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FACULTY NEEDS ASSOCIATED WITH AGRICULTURAL DISTANCE EDUCATION

Tim H. Murphy, Texas A&M University
H. Robert Terry, Jr., Oklahoma State University

Abstract

A census survey of the teaching faculty in a land grant university's College of Agriculture was conducted The survey instrument was a three-part questionnaire designed by the researchers. The purpose of this study was to provide baseline data and focus for the improvement of instruction in a College of Agriculture through the utilization of electronic teaching technologies. The objectives, stated as questions, were: I) What are selected personal andprofessionaf characteristics of the teaching faculty?; 2) What is the perceived level of competence that members of the teaching faculty have in using electronic technologies associated with distance education ?; 3) How important do teaching faculty members perceive that these technologies are or will be in teaching and learning?; and 4) What is the perceived availablilty of equipment, facilities, and training for faculty to use these technologies? Findings indicatd that teaching faculty lack both competence in using these electronic technologies, and confidence in their ability to use appropriate distance teaching methodologies to deiiver courses. However, they believe that using electronic technologies would enhance their teaching, and that the development and use of electronic teaching technologies will change how, but not change what, they teach over the next five years.

Introduction and Theoretical Framework

With rapid advancements in telecommunications technology in recent years, a great deal of interest has developed regarding distance education and its uses by colleges of agriculture. However, the research that has been conducted concerning distance education for agriculture programs has been limited. During the five year period between 1989 to 1993, only seven studies dealing with the topic of distance education were reported at the National Agricultural Education Research Meeting (Arrington, 1990; Martin, 1991; Mundt, 1992; Scanlon & Bruening, 1993; Lawver & Terry, 1994).

Keegan (1986) classified theories of distance education into three groups. The third group encompassed theories concerning interaction and communications. Gamble and Gamble (1989) proposed a model for all types of communication containing four primary parts. The first component of the model is the sender. The sender can be a person, group of people, or an entire institution. The second component is the message--the information to be communicated. The third part is the channel, or method by which the message is communicated. Finally, the fourth part is the receiver--the person, persons, or institution to which the message is targeted. These same four components are important in evaluating the potential success of distance education efforts for agricultural educational programs. Overall, distance education research has focused primarily on the two latter factors with more limited evaluation of the former two.

New developments in communications technologies have driven research regarding the methods of delivery, or the channel, used in distance education. Much attention has been directed to the technology itself The concept of the "information super-highway" has been the subject of countless articles in the popular press. Currently, there is a barrage of television commercials being aired by telecommunications and computing industry giants such as AT&T, MCI, and Microsoft promoting the benefits of these new technologies to help people

work, learn, and recreate more effectively. Jackson (1994) stated that the increase of available telecommunications technology has provided educators of agricultural subject matter unique opportunities.

A great deal of concern has also been directed toward learners, or the receivers of distance education programs. Dillon and Walsh (1992) pointed out "the dominate theme of distance education research has been linear; research has focused primarily upon learning outcomes, learning characteristics, and learner attitudes" (pg. 5). However, other factors must be considered as well. That is, there are other aspects of this communications process that must be considered.

The sender of the information is another critical factor in the communications model and must be investigated to ensure success of distance education programs. Newcomb (1990) pointed out that technology for distance education is ready; however, such programs in agriculture will not succeed until educators are as ready as the technology. McNeil (1990) stated that while the implementation of new technologies is growing, the rate of adoption is quite slow. A reason commonly given for this disappointing rate of adoption is the resistance of college faculty (Gunawardena, 1990). However, as Dillon and Walsh (1992) contend, faculty, the persons normally responsible for program design and delivery, have been largely neglected by distance education research. It is important to identify obstacles and challenges facing faculty in colleges of agriculture related to their work with electronic teaching technologies to ensure the success of distance education efforts.

Purpose and Objectives

The purpose of this study was to provide baseline data and focus for the improvement of instruction in a college of agriculture through the utilization of electronic technologies used in teaching. The objectives, stated as questions, were:

1. What are selected personal and professional characteristics of the teaching faculty of the college of agriculture at a land grant university?
2. What is the perceived level of competence that members of the teaching faculty of the college of agriculture have in the use of electronic technologies associated with distance education?
3. How important do teaching faculty members perceive that these technologies are or will be in teaching and learning?
4. What is the perceived availability of equipment, facilities, and training for faculty to use these technologies?
5. Do faculty have suggestions for the improvement of instruction through the use of these technologies?

Methods and Procedures

Population

The population for this study was all teaching faculty in the college of agriculture at a land grant university. A census of the population was surveyed. Department heads were asked to provide a complete listing of faculty members in their department who held teaching appointments. With all departments reporting, a total of 314 faculty members with teaching appointments were identified.

Instrumentation

The instrument used to collect data was a three-part questionnaire designed by the researchers. Part I consisted of 34 statements with a seven-point Likert-type response scale. The response choices were: 1 = "Strongly Disagree," 2 = "Disagree," 3 = "Somewhat Disagree," 4 = "Neither Agree nor Disagree," 5 = "Somewhat Agree," 6 = "Agree," 7

= "Strongly Agree." A seven point scale was chosen so categories could be included that would more accurately identify respondents who did not hold strong opinions. The researchers considered the possibility that many of the faculty would not hold strong opinions on some statements due to a lack of information about, and or exposure to, these relatively new technologies.

Items in Part I were designed to measure the following:

- level of competence of faculty members in the utilization of technologies associated with distance education;
- perceived value these technologies have or will have to the teaching of agriculture; and
- perceived availability of equipment, facilities, and training related to the use of these technologies.

Part II of the questionnaire was designed to identify the selected personal and professional characteristics of the respondents. The demographic variables included in the survey were gender, age, the number of undergraduate and graduate courses the faculty member taught per year, and the total annual enrollment in those courses.

Part III provided an opportunity for the respondents to add their comments concerning the improvement of their use of distance education technologies. This part of the questionnaire consisted of a single open-ended question: "In your own words, what would significantly improve your use of the new electronic educational technologies often associated with distance education?'

Content validity of the instrument was established by a panel of five experts made up of faculty members from the Department of Agricultural Education and the Department of Educational Human Resource Development. A pilot test of the instrument was completed by selected faculty members from the two departments. Minor changes in the instrument were made based upon evaluation of the pilot test and suggestions of the panel of experts.

Collection of Data

All teaching faculty in the college were sent a copy of the questionnaire along with a cover letter describing the project via campus mail. Of the 314 survey instruments sent out, 234 were returned within two weeks, for an effective response rate of 74%. A reminder was sent to non-respondents via campus mail and a third call was made via e-mail four weeks after the initial mail out. Those faculty without valid e-mail addresses were contacted via telephone. In each case, additional instruments were supplied upon request. In all, 256 survey instruments were returned for a final response rate of 8 1.5%. Survey and follow-up procedures were in accordance with those outlined by Dillman (1978).

Analysis of Data

Data were analyzed using SPSS® software on an IBM 3090 mainframe. Descriptive statistics were calculated for each variable. An attempt to control non-respondent error was made by comparing the data from early and late respondents as suggested by Miller and Smith (1983). No significant differences were found between the groups. Post-hoc reliability was established by calculating Cronbach's Alpha. The alpha for items related to perceived level of competence was .61; for items related to perceived level of importance was .65; and for items related to perceived availability was .68.

Frequencies and percentages were used to summarize agreement or disagreement with statements related to competence, importance, and availability. Only those respondents who indicated "agree" and "strongly agree" or those indicating "disagree" or "strongly disagree" are reported in the findings. Thus, those respondents who indicated "somewhat agree," "neither agree nor disagree" or

"somewhat disagree" were considered not to have a strong opinion about a given statement.

Results

Part II: Personal and Professional Characteristics of Teaching Faculty

More than 92% of the respondents were male and fewer than 23% were younger than 40 years old. Almost 64% of the faculty reported that they taught one or two undergraduate classes per year with 15.6% reporting they taught no undergraduate courses. Twenty-five percent did not teach any graduate classes, while 55.5% taught one graduate class per year. The average number of students taught annually was 117 with a range from 6 to 1,000.

Part I: Competence, Importance, Avaliablility

Competence. Nine items on the questionnaire were used to measure the perceived level of competence that respondents had in the use of electronic teaching technologies often associated with distance education. These data are illustrated in Figure 1. Almost three-fourths of the teachers believed fax machines were not difficult to use. More than 50% of the faculty indicated they agreed or strongly agreed that facsimile machines are easier to use than mailing a letter, while less than 10% disagreed or strongly disagreed. Only 4.3% marked at least "agree" when asked if they sent their most important correspondence by e-mail. Nearly 60% marked disagree or strongly disagree. More than one-fourth agreed they could teach others how to use the campus e-mail system while 39% disagreed or strongly disagreed with that statement.

The faculty were generally negative concerning their competence in producing instructional materials and using appropriate teaching methodologies for distance education. Nearly half of the respondents indicated they were not involved in creating multimedia instructional materials for their courses. Slightly more than 52% indicated they could not teach others how to use presentation graphics software, and 71.1% stated they did not produce their own color overhead transparencies. When asked if they were familiar with teaching methodologies used in teaching courses over distance, 44.6% disagreed or strongly disagreed, and 12.4% agreed or strongly agreed. Less than 20% indicated they could confidently deliver their course over distance, while 34.6% indicated they could not.

Importance. Fifteen items were used to measure the importance teaching faculty believed technologies associated with distance education have or will have to teaching agriculture. Faculty members recognized the importance of e-mail, with the vast majority (80.7%) agreeing they would put their e-mail address on their business cards. They were also positive concerning the value of electronic bulletin boards. Nearly 36% marked agree or strongly agree for the statement, "Participation in electronic bulletin board services offers great benefits."

As illustrated on Figure 2, opinions were mixed concerning the effect of electronic communications technologies. Nearly 57% agreed these technologies would drastically alter how we teach in the next five years, with only 6.3% in disagreement. However, 39% disagreed that these technologies would change what we teach in the same time period, while some 26% agreed.

Nearly one-third of the respondents agreed that course materials could be improved by incorporating sound with visual aids. In response to a statement about the value of animated graphics increasing student interest and retention, 43.7% agreed and 4.8% disagreed. More than one-third agreed that the use of full-motion video increases student interest and 58.6% agreed electronic information technologies will provide students with instantly available supplemental course materials. Fewer than 30% of the respondents had a strong opinion about students expectations of graphical learning experiences. Slightly more than 25% agreed

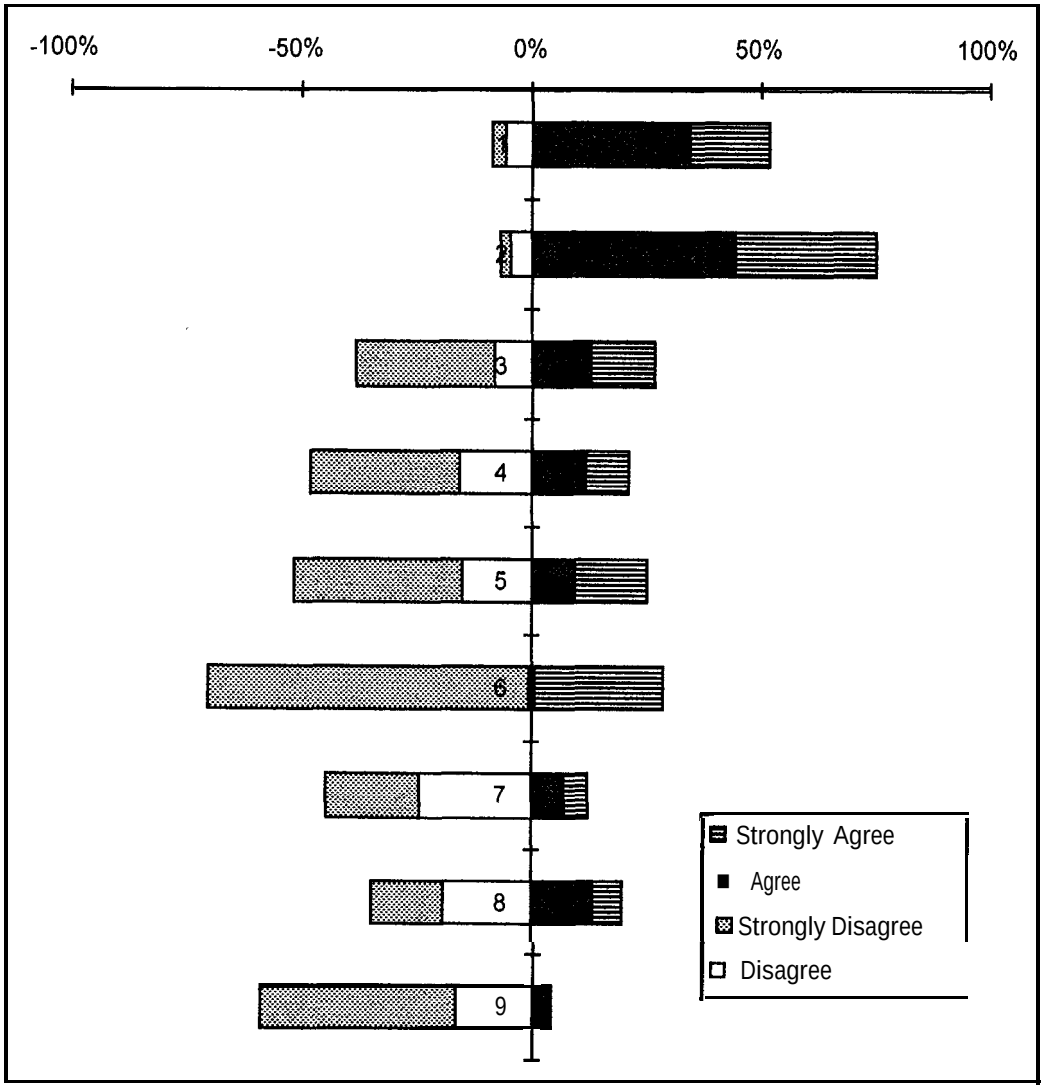

Figure 1. Perceived level of competence

1. Using a fax machine is easier than mailing a letter.

2. Fax machines are not difficult to use.

3. I can teach others how to use the campus e-mail system.

4. I am involved in the creation of multimedia instructional materials for my course.

5. I can teach others how to use "presentation" software packages,

5. I produce my own color overhead transparencies.

7. I am familiar with the methodological considerations of teaching courses over distance.

8. I could confidently deliver my course over distance, utilizing the TTVN or some other bi-directional television network. .

9. I send my most important correspondence by e-mail.

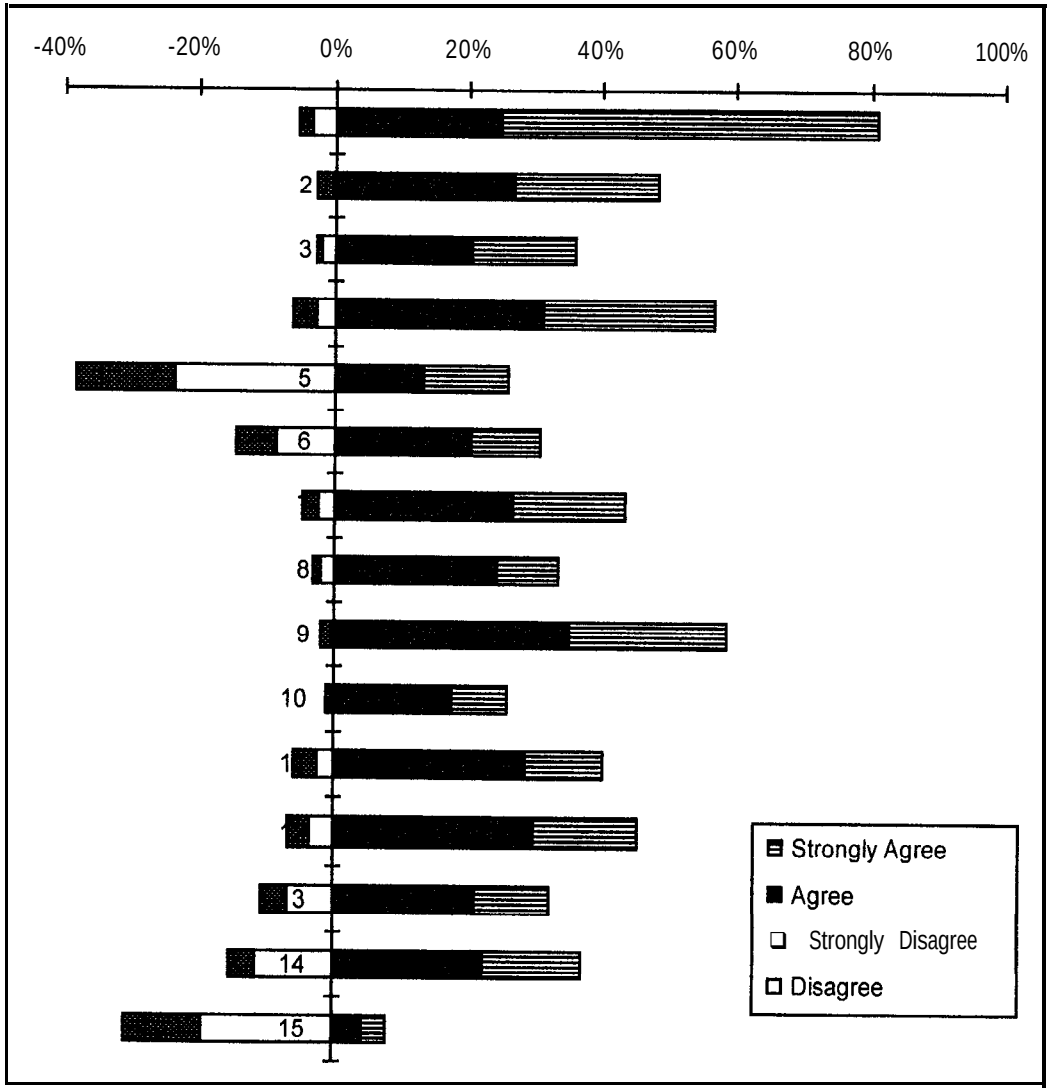

Figure 2. Perceived level of importance

I. I would put my e-mail address on my business cards.

2. Electronic database management systems, like Gopher searches, the World Wide Web, and Mosaic are conven ways to access information.

3. Participation in electronic bulletin board services offers g benefits.

4. Electronic communications, information, and imaging technologies will drastically alter HOW we teach in the next five years.

5. Electronic communications, information, and imaging technologies will drastically alter ***WHA T*** we teach in th next five years.

i. I think most course materials would be improved by incorporating sound with the visual aids.

7. Animated graphics increase student interest and retention

I. The use of full-motion video increases student interest,

). Electronic information technologies will provide students with instantly available supplemental course materials,

0. Students today expect a more graphical learning experier

1. Electronic information technologies are important in graduate courses.

2. Electronic information technologies are important in undergraduate courses.

3. It is important that I incorporate appropriate electronic information technologies in the courses I teach.

4. Learning requires a face to face meeting behveen teacher and student.

5. There are too many "bells and whistles" being used in teaching today.

that students expect more graphical experiences, and only 1.2% disagreed.

More than 40% believed electronic information technologies were valuable in graduate and undergraduate courses. Thirty-seven percent agreed or strongly agreed that learning requires face-to-face interaction between teacher and student while more than 15% disagreed or strongly disagreed. More than 30% agreed there are not too many "bells and whistles" used in teaching today.

Availability. Ten items were used to measure the perceived availability of equipment, facilities, and training for faculty to use technologies associated with distance education. Faculty opinions were negative on all but one of the items.

Concerning the availability of equipment, 79.9% of the teachers indicated they are connected to electronic mail in their office and nearly the same percentage indicated they were not connected at home. More than 45% disagreed or strongly disagreed that the equipment needed to produce and display multimedia course materials is readily available. Although there was a published memo, distributed university-wide describing the procedure to secure electronic presentation equipment, nearly half of the faculty members were not aware of this procedure. More than 57% disagreed that their classrooms were designed to support the use of such teaching aids.

Teaching faculty members were asked about the availability of training and assistance in the use of instructional technologies. More than one-third disagreed that there is ample opportunity to secure faculty development training to use multimedia equipment. Nearly 70% had no strong opinion about the availability or faculty training workshops on distance education. Of those with a strong opinion, 22.1% disagreed with the statement and 8.8% agreed. Nearly the same results were obtained concerning the availability of technical assistance in using distance learning technologies. Thirty-nine percent were not aware of a central location for assistance in using multimedia equipment. When asked if time spent developing multimedia materials was valued by their department, 41.4% disagreed and 6.4% agreed (Figure 3).

Part III: Suggestions for Imnrovement

Of the 256 faculty who returned the survey instrument, 154 supplied comments on this optional, open-ended question. In all, 453 suggestions were made. The comments were then grouped into categories by a panel of experts in distance education. Reported here are representative comments in each of the seven groups identified. Comments are reported with the authors' original emphasis included as underlining.

Administrative Practices. "I want to see a consistent, rational plan including timetables, rationale, and especially costs for implementing distance learning." "We need administrators who understand the business of teaching and can at least show some concern about quality." "I don't believe that the Dean has made this a priority." "Scheduling [of the facilities] is totally political and arbitrary."

Reward System. "I'd need to be convinced that the extra time required was worthwhile." "Give faculty an incentive to use it. Recognize distance education in promotion/tenure." "I do not perceive any reward system for excellence in teaching. Tenure, promotion, recognition, and salary all appear to be largely dictated by research performance. My perspective is that I am not willing to sacrifice time spent on research to undertake major time-consuming changes in my teaching program that will have no impact on my professional advancement."

Inservice Education. "Opportunities for quality hands-on in-service education in a small

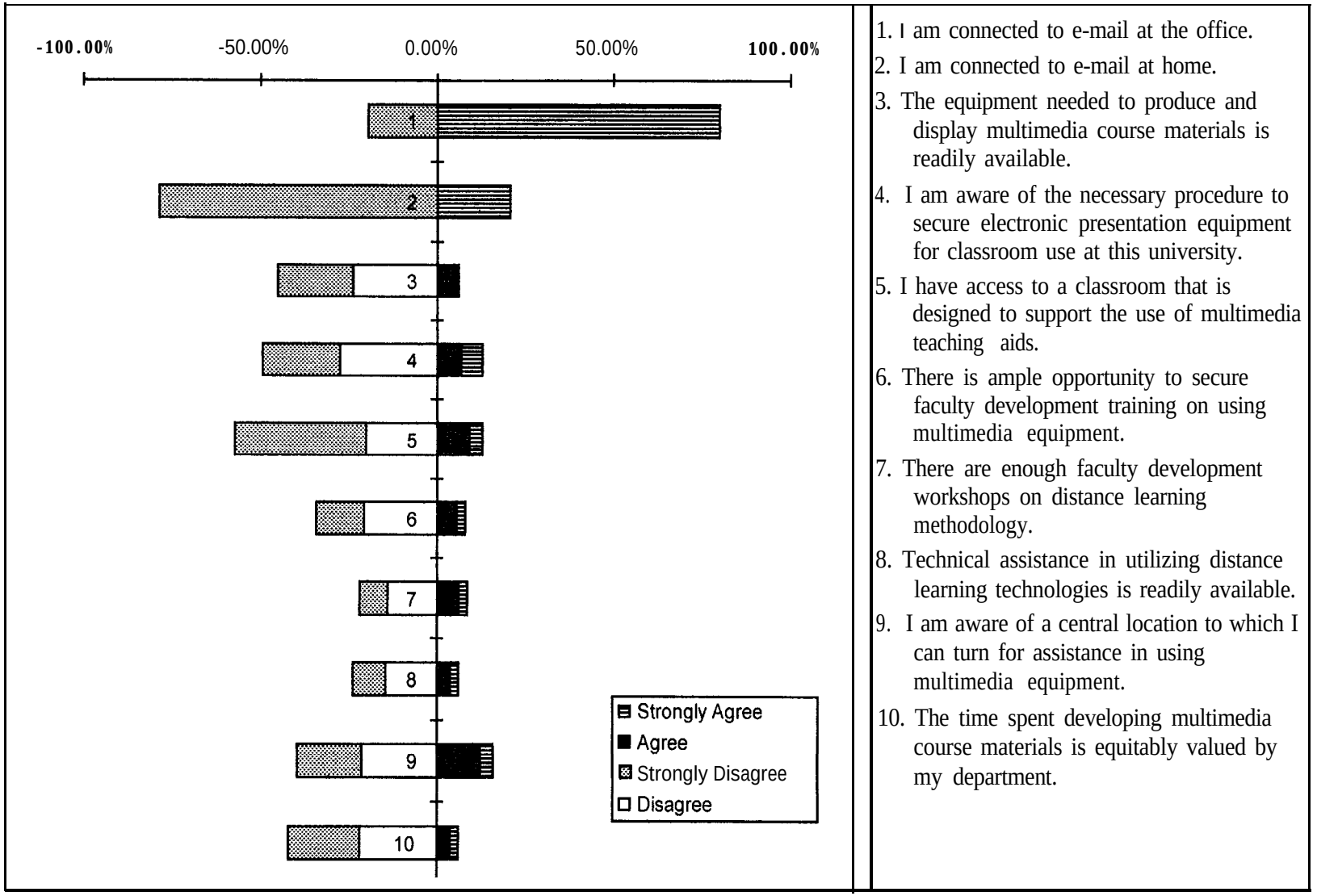

Figure 3. Perceived level of availability

group in a non-threatening environment." "I would like to take a short 'development leave' to sit down with somebody and learn how to use some of these technologies as well as learn graphics presentation packages."

Technological Support. "Ready access to support personnel who can devise and manipulate equipment for the desired effect. I do not have time, it seems, to become and remain adequately familiar with these new and important technologies while meeting the demands of my other responsibilities." "Technical support not control by specialists in educational technologies." "A qualified facilitator in our building."

Equipment. "Students need access to multimedia capable computers with WWW access." "Classrooms available equipped with more than a chalkboard and overhead projector." "Make the 'control center' adjustable to desk height when desired. The current system is designed assuming that one person is giving a one-way lecture with little feedback."

Instructional Methodology "The trick will be balancing the technology with the basic student-instructor interactions." "It will be VERY difficult indeed to teach highly technical quantitatively rigorous graduate course material via distance." "I teach by doing, not by lecture. This makes distance teaching difficult."

Philosophically Opposed. "I believe that Distance Education is an oxymoron. I don't think anyone can learn anything of significance by watching television." "I have no interest whatsoever in distance education. I hope to retire before it becomes mandatory." "If we teachers are not careful, we will be sucked into being just another group of entertainers wrapped up more in how we can entertain the students taking our classes than in imparting information that students can use to think their way through problems."

Conclusions

The average teaching faculty member in the college of agriculture was male and over forty years of age. He taught one to two undergraduate classes and one graduate class per year with an average annual enrollment of 117 students.

More importantly, this study found that teaching faculty members in the college of agriculture consider the use of electronic technologies to enhance their teaching to be useful and important. Respondents agreed that electronic teaching technologies contribute to effective teaching in both graduate and undergraduate courses. They believed that these technologies would continue to have a substantial impact on teaching, changing how teaching is conducted within the next five years.

While convinced of the benefits made possible through these new technologies, teaching faculty members contended that substantial support would be required for their effective adoption. They reported they lacked both competence in the use of these electronic technologies and confidence in their ability to incorporate them with appropriate teaching methodologies. Aggravating this condition, faculty members cited a lack of access to the equipment and facilities, and a lack of access to the training and assistance needed, to effectively develop and use electronic teaching technologies. Finally, faculty members did not believe the time and effort expended to develop multimedia course materials was appropriately valued.

Recommendations

1. Programs which will help faculty members become proficient in the use of electronic teaching technologies should be developed. These programs should focus upon equipment readily available to the teaching faculty.

2. Efforts should be increased to make teaching faculty aware of training workshops,

equipment, and technical assistance already available to help them develop and use electronic teaching technologies.

3. Classrooms should be modified and additional electronic teaching equipment should be purchased to enhance the teaching of graduate and undergraduate courses.

4. To improve participation and increase adoption, the faculty reward system needs to formally include rewards and incentives for the additional effort required for successful distance education programs. Modifications in the tenure and promotion process should be examined to cultivate the improvement of instruction through the adoption of these technologies.

5. Further clarification of the obstacles to the adoption of these technologies is required as well as identification of appropriate rewards and incentives.

6. A study similar to this should be conducted using extension specialists and agents involved in presenting educational programs.

7. Research should be conducted to determine subject matter that can best utilize these technologies and methodologies.

8. Further evaluation should be conducted concerning the impact that these technologies have upon various teaching and learning styles and how they affect learning.

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