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An Experimental Study of the Impact of Training on Faculty Concerns

By Dr. Rita L. Dobbs

Introduction

In 2000-2001, 89% of public four-year higher education institutions in the United States were offering courses through two-way interactive video (National Center for Education Statistics [NCES], 2003). 80% of the respondents indicated that distance education delivery utilizing two-way interactive video would start or be increased by their institution within the next three years (NCES, 2003); however, training for faculty utilizing videoconferencing was not addressed in this report.

In a previous NCES report (1999), only about a quarter of higher education institutions offering distance education courses required faculty to have training in distance education technologies. "The development of a quality distance learning program is predicated upon a quality faculty, not unlike that in any other instructional setting" (Savage, 1999, p. 209). The need for faculty training has been well documented in the literature. Perreault, Waldman and Zhao (2002), Savage (1999), Cyrs (1997), Moore (1997) and Beaudoin (1990) have all pointed out the need for faculty training in videoconferencing techniques; however, the literature is lacking in actual studies of the direct impact of training on the faculty who will be ultimately responsible for the success of the distance education program. The implementation of videoconferencing classes can be an expensive venture for an institution, yet the research indicates that institutions do not put money into the training of its faculty. Hanson, et al. (1997) stated, "a well-run distance education enterprise is the product of people, planning, and technology" (p. 34). However, the implementation of effective programs is often hampered by a variety of factors.

Some professors and administrators may have negative attitudes toward distance education. They have concerns about the quality of the education that is possible in a videoconferencing format. Many times this is due to the lack of understanding of the technology itself and sometimes due to lack of training of faculty, staff and administration (Savage, 1999). Some instructors are afraid of having to change instructional methods or of losing autonomy. If instructors do not receive support for planning or course design, negative attitudes may develop; however, a formal and thorough orientation to distance teaching and distance education can change educators' perceptions (Dillon & Walsh, 1992). Sheinberg (2000) stated that distance learning requires different technology as well as different course design, evaluation methods, and learner-support structures.

A review of the research related to implementing an innovation, such as videoconferencing, into an organization or institution revealed the Concerns Based Assessment Model (CBAM) developed by Hord, Rutherford, Huling-Austin, and Hall (1998) who wrote, "the single most important factor in any change process is the people who will be most affected by the change" (p. 29). Even though the technology and the institution are important to the successful implementation of a distance education program, the faculty, staff, and administrators utilizing the system are the most important factors in successful implementation (Hord, Rutherford, Huling-Austin, & Hall, 1998). Moore and Kearsley (1996) suggested that the success of a distance education program in an institution is dependent upon the internal commitment by the teachers and others within the organiza-

tion. If the innovation is to be successful, the *concerns* of faculty utilizing the systems must be addressed (Hall & Hord, 2001). It is important to note that the success of any new program in higher education is dependent upon the innovation being supported and implemented by the faculty of the institution (Hall, & Hord, 2001). Kaufman (2004) stated that the most active ingredient in any change initiative is people.

Frances Fuller, University of Texas psychologist, in 1969 originated the idea of addressing the concerns of individuals faced with implementing a new innovation. Through Fuller's work and that of Ven den Berg & Bandenberghe, 1981; Persichitte & Bauer, 1996; Shieh, 1996; and Hall & Hord, 1986, it was found that when people are exposed to change, they experience the same concerns (Hall & Hord, 2001). An administrator or director of a new distance education program would want to identify and address the concerns of faculty who would be using the new system for teaching purposes. This could eliminate negative attitudes and negative comments about the new technology.

Hall and Hord (2001) identified and confirmed seven specific categories of concerns that are detailed in the Stages of Concern Questionnaire (SoCQ) and tested in the Stages of Concern Questionnaire. "The most rigorous technique for measuring concerns is the Stages of Concern Questionnaire (SoCQ), which is a thirty-five item questionnaire that has strong reliability estimates (test/retest reliabilities range from .65 to .86) and internal consistency (alpha-coefficients range from .64 to .83)(Hall & Hord, 2001, p. 68).

Problem Statement

This study was undertaken to determine if formal distance education classroom training or classroom training combined with laboratory experiences would affect the concerns of college faculty about the implementation of distance education through videoconferencing in their institution.

Research Question

Do the stages of concern, as measured by the Stages of Concern Questionnaire (SoCQ), differ among groups of college faculty who are expected to begin delivering instruction via distance education and who receive classroom training on distance education, classroom training and laboratory experiences on distance education, or no distance education training?

Research Methodology

This research was conducted at Texas State Technical College-Marshall (TSTC-M), which is located in Marshall, Texas, a rural East Texas town of approximately 25,000 people. The college is part of the TSTC system, the only state-supported technical college system in Texas.

The population for this study was comprised of 27 full-time faculty of the college. The population was divided into three groups for the purpose of this study. Each group included nine faculty. The first group, the classroom group, consisted of personnel who participated in only the classroom portion of the distance education training activities. The second group, the classroom and laboratory group participated in the classroom training and completed an additional 18 hours of hands-on training in the distance-learning classroom. The third group, comprised of the personnel who did not participate in distance education training activities, served as the control group. A quasi-experimental design was used for the research because the individuals were not randomly assigned to treatment conditions.

The Stages of Concern Questionnaire (SoCQ) was administered as a pretest to all three groups before formal distance education training was conducted. The validity of this instrument was established by Hall, George, and Rutherford (1986) over two and one-half years of research with "intercorrelation matrices, judgments of concerns based on interview data, and confirmation of expected group differences and changes over time" (p. 12). The seven stages

of concern, awareness, informational, personal, management, consequence, collaboration and refocusing, assessed in the SoCQ represent a developmental sequence that an individual progresses through when confronted with change or innovation (Toms, 1997).

Each participant in all three groups of the study received the questionnaire on the first day of the scheduled classroom training. The control group attended the first fifteen minutes of the first scheduled classroom training to complete the survey. Once their survey questionnaire was returned, the control group members were dismissed from the classroom training session. Respondents indicated on a Likert scale the degree to which each concern was true and circled a number from 0 to 7 on the printed scale. Respondents were given as much time as necessary to complete the survey before actual classroom training began. Each series of the questionnaire consisted of items that are important at a certain stage of concern, according to the Hall, George and Rutherford (1986) concerns theory. Each of the seven stages of concern was represented by five questions on the survey. A scale score was obtained for the peak score and for each of the stages of concern on the questionnaire. This information provided the baseline data for the research. After the SoCQ was completed, the researcher presented nine hours of classroom instruction in distance education teaching strategies to the 18 participants in groups two and three.

Personnel choosing to participate in the study were placed into two groups. Each group met one day every second week for three hours of instruction. Classroom training consisted of three, three-hour sessions over six weeks of instruction. Participants took part in discussion and hands-on activities that familiarized them with the technology and the necessary skills for teaching at a distance. At the conclusion of the last classroom session, the participants who elected to end their training with the classroom portion were administered the SoCQ as a posttest.

The classroom and laboratory group was comprised of the faculty and administrators who wished to participate in additional hands-on activities videoconferencing classroom. This group participated in 18 hours of individual, hands-on practice in the distance-learning classroom in addition to the required classroom instruction. The laboratory time included guided practice in how to use the equipment effectively and feedback on instructional delivery utilizing the equipment. Participants presented a 10-minute lesson in their subject area in the videoconferencing classroom to a remote site at the conclusion of their 18 hours of laboratory work. Upon completion of the presentations, the SoCQ was administered to the classroom and laboratory group and to the control group. The respondents completed the SoCQ following the same procedures as in the two previous test administrations. A scale score was determined for the peak score and for each of the seven stages of concern.

Analysis of the Data

Data obtained from the SoCQ were hand-scored using the Quick Scoring Device included in the Hall, George, and Rutherford (1986) manual about measuring the stages of concern of an innovation. Data was transferred by hand to scoring sheets. Raw scores, the sum of the responses to the five questions matching each stage of concern, were entered into the SAS statistical program (SAS Software, 1999) which was used to analyze the data. The analysis of covariance (ANCOVA) was conducted on the data to determine if differences occurred among the three groups.

To determine if a covariate was needed in the analysis of the data, analysis of variance (ANOVA) was run on the pretest (covariate) for each of the seven stages of concern. A significant F ratio was found at the $p < .01$ level of confidence in five of the seven stages of concern, and at the $p < .05$ level of one additional stage of concern, indicating the appropriateness of the covariate analysis. This indicated the need for a covariate in the study. The ANOVA

Table 1. Analysis of Variance on the Seven Stages of Concern in the Stages of Concern Questionnaire

Stage of Concern	Group	Mean (SD)	F	Probability
Awareness	Classroom	11.67 (3.12)	1.92	ns
	Classroom and Laboratory	11.33 (4.80)		
	Control	15.11 (5.37)		
Informational	Classroom	25.00 (4.58)+	16.46	$p < .01$
	Classroom and Laboratory	22.78 (6.34)*		
	Control	11.56 (4.90)*+		
Personal	Classroom	24.78 (6.04)*	8.71	$p < .01$
	Classroom and Laboratory	17.22 (8.69)		
	Control	8.78 (9.31)*		
Management	Classroom	16.67 (7.48)*	4.86	$p < .05$
	Classroom and Laboratory	12.00 (5.24)		
	Control	7.33 (6.12)*		
Consequence	Classroom	21.89 (7.13)*	8.54	$p < .01$
	Classroom and Laboratory	16.22 (9.51)+		
	Control	6.33 (7.40)*+		
Collaboration	Classroom	22.67 (6.06)*	17.61	$p < .01$
	Classroom and Laboratory	21.00 (8.70)+		
	Control	4.78 (6.10)*+		
Refocusing	Classroom	15.44 (5.15)*#	20.69	$p < .01$
	Classroom and Laboratory	9.22 (5.17)+#		
	Control	2.11 (2.20)*+		

*indicates significant difference between means designated *
 +indicates significant difference between means designated +
 #indicates significant difference between means designated #

results among the three groups on the pretest are reported in Table 1.

Once the need for the covariate was determined, the data were analyzed by using ANCOVA.

Analysis of the Seven Stages of Concern

Hall, George and Rutherford (1986) recommended dealing with group data by "aggregating individual data by developing a profile that presents

the mean scores for each stage of the individuals in the group" (p. 32). The aggregate score was derived from the sum of the responses given to the five questions addressing each stage of concern. The total stage raw scores for each of the participants in each group were used in the ANCOVA test to determine differences among the groups. The authors noted that the higher the score, the more intense the concerns at that stage. The initial pretest score on the Stages of Concern Questionnaire was used as the covariate in this study.

Analysis of covariance (ANCOVA) was used to adjust for initial differences between groups before a comparison of the within and between groups was made. Gall, Borg and Gall (1996) suggested “the preferred statistical method is analysis of covariance in which the posttest mean of the experimental group is compared with the posttest mean of the control group with the pretest scores used as a covariate” (p. 496). Independent *t* tests of least squares means, Tukey, were conducted on the comparison results of the groups to determine which differences between and among groups were significant. (See Table 2) Significant differences occurred in four of the seven stages of concern indicating that training alleviates fears and concerns of faculty members who are going to using videoconferencing as a means of transmission for teaching courses. For clarity, each stage of concern is discussed.

Stage 0 - Awareness

The analysis indicates little difference in the awareness stage of concern about involvement with distance learning. After the posttest scores for the three groups were adjusted by ANCOVA, the obtained F value of 1.03 failed to reach the .05 level of probability.

Stage 1 - Informational

In stage 1, informational, a general awareness of distance learning is indicated. After the posttest mean scores for the three groups were adjusted by using the ANCOVA analysis, the obtained F value of .79 did not exceed the critical value at the .05 level. There was no significant difference among the adjusted mean scores of the groups in stage 1.

Stage 2 - Personal

The analysis of stage 2, personal, indicates little difference in the involvement with distance learning. After the posttest scores for the three groups were adjusted, the obtained F value of 2.32 failed to reach the .05 level of probability.

Stage 3 - Management

Responses to stage 3, management,

Table 2. Analysis of Covariance Results of the Seven Stages of Concern

Stage of Concern	Adjusted mean (se)	F-value	Probability
Awareness		1.03	ns
Classroom	10.07 (1.63)		
Classroom and Laboratory	8.39 (1.64)		
Control	11.87 (1.70)		
Informational		.79	ns
Classroom	14.76 (1.85)		
Classroom and Laboratory	17.47(1.68)		
Control	15.43 (2.18)		
Personal		2.32	ns
Classroom	13.97 (2.79)		
Classroom and Laboratory	18.97 (2.40)		
Control	11.62 (2.82)		
Management		7.04	p < .01
Classroom	11.97 (2.11)		
Classroom and Laboratory	17.11 (1.93)*		
Control	6.47 (2.11)*		
Consequence		7.70	p < .01
Classroom	14.61 (2.12)*		
Classroom and Laboratory	21.99 (1.88)*+		
Control	11.51 (2.22)+		
Collaboration		7.14	p < .01
Classroom	17.00 (1.31)*		
Classroom and Laboratory	21.53 (1.24)*+		
Control	14.14 (1.61)+		
Refocusing		6.52	p < .01
Classroom	11.50 (2.39)		
Classroom and Laboratory	16.51 (1.77)*		
Control	6.55 (2.44)*		

*indicates significant difference between means designated *
 + indicates significant difference between means designated +

indicated concerns with logistics, time and management concerned with distance learning. Adjusted posttest scores resulted in an obtained F value of 7.04 indicating a significant difference at the .01 level of probability. The results of the Tukey post hoc analysis indicated that significant differences occurred between the classroom and laboratory group (17.11) and the control group (11.51).

Stage 4 - Consequence

Consequence, stage 4, indicates the degree of concern about the consequence of the distance learning innovation upon students. The F value of

7.70 for treatment effects among the three groups was significant at the .01 level. The results of the Tukey post hoc analysis indicated that the adjusted mean of the classroom and laboratory group (21.99) and the adjusted mean of the classroom group (14.61) differed significantly. The post hoc analysis also indicated that the adjusted mean of the classroom and laboratory group (21.99) and the adjusted mean of the control group (11.51) differed significantly.

Stage 5 - Collaboration

Stage 5, collaboration, indicates the degree of concern about working with

others in distance learning. The F value, 7.14, was significant at the .01 level of probability. Results of the Tukey post hoc analysis indicated that the adjusted mean of the classroom and laboratory group (21.53) differed significantly from the adjusted mean of the classroom group (17.00). The post hoc analysis also indicated that the adjusted mean of the classroom and laboratory group (21.53) differed significantly from the adjusted mean of the control group (14.14).

Stage 6 - Refocusing

The analysis of stage 6, refocusing, indicates the degree of concern about wanting to learn more about distance learning. The F value of 6.52 exceeded the critical value at the .01 level of probability. Results of the Tukey post hoc analysis indicated that the adjusted mean of the classroom and laboratory group (16.51) differed significantly from the adjusted mean of the control group (6.55).

Analysis of the Dimensions of Concern

For further clarification, the seven stages of concern can be grouped into three dimensions. The dimensions are self, task and impact. Stages 0,1, 2 fall into the self dimension. In this dimension, the person is more concerned about personal issues. Stage 3 falls into the task dimension and stages 4, 5, 6 make up the impact dimension. (See Table 3) After analyzing the data, significant differences occurred in two of the three dimensions of concern.

Discussion of Findings

Results of the data analysis for the experimental populations in this study indicated that significant differences favoring the experimental strategy for the classroom combined with laboratory experiences group occurred in four of the seven stages of concern at the p < .01 level of confidence and in two of the three dimensions of concern at the p < .01 level of confidence.

Concerns research shows that concerns change over time in a developmental manner. Because this is true, profes-

Table 3. Analysis of covariance on the Dimensions of Concern

Dimension probability	Adjusted mean (se)	F-value	Probability
Self (0, 1, 2)		98	ns
Classroom	36.86 (4.31)		
Classroom and Laboratory	44.66 (3.82)		
Control	41.04 (4.47)		
Task (3)		7.04	p < .01
Classroom	11.97 (2.11)		
Classroom and Laboratory	17.11 (1.93)*		
Control	6.47(2.11)*		
Impact (4, 5, 6)		12.61	p < .01
Classroom	41.33 (4.31)*		
Classroom and Laboratory	60.04 (3.59)*+		
Control	33.97 (4.83) +		

*indicates significant difference between means designated *

+indicates significant difference between means designated +

sional development for faculty should address the stages of concern in a progressive manner if the new technology, or change, is to be effective. This means that a person’s concerns should be addressed at the point of the score on the SoCQ and then activities should be presented to help them move to the next concern. For example, if a person is at the informational stage when the new innovation is introduced, then there is no reason to take the person back to the first stage of awareness. The professional development should address the individual’s concern at the time and help the person move to the next stage until the individual reaches the refocusing stage where the concern that the individual has is for the institution and the students receiving the instruction through the videoconferencing classroom. The sum of the responses to the five questions addressing the seven stages of concern should show the progressive development of an individual or group moving from a high awareness or self-concern to the refocusing concern that indicates acceptance and willingness to implement an innovation (Hall & Hord, 1987).

When evaluating the classroom and

laboratory group in this study, the analysis of the data indicated that this group had shifted its focus away from concerns primarily about self and had begun to evaluate the management, consequence, collaboration, and refocusing stages that are essential for the new innovation, distance education, to be successful at TSTC-M.

High concerns in stage 3 for the classroom and laboratory group indicated that this group was concerned about logistics, time and management concerns. The highest adjusted mean score for the classroom and laboratory group occurred in stage 4. This indicated that the group had concerns about the effects of distance learning on students. Their next highest adjusted mean score was in the adjacent stage 5, collaboration. This indicated that the group had concerns about the collaborative efforts of distance learning. The high score on the refocusing stage, with a low score in the awareness stage, indicated that the individuals who had participated in classroom and laboratory experiences were concerned about its effects on students. They were also concerned with collaboration efforts to make distance education more effective for students

involved in the process.

The analysis of the data of the classroom group in this study showed a significant difference at the $p < .01$ level of confidence in two stages of concern. The highest adjusted mean score for the classroom group was in stage 5, collaboration. A significant difference between the classroom and the classroom and laboratory groups appeared at this stage. A significant difference between these two groups also occurred in the consequence stage. These differences indicated that classroom training was beneficial to both groups but the actual laboratory experiences helped the faculty feel more comfortable about distance education. The classroom group also showed a significant difference from the classroom and laboratory group in the impact dimension. This shows that the classroom training made the group more aware of distance education but faculty need the additional laboratory experiences before beginning instruction in the distance learning classroom.

The control group profiles in this study align with that of the nonuser in the stages of concern. The concerns of nonusers are typically the highest on stages 0, 1, and 2, and typically lowest on stages 4, 5, and 6. The highest adjusted mean score for the control group occurred in stage 1. This indicates that the group is more concerned with personal position and well being in relation to the change. With the second highest adjusted mean score falling in stage 5, the results of the ANCOVA suggested that the control group is also highly concerned with working with others. The "tailing-off" stage 6 indicates that the group does not have ideas that compete with the distance education innovation. The responses for the control group followed the typical pattern of a nonuser of distance education. This group appeared to have little interest in distance education.

Limitations of the Study

The results of this study should not be generalized to extend to other institutional groups without comparative data. The findings must also be viewed with

limitations specified by the experimental design, the participating faculty, the researcher, the questionnaire, and the statistical analysis.

Conclusions

Based on the findings of this study and recognizing the limitations stated in the previous section, it was determined that classroom training combined with laboratory experiences was more effective for addressing concerns of college faculty about the innovation of videoconferencing classes. This type of treatment seemed to be more effective in preparing these personnel to teach in a videoconferencing setting and helping them move from the early stages of concern concentrating primarily on how the innovation affects them to the task and impact stages of concern where a person can be more concerned about how the innovation affects the student. Another conclusion that could be supported by the data is that training in the new teaching methodologies required in this environment can help increase the institutionalization of the innovation and should be viewed as a critical component when beginning videoconferencing classroom instruction.

Determining if classroom training and classroom experiences aid in the smooth acquisition of the innovation of videoconferencing programming provides pertinent and useful data on how higher education faculty embrace and adapt to change as measured by the SoCQ. This study was conducted under the assumption that personnel implementing distance education programs desire a smooth and successful acquisition of the innovation.

Implications

The implications of this study are important to show the need for faculty training before teaching in a videoconferencing environment. Because of the expense involved for any institution installing a videoconferencing classroom, it is important to ensure that the equipment is being used and that faculty does not have negative feelings about teaching in the new environment. "For faculty members to succeed in distance

education, they need to be supported with accurate and complete information and training in order to develop their skills and understanding" (Cavanaugh, 2002, 176). With faculty focusing on the needs of their students and not their personal concerns about teaching in the new environment, they can focus more on the quality of the curriculum and in attracting and retaining students. Cavanaugh (2002) also points out that all distance education faculty members need training and this training should be followed up with ongoing assistance and peer mentoring.

By using the SoCQ, the concerns of faculty can be assessed throughout the process of implementing videoconferencing classes as well as assessing concerns years into the process. This can help determine if the faculty utilizing the classrooms are effective in their instruction. The literature supports that teaching in a videoconferencing environment is different from teaching in a traditional face-to-face classroom (Willis, 1994, Palloff & Pratt, 1999, Palloff & Pratt, 2001). Oblinger and Maruyama (1996) report that in higher education lecture is still the traditional mode of delivery of course content. Because of this, it is important to provide training combined with laboratory experiences to faculty new to the environment so that their concerns can be addressed and effective instruction, resulting in quality programs, will be the product of the new innovation.

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