"Testing the Waters of On-Line Instruction"

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Abstract

The Internet has become a household accessory to nearly 35 percent of America's homes. In addition, a large majority of public schools, libraries, community service offices, and collegiate faculty have immediate access to the Internet and to associated technology-facilitated educational resources. Until recently, the primary use of the Internet has been as a source of information. However, this picture is changing. Public primary and secondary school teachers have been quick to take advantage of the technology-facilitated resources available to enhance classroom instruction and student participation in self-directed learning. College and university administrators are increasingly looking to faculty to utilize the Internet to reach new and more audiences - particularly the non-traditional, place or profession bound, adult learner seeking professional advancement through academic achievement. However, academia understanding of adult learner preferences and aptitudes for Internet-facilitated instruction is limited. To better understand the needs of potential audiences of on-line collegiate instruction and to determine the applications of distantly delivered curriculum and technology-enhanced instruction in the agricultural education arena, a series of extensive Aneeds assessments@ of traditional and non-traditional Extension clientele groups was conducted, with the primary emphasis on the use and appropriateness of the Internet as a medium for providing educational opportunities to audiences other than traditional residence, on-campus students. Five potential agriculturally based audiences, totaling 667 candidates of Internet-facilitated non-traditional collegiate instruction, were surveyed: undergraduate agricultural college students, vocational agriculture teachers, Extension Service field office faculty, and USDA Natural Resources Conservation Service and USDA Bureau of Land Management subject matter specialists. In addition, traditional,

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resident college of agriculture instructors and campus-based Extension faculty specialists were surveyed. Nearly 90% of all individuals assessed had immediate access to the Internet on a regular basis. Seventy-two percent of all respondents expressed interest in exploring opportunities for technology-facilitated instruction; the lowest percentage (53%) was with traditional, campus resident undergraduate students of agriculture while the greatest percentage of interest (89-92%) came from Extension field faculty and vocational agriculture instructors. Not surprisingly, on-line, interactive synchronous and/or asynchronous instruction with text-based support was rated as being more preferable to other formats of self-directed, technology-facilitated instruction by nearly a 2-to-1 margin. Similarly, e-mail format, electronic conferencing, and use of list servers was unanimously identified as the most "comfortable", most preferred, and least intrusive technology-facilitated format for instruction, compared to use of videotape with correspondence, multimedia instruction, or interactive video at centralized locations. These needs assessments demonstrate that an emerging component of agricultural education programming should consist of technology-assisted instruction, including distantly delivered courses and educational offerings of content, level, and requirement directed to specific target audiences with the primary purposes of providing off-campus formalized instruction opportunities and curriculum to degree and non-degree students, providing formalized professional improvement and inservice training and certification opportunities to off-campus, non-traditional, non-degree participants, and providing personal enrichment and empowerment learning experiences. Our assessments revealed that potential student audiences, whether the traditional classroom undergraduate, the place-bound professional or educator seeking inservice instructional updating or college curriculum, or the practioner in need of educational opportunities to keep abreast of rapidly changing technology associated with his or her profession, is both receptive to and capable of capitalizing on technology-facilitated, distantly delivered educational opportunities. Faculty members who are currently comfortable with distant delivery instruction and remoteness from the university campus are receptive, comfortable with the technology, and eager to engage in

this new paradigm, either as instructors or students. In order for that to happen, instructors of agricultural technologies need to come on-line to the use of technology-faciliated instruction.

Introduction

College and university administrators are increasingly coming "online" about the issue of integrating technology into the collegiate role and mission. Today the technology is Internet-facilitated on-linen or distantly delivered instruction - for both the traditional, on-campus resident student and non-traditional adult learners. This new technology offers many opportunities in both the formal classroom and in distantly delivered instruction, whether formal or informal. Within the last several years, in addition to the individual attentions of higher education institutions, there have been numerous undertakings to create consortia and associations to address the use of technology in the collegiate curriculum (and the breakdown of institutional barriers that come with Internet utilization and accessibility). For example, in June of 1996, the Western Governors Association founded the Western Governors University (WGU), a degree-granting "virtual" university with support and programs from 18 member states (http://www.westgov.org/smart/vu/vu.html). Another fifteen states are combining forces to offer online programming through the Southern Regional Electronic Campus, an interstate compact created by the Southern Regional Education Board (http://www.srec.sreb.org/). Another such program is the NUDC - The National Universities Degree Consortium - made up of 13 accredited land-grant and state universities across the United States that offer distance education.

The impetus behind these consortia, whether between academic institutions or with business, is to offer more advanced and integrated levels of education to students, while serving the missions of member schools. How it plays out remains to be seen. This growing attention to online instruction served as one of the reasons for us to take a look at student and faculty attitudes about technology-mediated instruction, both in the classroom and in the non-formal Extension education arena.

The one underlying principle about Internet-facilitated instruction which has been repeatedly discovered and reiterated is that whether focusing on formal, degree-requirement courses, independent study, self-paced discovery learning, structured professional or personal improvement, or casual adult learning by providing access to organized resources and expertise, each of these approaches requires that the instructor, facilitator, or organizer have a degree of knowledge of the recipients needs, desires, and background understanding. As Boettcher (1998) points out, Internet (or Web) instruction "is not just a class" on the Web. In the classroom there are

well-defined patterns of communication. In contrast, in the online environment the lines of communication are more divergent-the Internet provides a fully linked network of communication lines. The network extends between faculty and students and between and among students and groups of students. Expertise can come from many different directions.

While it initially was perceived by administrators as a risk to adopt the streaming technology as a delivery system, the experience to date is that there are significant benefits in the use of asynchronous on-demand delivery, including increased course access, increased quality of the learning experience, and potentially lower costs for both the educational institution and the participants. However, in order for that to happen, the Extension educator and the University faculty member with classroom responsibility need to understand student needs and attitudes and effectively develop educational offerings that address the student needs.

In an effort to define the direction that Montana State University College of Agriculture should take in the technology facilitated instructional arena, a faculty committee was convened to investigate the appropriateness and potential of integrating Internet-based technologies into the instructional responsibilities of the college, and to determine the applications of distantly delivered curriculum and technology-enhanced instruction with respect to the Montana State University College of Agriculture. This paper present results of a series of extensive "needs assessments" of traditional and non-traditional Extension clientele groups, Extension faculty, and campus-based faculty at Montana State University, with the primary emphasis on the use and appropriateness of the Internet as a medium for providing research-based knowledge through education to audiences other than traditional residence, on-campus students.

Is Distant Delivery and Technology Facilitated Instruction Real?

The approach the committee undertook was to:

1. investigate the programs and efforts of other institutions with respect to distantly delivered curriculum;

2. conduct a review of literature on this issue and prepare a summary of findings of pertinent facts (included herein);

3. conduct a series of detailed "needs assessments", gathering information from faculty of the College of Agriculture, Extension field faculty, undergraduate

students, and other potential target audiences from throughout Montana (selected results included herein);

4.   integrate these findings into a report which consisted essentially of a series of recommendations, observations, summaries of findings, and results of "needs assessments" of six different target audiences.

The initial phase of this project included a review of pertinent information in the academic literature, in an attempt to address some specific questions. We investigated the current literature, research findings, and surveys and databases available regarding trends in distant delivery curriculum and use of electronic technologies for information transfer and formalized instruction.

What are the trends in electronic information access and distant delivery education at the present time? That question can best be answered with a few statistics and findings of others who have taken a look at distant delivery and electronic information access.

(From Foreester Research Inc., and The New York Times, May 7, 1997. Reality Bites, as quoted in Fidelity Focus, Winter 1997 issue, page 7.)

1 - **Internet usage** has quadrupled to more than 30 million users in the past three years. One third are women. (Obviously those two statistics have changed significantly in the last three years);

2 - **The five top content** areas users plan to explore in the near future are online banking, adult education, health and medicine, personal investments, and travel.

3 - **The percentage of online** users who say they use e-mail daily increased from 47% in 1995 to 59% in 1997, while the percentage of online users who say they use long-distance phone services dropped from 25% to 22%.

4 - **20% of online business** users get their news online versus 21% who say they get it from the radio.

5 - **27% of the Internet** users have made online purchases in the past twelve months.

6 - **At the end of 1994**, 621,000 investment accounts were using online trading services. By the end of 1997 that number was expected to reach 1.5 million accounts and 2.8 million by the end of 1999.

7 - **It took 146 years** for the New York Stock Exchange to reach a trading volume of 5.5 million shares per day. Virtual investing did it in less than 5 years.

8 - **The average age** for clients of full-service brokerage firms is 63 years. Average age for Internet investors: 41.

Admittedly, many of the statistics about recent Internet usage don't relate directly to collegiate instruction and curriculum in the future - but as John Nesbitts pointed out in his best selling book Megatrends 2000, one needs only watch what is making the news these days to get a glimpse of the future. Clearly electronics, information access, remote access, information download are trends of the future - not the past. Technology stocks currently represent the single most economically significant sector of the world stock exchanges.

A revealing set of statistics with reference to university study by means of electronic technology, distant delivery, and remote access by students, appeared in a recent keynote address of the NACTA by Murphy (1997), formerly of the University of Idaho (Gubernick and Ebeiling, 1997).

- 93 cybercolleges offered credit-granting courses on-line in 1993
- by 1997, 762 cybercolleges offered credit-granting courses on-line
- over 1 million individuals attended a virtual college classroom in 1997

To further support the notion that electronic classrooms are one of the significant issues of the future that colleges and universities should give serious consideration to, Dillman et al. (1995) reported the following findings of a national survey of adult learners:

- 81% of the individuals surveyed indicated that getting additional education beyond the undergraduate college level is important for them to be successful in their employment;

- distance education strategies have the potential to overcome significant barriers to lifelong learning;

- "public support exists for ... land grant universities to do more than educate 18-22 year old undergraduates"

Do graduating students find a need for continuing education these days? According to Davis and Botkin (1994), "...educational systems from the past ... no longer ...

meet ... needs of students ... for the future.... In their first five years of working, half of what engineering students learned in ... college becomes obsolete."

Needs Assessments - What Kind of Audiences Exist What Do Those Audiences Say About Distantly Delivered Curriculum?

To gather information specific to the interest of various potential student audiences in technology-enhanced instruction, and to learn about faculty involvement in technology-facilitated and distant delivery instruction, a series of detailed "needs assessments" were completed. Five potential student audiences, along with the faculty of the College of Agriculture at Montana State University-Bozeman, were surveyed. A relatively broad-scoped needs assessment was prepared and then modified as necessary to suit the individual conditions of each of the interest groups. Generally, the foundation questions regarding technology-enhanced instruction and distantly delivered instruction were the same throughout all assessment documents. The five potential audiences were:

292 of the undergraduate students (approximately 25%) of the College of Agriculture, Montana State University-Bozeman;

52 vocational agriculture instructors from through out Montana;

58 MSU Extension Service field faculty;

145 USDA-Natural Resources Conservation Service professional field staff employees;

120 USDI-Bureau of Land Management profes sional field staff employees;

In addition, the findings of a related survey of nearly 2000 middle and high school science teachers were reviewed and summarized. We also surveyed the resident faculty of the College of Agriculture at Montana State University. Our interest was in learning about the potential for use of technology-enhanced and distantly delivered instruction with a variety of different student audiences and various formats. We also were interested in learning about Extension and campus resident faculty perceptions and receptiveness to adoption of technology-enhanced instruction.

College of Agriculture Undergraduate Students

The significant issue with undergraduate students is one of changing the paradigm from the traditional classroom-lecture format to technology-facilitated learning, in part outside of the traditional classroom. We surveyed nearly 25% of the undergraduate students of the College of Agriculture at Montana State University. The questionnaire included 27 questions pertaining to on-campus, off-campus instruction, comfort and familiarity with technology-enhanced and distantly delivered instruction and methodology. Admittedly, part of the impetus of this study was to gain an appreciation for the potential of acceptance of technology-facilitated instruction by several audiences. A second objective was to evaluate the opportunities for use of distantly delivered instruction facilitated by Internet technology. We completed the survey in six undergraduate classes; we also completed the survey in two graduate classes of the College. However, these latter results were not included in the survey of College of Agriculture students reported herein. In our needs assessment, we queried all of the other audiences on the same and/or similar issues:

-interest in technology-enhanced instruction in and outside the classroom
-experience with the various technologies available for use in instruction
-ability to adopt and utilize these technologies
-appropriateness of and comfort with various technology-enhanced venues of instruction.

The following is a summary of some of the responses to questions asked.

52% of the respondents indicated some level of interest in enrolling in university courses for credit and degree requirements or electives via technology-facilitated distant delivery at local sites or by electronic delivery methods at remote sites; only 15% said they were not interested.

68.3% of the students interested in distantly delivered instruction would be willing to commit 10 to 30 hours per week participating in distantly delivered instruction; 37.1% of the respondents indicated a willingness to engage in 'full semester' courses of study; 36.7% of the respondents indicated a willingness to engage in 4 to 10 weeks of technology-facilitated, distantly delivered instruction;

As we surveyed prospective students or users of technology-enhanced instruction, the various groups were asked to: 1) rate their comfort level with use of various types of distant delivery technology, and 2) rate their preference for use of various types of distant delivery technology. Options included some configuration involving email, videotape presentations, satellite downlink to classroom, structured classroom setting, and computer networking, as suggested by other educators researching the use of technology-enhanced instruction. The choices and preferences in order of priority for the audiences we surveyed are summarized in Table 1. The 'top' choices of undergraduate students were:

Vocational Agriculture Teachers and Instructors

Our needs assessment surveyed 52 Vocational Agriculture (VoAg) instructors from throughout Montana. One of the primary instructional needs of this audience is professional improvement and inservice recertification for teaching. These individuals are professional educators - a uniquely identifiable target market for distant delivery, technology-facilitated education. They are continuously in need of technical up-dating, professional in-service training, and teacher recertification. They are geographically dispersed and could be considered somewhat "place bound", i.e., their access to the traditional classroom for inservice instruction or professional development is constrained by their employment situation. Some statistics about these individuals, based on responses to the needs assessment document.

- 88% are currently interested in enrolling in university courses for credit while full-time employed; this number increased to 94% interested in enrolling in university courses for credit if they can complete all of the course work by distant delivery methods;

- Respondents indicated a willingness to commit 5 hours per week to study; they would prefer courses of study to be 8 weeks in duration.

As with undergraduate students, VoAg instructors were asked to: 1) rate their comfort level with use of various types of distant delivery technology, and 2) rate their preference for use of various types of distant delivery technology. Options included some configuration involving email, videotape presentations, satellite downlink to classroom, structured classroom setting, and computer networking. Their >top= choices for comfort of use and preference are summarized in Table 1.

It is interesting to note that the VoAg instructors indicated that one of their most preferred venues of instruction was the centralized classroom setting close to home. This was somewhat surprising initially. Our assessment of the preference of the vocational agriculture instructor for the traditional classroom setting is that vocational agriculture instructors, much like the campus-bound faculty member, are most comfortable with their normal teaching style - both for teaching and learning. i.e., the centralized classroom. This is a direct contrast to what we learned from the younger students, self-directed adult learners, and the non-institutional respondents.

The responses of the VoAg instructors are significant with respect to both comfort level and preference. Note that these individuals are very comfortable with e-mail, computer networking and interactive video. However, as learners they have a strong preference with centralized classroom settings. In essence, learners have a different attitude about technology-facilitated, distantly delivered instruction than do the instructors or adopters of this technology. A logical combination of methods and media for distant delivery to this audience is interactive video combined with e-mail or some type of computerized networking and work assignments.

Some additional observations regarding vocational agriculture teachers as students in the setting of distantly delivered, technology-facilitated students:

- 72% identified technical/science/content information as the most valuable or desirable training in their professional capacity;

- 88% rated their interest level in participating in distantly delivered courses for certification or completion as moderate or greater (59% said they had relatively high degree of interest in courses offering certification of completion)

Montana State University Extension Service Field Faculty

A needs assessment was distributed to all Extension field faculty within the Montana State University Extension Service faculty system. Participants were asked to respond to 24 questions dealing with perceived need for and comfort with technology-enhanced curriculum - targeted to Extension field faculty and their respective clientele groups. In general, most of the questions were similar to those asked of undergraduate and VoAg audiences. The response rate was 51%. A summary of the responses to questions pertaining to comfort level with use of technology-facilitated instruction is included in Table 1.

Table 1. Summary of responses of potential audiences of technology-facilitated, distantly delivered instruction to key issues related to experience, perceived benefit, and preferred formats of instruction.

	Undergraduates MSU / C of Ag N = 292	Vo Ag Instructor N = 52	Extension Service Faculty N = 58	USDA - NRCS Staff N = 145	USDI - Bureau of Land Mgmt N = 120	Average
Interested in learning more about technology-enhanced instruction	53%	92%	89%	63 - 78%[1]	50 - 78.6%[2]	71.9%
Have off-campus access to computer, modem, Internet	64.4%	87%	100%	86.1%	100%	87.5%
Rate computer / Internet proficiency as considerable to extreme	80.1%	46.2%	68%	54.6%	94.6%	68.7%
Rate proficiency with file transfers, downloading, and file retrieval as considerable to extreme	70.8%	38.7%	62%	34.9%	57.1%	52.7%
Preferences for formats for participation in technology-enhanced instruction						
Videotape supported with text / assignments	20%	6%	22.4%	37.2%	21.4%	21.4%
Interactive e-mail / conferencing with text support	33%	43%	51.7%	43%	57.1%	45.6%

Interactive video at central site with text support	21%	51%	25.9%	19.8%	21.4%	27.8%
Comfort level rating with various technology-facilitated instruction formats						
e-mail / retrieval, file folders, downloading, uploading files	1	1	1	1	1	1
e-mail conferencing with listserver	2	5	2	6	2	2
videotape with correspondence	3	6	3	4	5	4
multimedia combinations	4	4	5	5	6	5
computer networking via modem / asychronous exchange	5	3	6	2	4	3
centralized classroom at remote site with interactive video	6	5	4	3	3	4

*All supported with traditional text reading and written assignments. Balance falls into category of "other" formats. Because some questions included response options which are not included in the summary presented in Table 1, the values may not necessarily sum to 100%.

[1] The expressed interest was in utilization of technology-enhanced instruction to support clientele needs primarily; secondary interest as recipient / learner.

[2] 28.6% indicated uncertain until such time as additional details are provided.

Some interesting statistics with regard to continuing education and in-service training:

- 58.6% indicated interest in continuing college courses for credit while in current employment and by means of technology-facilitated distance delivery instruction; as with the Extension faculty, this number increased to 70.7% interested in enrolling in distantly delivered university courses taken at local site or by electronic delivery to place of work or home;

- 51.7% (of those previously taken distantly delivered courses) considered distant delivery instruction acceptable, worth repeating, rewarding or fulfilling their needs; only 1.7% did not enjoy or would not repeat the experience; 53.4% (not surprisingly) have previously taken distantly delivered courses.

USDA-Natural Resources Conservation Service

Use of technology-facilitated instruction presents opportunities beyond the traditional classroom to the faculty member. It is not likely that new audiences for instruction are recognized, but clearly opportunities are improved to more easily reach and teach to place-bound or profession-bound audiences. For that reason, we felt that it was important to gain an understanding of the attitudes of traditional off-campus student groups. For our survey, we conducted a needs assessment of the professional staff of the USDA-Natural Resources Conservation Service (NRCS) within Montana. Eighty-six individuals provided information regarding their percieved need for and acceptance of technology-facilitated distantly delivered instruction.

The NRCS professional staff are technical specialists with responsibility for providing public assistance with natural resource management and conservation. As with the VoAg instructors, one of the primary instructional needs of this audience is professional improvement and inservice training - generally of a less formal nature than that required of either VoAg instructors or inservice teachers. This group of individuals are a uniquely identifiable target market for technology-facilitated education, using a non-traditional delivery format. They are continuously in need of technical updating and professional in-service training. As with the VoAg instructors, they are geographically dispersed and are constrainted in their access to the traditional classroom for inservice instruction or professional development by their employment situation, limited availability of time blocks, and geographic dipsersion.

- 63% are currently interested in enrolling in university courses for credit while full-time employed; this number increased to 78% interested in enrolling in university courses for credit if they can complete all of the course work by distant delivery methods;

- 19.8% had previously completed technology-facilitated courses while 81.4% of the NRCS professionals considered technology-facilitated distantly delivered instruction an acceptable means of continuing education.

The NRCS professionals were asked to rate their proficiency with office-to-office and employee-to-employee communications via computer modem. Only 15.1% rated themselves as having little or no experience while 54.7 indicated a moderate degree of comfort and 30.2% indicated considerable or extensive proficiency with computer connections. The responses with respect to Internet access and familiarity were 45.4% with little or no experience, 36.0% with some experience, and 18.6% with considerable or extensive experience.

Similarly, these individuals were asked to declare their preference for use of various types of distant delivery technology. Options included some configuration involving email, videotape presentations, satellite downlink to classroom, structured classroom setting, and computer networking. Their 'top' choices for comfort of use and preference are summarized in Table 1.

It is interesting to note that the NRCS professionals indicated that the most preferred venue of instruction was interactive email conferencing with some form of assigned activities, coordinated with the email conferencing and to reinforce the desired outcomes of the instruction. This was quite similar to the responses from the undergraduate students of the College of Agriculture and the Extension professionals. We considered the NRCS professionals to represent another group of self-directed adult learners seeking professional improvement by the most convenient means - but not necessarily solely for the purpose of knowledge enhancement, as might be the case with VoAg instructors.

Some additional observations regarding NRCS professionals as students in the setting of distantly delivered, technology-facilitated students:

- 93% indicated that technology-facilitated instruction should be used to connect university teaching faculty with non-traditional student audiences and adult learners;

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- 69.8% of the respondents expressed opinion that adult learners and place-bound individuals not interested in college or university credit courses are a potential audience for campus-based faculty and should be offered various formats of professional and personal improvement instruction by means of technology-facilitated distantly delivered programming.

USDI - Bureau of Land Management

Another non-traditional audience which were quiried was the professional employees of the U.S. Department of Interior - Bureau of Land Management in Montana. The regional headquarters for this agency, which deals primarily with natural resource management on federally owned land under the jurisdiction of the Bureau of Land Management, is located in Billings, MT, approximately 140 miles distant from the Montana State University Bozeman campus. Most of the professional employees with the Bureau of Land Management have post (college) graduate training and advanced degrees in some discipline associated with natural resource management.

One of the primary instructional needs of this audience is professional improvement and inservice training - generally of a less formal nature than that required of either VoAg instructors or inservice teachers and similar to that of the USDA-NRCS professionals. Some of this training and professional updating is routinely provided by agency personel. And, like the NRCS professionals, this group of individuals is an identifiable target market for technology-facilitated education, using a non-traditional delivery format. They are continuously in need of technical up-dating and proféssional in-service training, they are geographically dispersed and are constrainted in their access to the traditional classroom for inservice instruction or professional development by their employment situation, limited availability of time blocks, and geographic dipsersion.

- 71.4% expressed interest in participating in university mediated instruction and inservice training while full-time employed; this number increased to 78.6 % under the condition that the course work could be completed by technology-facilitated distant delivery methods;

- 35.7% had previously completed technology-facilitated courses; of this group, 60% indicated that the format was acceptable while 40% of the individuals considered technology-facilitated distantly delivered instruction sufficiently

satisfying of their needs to complete additional training by this method.

The same audience was asked to rate their proficiency with office-to-office and employee-to-employee communications via computer modem. Forty-three percent rated themselves as having little or no experience with computer connections via modem while 57.1% indicated a moderate to considerable degree of comfort with modem connectivity. The responses with respect to Internet access and familiarity were only 7.1% with little or no experience, 64.3% with some experience, and 28.6% with considerable or extensive experience (Table 1).

Similarly, these individuals were asked to declare their preference for use of various types of distant delivery technology. Options included some configuration involving email, videotape presentations, satellite downlink to classroom, structured classroom setting, and computer networking. Their most preferred choice of format for technology-facilitated instruction was interactive email conferencing combined with assigned text and written homework (57.1%); pre-recorded video tape and interactive video conferencing were considered as approximately equal and less acceptable as the format of instruction (21.4% each).

The Bureau of Land Management professionals indicated by a margin of 2-to-1 that the most preferred venue of instruction was interactive email conferencing, sending and retrieving files with some form of assigned activities, coordinated with the email conferencing. Surprisingly, the second most frequently cited preference for format was the use of a centralized classroom setting near the place of employment.

College of Agriculture On-Campus Faculty

A survey/needs assessment document was prepared and distributed to all College of Agriculture faculty. Approximately 105 faculty located in departments of the College and at the Agricultural Research Centers throughout the state were contacted and asked to respond to 20 questions dealing with perceived need for, participation in or use of and acceptance of technology -faciliated distantly delivered curriculum - targeted to a variety of potential audiences, including on-campus traditional classes and off campus non-traditional learners. The response rate was 36%. Only 10.5% of the respondents indicated that they either currently were or had previously taught by some means of distant delivery while 89.5% had not.

Some additional statistics regarding use of technology-facilitated distant delivery instruction bu campus resident faculty:

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- 35.1% have used distant delivery technologies, i.e., video tape, remote broadcast, self-accessed computer assisted instruction, audio-tutorial resources with on-campus classes.

68.4% primarily lecture presentation, supported by laboratory or in-class discussion
42.1% use some Internet accessible resources; students are assigned to access information available via the Internet.
31.6% use some e-mail communication

Electronic conferencing, television broadcasting, and interactive video networking are utilized by 13.2, 7.9, and 5.3%, respectively.

- 81.6% of the respondents expressed interest in integrating distant delivery technologies in their teaching; the most frequently cited reasons for this interest in changing the paradigm included desire to be innovative (63.2%), reaching different students (50.0%), and perceived need for changes in teaching format (47.4%).

Faculty identified a variety of different formats as being acceptable for teaching via technology-facilitated instruction. Acceptable or preferred formats were:

76.3% - some combination of distant delivery and classroom setting
47.4% - interactive video conferencing at central location
39.5% - interactive e-mail conferencing

The campus-based faculty of the College of Agriculture were asked to: 1) rate their comfort level with use of various types of distant delivery technology, and 2) rate their preference for use of various types of distant delivery technology. The options presented included some configuration of e-mail, server conferencing, correspondence and videotape, interactive video, satellite down linking, multimedia combinations, computer networking, and centralized classrooms.

Overwhelmingly, by a margin of 2 to 1 over all other methods and technologies except e-mail sending and retrieving, faculty indicated that the traditional classroom setting was the most comfortable technology for instruction. E-mail was rated as the second most comfortable means of communication of information. All of the other options were scored significantly lower, suggesting little or no experience or use with these technologies. Not surprisingly, the four most preferred methods of future delivery were: 1) traditional classroom setting, 2) e-mail (sending

and retrieving documents), 3) interactive video conferencing at a central location, and 4) multimedia combinations. (Table 1).

One of the avenues of questioning dealt with hindrances to faculty adoption of technology-enhanced instruction. Faculty perceive some significant deterrents or hindrances to development or teaching with significant emphasis on technology enhancement or distantly delivered courses: anticipation of excessive amounts of time to develop and teach courses via technology-faciliated distant delivery, lack of justification or incentives, and anticipation of lack of student responsiveness were the most consistently cited deterrents. Issues such as potential dishonesty of students, anticipation of poor performance evaluations, uncertainty about the potential utility or application of technology-facilitated distant delivery technology were perceived as relatively insignificant.

The most frequently cited reasons for not teaching university courses via distant delivery technologies were: 1) a feeling that it would not benefit students, 2) belief that it would not enhance existing courses, and 3) belief that the material currently taught is not suited to distant delivery. (18.4% of the respondents expressed these opinions; in contrast, 34.2% of the respondents indicated an interest in investigating distant delivery instruction from their offices.

- 35.1% of the respondents indicated interest in teaching university courses for credit or degree requirements to off-campus students.

- 70.3% of the respondents indicated an interest in incorporating some components of distant delivery into their current instruction.

Montana and Surrounding States' Teachers

One potential audience which has been identified and surveyed is teachers. Elisabeth Charron (1996, personal communication, Montana State University) conducted a needs assessment of 2000 teachers in the U.S. in 1995. A similar survey was conducted in 1991. Five hundred and seventy-five teachers responded, including 245 from Montana. The highlights of the findings of this survey.

Eighty-six percent of the respondents indicated that they had access to computers with modems and 78% indicated that they had or could arrange access to Internet accounts.

Availability of distantly delivered courses: not response - uncertain - 40%; somewhat available - 45%; not available - 15%

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Distance presently from college/university campus: < 30 minutes - 39%; 30 minutes-1 hour - 26%; 1-2 hours - 16%; 3-4 hours - 12%, > 4 hours - 6%

Expressed interest in individual graduate courses of study: 86%; no interest - 13%.

What We Already Know!

According to Sherron (1998), we are becoming a society in which continuous learning is central to effective participation as citizens and wage earners. Telecommunications technologies are not only transforming our needs for education and training, but they are expanding our capacity to respond to those needs. Distance learning, which has a long history of serving isolated and remote learners, is now emerging as part of mainstream education and training that can provide learning opportunities that are flexible and responsive to learners' needs, whether on or off campus. This distance learning and access to evolving knowledge is facilitated by the technology offered by such resources as the Internet - resources which weren't available only a decade ago. In addition, the immediate access to up-to-date information provided by the Internet and technology-facilitated instruction, makes state-of-the art understanding available to the student.

As Berger (1998) points out, the classroom may be more prepared and receptive to the integration of technology into the classroom than is the instructor. Referring to Ann Jackson's four myths of integrating technology into the classroom, some key lessons have already been learned about this evolution:

- technology provides a motivation for students to spend more time on task, i.e., the central focus of the instruction, the class, the lesson.

- technology shouldn't have to compete with standard instructional formats. There's a place - and a need - for both in education today.

- changing the mode or way of teaching can increase learning.

- as we work with an increasingly diverse group of students, it becomes important to be able to address them in a variety of modalities. Overall learning can be best achieved by students using many modes of instruction.

- the most important element in overall learning is 'student ownership of the learning experience'. The more involving the learning techniques are, the greater the chance that learning will be retained. Students who interact with course materials make commitments and predications, try out new ideas, and get response to those ideas - all of which may be fostered through the use of technology - have the greatest chance of overall retention and integration of learning.

According to Murphy (1997), "....the text context (traditional text-supported classroom lecture format) for learning in our society is undergoing profound change, from a focus on teaching to a focus on learning. As Means (1994) reports, the school reform movement and the introduction of technology into classrooms are two the most significant trends in education today." The successful educational systems from our past are no longer adequate to meet the needs of the student we're preparing for the future. In their first five years of working, half of what engineering students learned in their four years of college becomes obsolete (Davis and Botkin, 1994). Lifelong learning is no longer an educational buzzword: it's become an economic necessity. The amount of learning required by every information-age worker is equivalent to that currently associated with 30 credit hours of instruction every 7 years. This level of new learners puts 1/7th of the workforce in class each year. It could potentially add 20 to 28 million more full-time equivalent students to our already capacity-strained campuses (Dolance and Norris, 1995).

Summary

Clearly an emerging component of Extension programming, whether by campus based faculty with Extension appointments or traditional classroom lecturers, should consist of technology-assisted instruction, including distantly delivered courses and educational offerings (not limited specifically to college format courses) of content, level, and requirement directed to specific target audiences with the primary purpose of enhancing the entry level of incoming students, providing off-campus formalized

instruction opportunities and curriculum to degree and non-degree students, providing formalized professional improvement and inservice training and certification opportunities to off-campus, non-traditional, non-degree participants, and providing personal enrichment and empowerment learning experiences.

Our assessments of various learner groups and faculty who might take advantage of tecnology-facilitated instructional opportunities revealed several key characteristics which are important in understanding the changing paradigm of instruction on and off college campuses.

1) potential learner audiences are receptive, comfortable, and eager to begin this new paradigm

2) faculty members who are currently comfort able with distant delivery instruction and remoteness from the university campus are receptive, comfortable with the technology, and eager to engage in this new paradigm, either as instructors or students;

3) campus resident faculty, comfortable with the traditional classroom lecture format, are the least receptive partner in this changing paradigm.

At this point it appears that the student audience, whether the traditional classroom undergraduate, the place-bound professional or educator seeking inservice instructional updating or college curriculum, or the practioner in need of educational opportunities to keep abreat of rapidly changing technology associated with his or her profession, is both receptibe to and capable of captializing on technology-facilitated, distantly delivered educational opportunities. In order for that to happen, the instructor's paradigm of how education is packaged and delivered needs to be evaluated - and most likely changed, as we venture into the 21st century of adult education.

Literature Cited

Berger, Carl. 1998. Ann Jackson and the four myths of integrating technology into teaching. Syllabus 11, 7, 18-20. <http://www.syllabus.com/syllabusmagazine/syllmag.cfm>

Boettcher, Judith V. 1998. How Many Students Are "Just Right" in a Web Course?, Syllabus 12 (1) 45-49. <http://www.syllabus.com/syllabusmagazine/syllmag.cfm>

Davis, S., & Botkin, J. 1994. The monster under the bed. Simon and Schuster Publishing, New York.

Dillman, A., J.Christenson, P. Salant, and P. Warner.1995. What the public wants from higher education. (5\95-52). Pullman, WA: Social & Economic Sciences Research Center, Washington State University.

Dolance, M.G., and D.M. Norris.1995. Transforming higher education: A vision for learning in the 21st century. Ann Arbor, MI: Society for College and University Planning.

Gubernick, L., & A. Ebeling. 1997. I got my degree through e-mail. Forbes. pp. 84-87, 90, 92.

Means, B. 1994. Technology and educational reform San Francisco: Jossey-Bass.

Murphy, Tim H. 1997. Five factors to evaluate distance education programs. NACTA Journa. 41(3): 6-11.

Sherron, Gene T. (1998). In support of Distance Learning. Syllabus 11(70): 44-47. <http://www.syllabus.com/syllabusmagazine/syllmag.cfm>.