliability from its potential effects), the participants were selected from the categories suggested by Garland (1991, p.255). These include management, information systems technologists, subject experts, instructional designers, and learners. For each category, individuals were selected whose relationship to the BMMT fell within that description. These people were approached about being interviewed and, as part of this conversation, asked who else was involved with the device when it first got started. This procedure was repeated until no new names were generated. This completed the participant selection process, except for students, and generated twenty-two names.

Representing the student perspective proved more troublesome. The procedure employed to select other participants was intended to obtain 100 percent coverage of those personnel still present. For students, this was neither possible (the last ones having graduated well before the study began) nor practical (literally hundreds being present at any one time); consequently, an alternative selection strategy was used.

Selection of students began with the assumption that their perspective remains relatively constant across time (the system is always new to the students). The major weakness of this assumption is that, during implementation, the students were faced with instructors for whom the system was also new. This threat was countered by including participant-observation logs from four trained observers (including the author) who participated in early classes. Actual students were then selected using a stratified random sampling technique, with two selected from each available class, for a total of sixteen. One selected student from each class had used the resource suite (a source of remedial instruction), while the other had not. Together, these methods were intended to ensure that perspectives were provided that reflect the full range of instructor teams and instructional approaches for the system. They also ensured that students who had trouble with the course were represented equally with those whose achievement met or exceeded normal levels.

Data Collection

As already implied, this study is an historical retrospective, as the BMMT was implemented approximately two years before it began. Since this prevented the use of participant-observation (other than that recorded in historical documents), the primary method of data collection was the in-depth interview. This method, as described by Bogdan & Biklen (1992, pp.2, 3, 96-101) uses a few general questions to orient the discussion, but generally allows the interviewee to talk about what (s)he sees as important. That is, after all, the objective (Martin, p.6).

The most specific guidance was reserved for the introduction, and for the demographic questions. Before starting this portion of the interview, a few minutes of shop talk were used to help relax the participant, and to make the interview less like formal questioning and more like an everyday conversation. The interview itself consisted of two core questions: Tell me about your involvement with the BMMT when it first got started, and Tell me about yourself. Once each question was asked, the interviewee was allowed to talk everything out before a series of more specific, semi-structured questions under each core question were asked. The use of these questions helped in the comparison of responses from different participants. The interview ended when the interviewee ran out of things to say. Demographic questions were reserved for last so the interviewee would be more relaxed. This strategy was selected under the assumption that beginning with demographic items would focus the interviewee on the fact that this was a research interview, perhaps altering the nature of the conversation.

To help ensure accurate representation of each interview, a tape recording was made of the session (after securing the interviewee's permission). For those who choose not to be recorded, field notes were taken directly. In either event, the interviewee was assured that all data collected would be held in confidence, and would not be reported with names or other identifying information.

The major weakness of an interview strategy under these circumstances is that it relies on participants' recollection of events and their reactions to them. This required the use of additional data sources for triangulation. Fortunately, the military bureaucracy is well known for generating a volume of historical documents, which served as a rich data source representing several points of view. The most common of these was the official point of view of the school hierarchy. Documents originated at each echelon provided a glimpse at coordination that occurred during the process, and various viewpoints on the device itself. Besides the official perspective, records of the evaluation organization within the school provided professional-grade qualitative data from focus groups conducted during implementation. As these

records described the feelings and concerns of participants during the implementation, recorded at that time, they served as a useful cross-check for interview data collected during this study.

Coding and Analysis

Some degree of lreflective analysis during data collection was inevitable, as analysis-in-the-field is an essential part of the qualitative tradition (Bogdan & Biklen, p.154). This consisted chiefly of the emergence of coding categories during the study, leading to increased attention paid to particular comments occurring during an interview comments that frequently reinforced a tentative category or suggested the emergence of a new one. Occasionally, such informal analysis also alerted the author to additional questions, new data sources, or differing perspectives of potential adopters.

Primary data analysis, however, occurred toward the end of the study. In part, this was to preserve energy and time for the tasks of establishing rapport and getting on in the field, as suggested by Bogdan & Biklen (ibid.); in part, it was to ensure that the perspectives gained from analyzing early interviews did not limit the scope of inquiry in later ones.

This analysis process began with transcription of interviews. At this time, the tape recorded (or manually recorded, via field notes) interviews were entered, with the various classes of documents discussed earlier, into journal format on a computer. The data were then reviewed, as a whole, to formalize the initial coding categories discovered during data collection. This use of open coding facilitated the broadest coverage of the data.

Once the core categories were extracted in this fashion, the study shifted to axial coding to explore them in greater depth. This portion of the process focused on identification of examples for each category from the data, and occasionally the perception of new core categories that more closely fit the observed phenomena.

RESULTS

Results of the study fall into two sections, associated with initial and subsequent rounds of analysis. In the first round, factors extracted from participant comments were organized into categories, and general impressions of findings were formed. In the final round, these categories and impressions were examined to identify major themes, or critical issues, that could be acted upon by planners and administrators.

Factors and Factor Groups

Initial coding identified nineteen factors comprising five major groups. These focused on how participants perceived certain characteristics of the different entities involved in the implementation. Such entities included other participants, the system itself, external organizations, leaders of the implementation, and the bureaucracy.

Participant Factors

These factors describe how potential adopters own characteristics, and beliefs about those of others, affected their perceptions of the system. Participant type refers to the role of the individual with respect to the innovation (e.g., management, instructors, etc.). Some comments reflected participants views of the effect of others roles on their perceptions (e.g., The command group just didn't understand what the instructors needed this thing to do). As expected, however, its greatest impact was the effect of each participants own role on the factors that affected them. The individual's role was also found to impact less on what factors were important than on how those factors were viewed. For example, individuals from all roles talked about system quality and gains (or losses) associated with adoption. In doing so, however, senior personnel focused on its impact on students, while mid-level personnel emphasized their responsibilities for the innovation itself. Instructors highlighted its effects on their interaction with other individuals, especially students, while students themselves considered what the innovation required of them. Other factors in this group included participant background, referring to whether an individual was considered a Morse subject-matter expert, competence, describing perceptions of co-workers abilities to perform their system-related duties, and views of change, relating to a participants orientations and reactions to change overall.

System Factors

This second set of factors addressed potential adopters' views of the trainer itself. Quality refers to a participant's perception of the trainers merit (e.g., poor, fair, good). Net Gain describes perceptions of this merit in relation to that of the previous system (e.g., worse, equivalent, better). These factors were surprisingly distinct, i.e., several participants felt that BMMT was a poor-to-fair system because it coddled students, yet these same individuals described it as much better than its predecessor, and therefore supported it. A final factor of this type, lessons learned, refers to a participantís impression of how the teachings of experience were incorporated into the new system and its surrounding philosophy.

External Organization Factors

Another common theme described dealings with outside organizations, such as hardware and software vendors. Capability describes a participants views of the outside organizations technical capacity to perform according to the stated requirements. Motivation covers perceptions of the goals that guided the outside organizations planning and actions (e.g., the most profit with the least effort vs. genuine concern for improving the learning process). Finally, attitude refers to a participants impression of the tone of interaction with representatives of the outside organization (e.g., condescending, hostile, cooperative).

Leader Factors

One of the most pervasive factor groups relates to the characteristics of the implementation efforts leadership, as seen by the potential adopters. Continuity describes participant views on the consistency of the implementation strategy as the effort progressed. Comments showed that personnel at all levels had difficulty adjusting to the implementations new personality when key leaders retired or were reassigned during the effort. Qualifications refers to a participants awareness of the background of the implementations leadership, and how they felt this affected leaders ability to manage the process. Involvement addresses the potential adopters perceptions of the leaderships level of interest in and attention to the implementation.

Bureaucracy Factors

This final set of factors reflects the Defense bureaucracies artificial compartmentalization of the change process, as experienced by potential adopters. Most individuals reported feeling isolated from the other organizations involved throughout the process. In fact, this contributed to the focus of the factor groups, as individuals struggled to make sense of the implementation effort as a whole, while seeing themselves as cut off from all but the adjacent parts. These categories tended to correspond to the phases of the Systems Approach to Training (SAT) model. Analysis describes participant views on the effectiveness of the front-end analysis. Comments suggested that instructors and training division administrators interpreted this as job and task analysis, and were concerned that no one ever took the time to look at what we do down here and figure out how BMMT could support it. Senior-level command and staff, on the other hand, talked about needs assessment as described by Kaufman (1972): how does the status quo differ from the desired end-state, and what must the BMMT do to move us from here to there and felt that the trainers obvious efficiency at doing so meant the process had been successful. Design refers to participant understanding of the process used to generate the requirements for the system. Development relates to their perceptions concerning creation of the courseware. Implementation describes their feelings about the adequacy of guidance they received or ideas they were allowed to contribute as training with the system began. Finally, departing from the SAT phase factors, instruction of key personnel relates to participant assessments of the process used to familiarize them with its operation, and coordination describes their perceptions of how it all was (or was not) tied together.

Critical Issues and Recommendations

A final round of analysis focused on translating the factors identified by participants into critical issues that administrators, instructional technologists, and change agents could have focused on during the planning stages of the trainer to smooth its implementation. Many factors were eliminated at this time, reflecting differences between the participant perspective and that of the planner. This is not a judgment of validity; it is the product of an audience analysis. One senior administrator put it this way: Don't waste my time telling me what I already know; don't waste my time telling me what I can't change; don't waste

my time telling me what doesn't matter This guidance defines a critical issues by exclusion. Some factors eliminated may be considered common sense (e.g., the effectiveness of the new system, by itself or relative to the old system); others are outside the organizations control (e.g., the capability, motivations, or attitude of the contractors). Many more, while they appeared in several sources, were neither pervasive throughout the data nor particularly critical to those who mentioned them. The four issues discussed here are those that represent central themes throughout the data, could have been implemented by planners and administrators in the organization, and would probably have promoted acceptance at the least cost to resources or effort (based on participant comments).

Coordination

This issue is grounded in the leader factor involvement and the bureaucracy factor coordination. Taken together, these factors describe a participant's perception of the role played by the organization's leadership in planning and managing the change process, and in keeping their subordinates informed as that process progressed. Participants especially those at lower echelons saw those in key leadership positions as uninvolved and uncommunicative. Planners and administrators were generally described as lacking knowledge of project specifics, or of technical background. Participants seldom heard anything about what was happening outside their level of their organization. This contributed to a common perception that no one was at the wheel and that other organizations either were not working much at all or were working at cross purposes. For their part, planners and administrators interviewed were clearly taking active roles in the project, and took a certain amount of pride in their grasp of its complexities. In fact, their comments often reflected a belief that the concerns of those at lower echelons stemmed from lack of exposure to the big picture

This is clearly a communications issue. The structure of this type of organization discourages information flow between other-than-adjacent echelons. Unfortunately, while it is a necessary part of military order and discipline, its strict interpretation does promote the sort of perception discussed above and restricts the ability of the organization to bring its collective experience to bear. To optimize both these criteria, the organization's leadership might sponsor some form of structured information flow outside conventional channels. One participant suggested a project newsletter, published by the project's lead organization and actively soliciting contributions from all levels of all organizations involved. This low cost alternative would provide a quick and convenient forum for participants to share ideas and keep each other current on the activities of their particular section. It would offer the dual benefit of increased goodwill and pooling of expertise on all phases of development.

Empowerment

This second issue is grounded in the bureaucracy factors analysis, design, and implementation. The intended users of a new trainer are primarily personnel from the academic department for which it is intended. Unfortunately, the findings showed that actual (future) users of the trainer were almost never consulted or involved in requirements definition. Comments from those who drew up the specifications for them often showed this to result from their perceptions that they knew what the users' requirements would be (often because they had once held the users' roles). Whether this assumption was valid or not, it fostered the impression that those in charge did not place much value on what the trainer's future users thought or wanted. Thus, in a worst case scenario, a system could be designed based on inaccurate perceptions of user needs and the users could know this and resent the system (and its proponents) for it. This in turn would encourage users to magnify the system's failures, and to blame them on their lack of involvement in defining the requirements in the first place.

To prevent this, planners and administrators should ensure the active representation of actual (future) users throughout the implementation process. This is most critical for instructors, who will have the most day-to-day contact with the system over an extended period (and thus the most impact on its success or failure). Again, this does not need to be incompatible with a structured environment. A training division administrator can be asked to task one of his instructors as the project team representative. The findings showed, however, that this person must continue to be primarily an instructor. Otherwise, his understanding of instructor priorities may become dated, and he will cease to be seen as a peer, becoming instead a project team stoolie. Similarly, such an individual must confer frequently with his fellows, to ensure that he is, in fact, representing them and not like the former user in the preceding paragraph merely assuming he understands them. Administrative and maintenance personnel who will personally use the system may be represented in the same manner. Student representation may generally be limited to

observations or interviews during the front-end analysis, and conventional testing for usability and instructional effectiveness.

Competence

This issue is grounded in the participant factor competence, the external organization factor capability, and the leader factor qualifications. The importance of this issue is probably best known in relation to subject-matter (or other contextual) expertise. This is due to the prevalence of external contractors as development agencies for the type of system discussed here. While contractor personnel are usually competent developers, they generally lack the same familiarity with the subject matter being taught and the context in which it will be applied that is associated with internal personnel. However, it can be equally crippling when the perceived deficiency in competence relates to the development process itself. Likewise, if the project team is seen as lacking the authority (a sort of capability) to enact its decisions, no amount of subject-matter or development expertise will compensate for this. While each is necessary, neither subject-matter experts, nor instructional developers, nor skilled leaders are sufficient without the others to produce an effective system.

Consequently, planners and administrators should ensure that all required skills are represented when a project team is formed. That participants perceive this to be the case is at least as important. The findings offer an example where the military courseware developers possess roughly the same mix of development skills and experience as would be allocated to a project of comparable size by a contractor. However, since they did not initially possess this experience, they were written off as unqualified by many other participants. Thus, planners and administrators should attempt to select project team members whose expertise in their area is respected by other participants especially the system's intended users.

Personal Benefit

This final issue is grounded in the system factors equality and net gain and, to a lesser extent, the bureaucracy factor instruction of key personnel It has two major components. The first asks, How will use of the new system affect how well or how easily I can do my job The second asks How will use of the new system affect the nature or status of my job Comments from participants at all levels suggested that the BMMT"s implementation effort was aided by both aspects. The trainer was seen as offering substantial improvements in efficiency and effectiveness of job performance, and most participants reported some level of personal benefit associated with these gains.

Planners and administrators should understand that this may not always be the case. The BMMT replaced a similar, computer-based system that nearly all participants felt needed replacing. User roles were not substantively redefined, nor did users feel personally threatened by the new system. Systems introduced into classrooms previously dominated by lecture/conference instruction and practical exercises may leave users unsure of how they should interact with the new trainer, and threatened by its intrusion into a familiar environment with comfortable patterns of control. This can be aggravated by a change agent who stresses the strengths of a new trainer relative to conventional instruction, and is thus perceived as presenting it as a more efficient alternative.

This can create a false dichotomy between traditional and computer-based instruction. In reality, neither is a philosophy to be accepted or rejected. Both are tools for an instructor which, like any other tools, are appropriate for some tasks and inappropriate for others and both may be used together. For example, complex, conceptual topics may require the adaptive skills of a human instructor and be best suited to a lecture/conference mode while basic declarative knowledge, or psychomotor or procedural skills may require extensive, self-paced drill-and-practice and be best suited to computer-assisted delivery. Furthermore, the conceptual topic mentioned above may have to be integrated into a sequential procedure, suggesting a lecture/conference followed by a computer-assisted practical exercise. Decision-makers should emphasize this toolbox orientation, whether they are integrating a training device into an existing course or designing a new course with device-based support. A strategy that recognizes the instructor as the central component of all resident instruction is likely to meet with much more enthusiasm than one that proposes a device or system as the new center of attention. Technological support should instead be introduced as a means of relieving the instructor of tedious, repetitive administrative chores that a computer can perform more efficiently thereby freeing him to address the real business of teaching. An important part of this approach must also be provision of transition training, to provide instructors with tips and techniques for using the system to their greatest advantage, as these techniques are frequently quite different from those used in unassisted platform instruction.

DISCUSSION

Beginning with its central question, this study's findings can be summarized as follows: triangulation from the three data sources (interviews, historical documents, and participant-observation) produced a set of robust factors offering a credible explanation for participants adoption/rejection decisions. As expected, the BMMT as a successful system provided a wealth of positive comments that reflected a solid implementation strategy. More surprisingly, it also offered many lessons learned, pointing out factors that were not addressed to the satisfaction of most potential adopters.

Taken together, these positive and negative impressions represent the importance of each factor to participants . . . and thus the value of attention paid to that factor as a force multiplier for increasing the systems chances of acceptance. Considered separately, the vector sum of these impressions represents the degree to which planners and administrators already understand and attend to each factor. (A strong, positive vector sum shows the factor is under control; a strong negative suggests it is not, with a range of possibilities between). By applying these criteria, together with an assessment of the organization's leverage on each factor, this study was able to derive a set of critical issues which deserve additional attention. (This approach may be useful even in situations where these particular factors are less prevalent.)

Moving on to the first related question, the initial hypothesis concerning the effect of a participant's role relative to the trainer was confirmed by the findings. Its effect, however, was primarily one of perspective on each factor, rather than determining the factors themselves. Furthermore, based on analysis of the types of comments made by each participant, some migration occurred from Garland's categories. As a result, several participants finished the study in a category other than that for which they were selected. Redesignation of the categories according to their new membership resulted in the following perspectives: management, administrative staff, instructors, and students.

Concluding with the final question, comparison with previous studies showed widespread congruence. Differences that arose reflected viewpoint more than substance, and illustrated key effects of the military setting. For example, the traditional category of training effectiveness was frequently viewed as a negative factor because students who are also soldiers are expected to succeed in spite of the worst the environment can throw at them. Table 1 summarizes the correspondence between factors identified in this study and three prominent frameworks based on research in other settings. (Each X represents one corresponding factor.)

TABLE 1 Support for Factors from Research in Other Settings

Identified Factor	Rogers (1983)	Ely (1990)	Zaltman & Duncan (1977)
Participant Type			XXX
Participant Background	X	X	XX
Competence		X	X
Views of Change	X	XXX	XXXXX
Quality	XXX		
Net Gain	XX	XXX	XXXXXX
LessonsLearned	X		
Capability		X	X
Motivation			XXXX
Attitude			XXX
Continuity		XX	
Qualifications		X	XX
Involvement		XXXXX	XX
Analysis		X	X
Design		X	X
Development		X	X
Implementation		X	X
Instruction of Key Personnel	X	XX	XX
Coordination			XX

The scientific impacts of this study follow from this comparison. Despite the environmental differences associated with a military setting, the factors that the study identified corroborated those of its civilian/educational predecessors. This supports the possibility of a diffusion paradigm that is, at some level, applicable across all settings. At the same time, the different viewpoint of the results adds richness to the research base through examples of setting-induced variance.

Limitations of the Study

The most critical limitation of this study results from its status as a single-site case study. Of all qualitative techniques, this type of study offers the least generalizability due to its focus on a particular situation. Other threats to external validity (generalizing power) include its use of a military site, with the associated centralized, highly cohesive structure. While the support drawn from previous research in other settings offers some assurance that similar factors may be encountered elsewhere, the findings reported will be of primary use only to suggest issues for consideration, or frameworks for future inquiry.

It should also be remembered that this study's objectives were restricted by the research questions. Factors were identified and used to generate issues for consideration, and these issues were examined for the

effect of participants' roles relative to the system (and compared with frameworks from research in other settings). Beyond this, exploration of interrelationships between factors, or statistical investigation of correlations between factors and demographic characteristics, are deferred to future studies.

Implications for Future Research

While this was intended primarily as an exploratory study, its findings suggest several implications for future diffusion research. Most notably, it derived a set of factors without placing a priori restrictions on the type of factor being sought. In contrast, while several well-validated frameworks exist, most previous research in this area focuses on part of the diffusion problem. Rogers identifies innovation characteristics facilitating adoption; Ely does the same for environmental conditions; Zaltman & Duncan look chiefly at factors hindering adoption. As the field was being defined, this approach made a great deal of sense, amounting to a divide and conquer strategy. Now, perhaps, a more appropriate role for future inquiry is the integration of these perspectives: looking at the diffusion problem as a whole (the innovation and its environment) from whatever mix of perspectives (acceptance and resistance) offers the most rigorous explanation of the observed phenomena.

Another implication is embedded in the method employed to derive critical issues from the identified factors. The technique used is new, as far as the author is aware. It has the advantages of being simple, and allowing an objective means of comparing factors to identify the most cost-effective opportunities for intervention. However, while this procedure may be intuitively appealing, and appears to have produced reasonable results in this circumstance, it has not been validated outside this study. Future investigations of this sort may wish to learn if it has wider application.

Finally, the findings of this study offer an in-depth look at the factors affecting the adoption/rejection decision for the full range of participants in the implementation of a particular training device in a particular Army discipline. While this evidence is probably adequate to suggest attention to the identified factors in any future implementation, it is not sufficient to conclude that there are no other factors of equal importance to other systems, or in other disciplines or environments. Ideally, further expansions of scope should be conducted until no new issues are revealed. Such augmentation would have the additional benefit of clarifying the factors already discovered, offering insight into issues such as circumstances causing a particular factor to assume prominence in a particular implementation, interrelationships between factors, or correlations between factors and demographic characteristics. The result could be a user's guide for implementing technological support for any training in any environment.

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