

CAN SELECTED LEARNING STRATEGIES INFLUENCE THE SUCCESS OF ADULT DISTANCE LEARNERS IN AGRICULTURE?

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Abstract

The purpose of this study was to determine whether providing information about learning strategies to agricultural distance learners through a professionally developed videotape would result in their achieving intended learning outcomes to a greater degree and result in increased satisfaction with the distance learning experience. At the beginning of fall and spring semesters of the 1999-2000 academic year, 110 of the 218 students enrolled in 25 off-campus courses offered by 14 different departments in the Iowa State University College of Agriculture were randomly selected to receive the videotape and a book mark outlining six learning strategies that were recommended in the literature. At the end of each semester, all off-campus students were asked to complete a learning survey. Students who viewed the tape rated it very favorably in terms of its value to off-campus learners. Even so, students who watched the videotape did not earn higher grades for the semester in which they were involved in the study nor did they express a more positive attitude toward the distance-learning environment than students in the control group. Further analysis revealed that students who chose to participate in the study achieved a semester GPA 32% higher than students who did not participate. Those who may have been able to benefit most chose not to participate.

Introduction

Distance education has been successful at providing access to individuals in various situations, but increasingly educators realize the need to focus on learner success (Gibson, 1998). Producing high quality distance learning programs is difficult. To understand this difficulty one need only consider the very complicated teaching environment (Willis, 1995a). Agricultural faculty recognize this and have expressed interest in information and training in the areas of: teaching techniques, models of effective teaching, principles of teaching, and designing instruction (Miller & Carr, 1997).

If the teaching environment for agricultural faculty who teach distance education courses is so different and challenging that it necessitates training and assistance in course delivery, imagine how different the learning environment must be. Learning at a distance is fraught with unique challenges. Distance education students are often older and are coordinating various job

and family commitments with their learning opportunities (Miller, 1995; Willis, 1995b). In addition, students at a distance usually experience limited interaction because of geographic isolation from the instructor and other students (Miller, 1995; Willis, 1995a). Finally, distance education students must rely on the technology to provide the information for learning (Willis, 1995a).

Perhaps one way of empowering students to succeed in the distance learning environment is to assist them in expanding their repertoire of learning strategies. Learning strategies can be defined as thoughts and behaviors intended to influence the learner's ability to select, acquire, organize, and integrate new knowledge (Weinstein & Mayer, 1986). Learning strategies are designed to teach learners how to learn (Jonassen, 1985). Effective learning involves knowing when to use a specific strategy, how to access that particular strategy, as well as when to abandon an ineffective strategy (Jones, Sullivan Palincsar, Sederburg Olge, & Carr, 1987). According to Jones et al. (1987), both less

proficient and more proficient students are able to develop effective learning strategies.

Pilcher and Miller (2000) conducted an extensive literature review to identify potentially useful learning strategies for the distance education environment. They settled on McKeachie, Pintrich, Lin, and Smith's (1986) taxonomy as their theoretical framework. This framework encompasses the cognitive, metacognitive, and resource management dimensions of learning. Pilcher and Miller speculated that the metacognitive and resource management strategies would hold the most promise for influencing the success of adult distance education students because students had likely mastered the cognitive strategies earlier in their educational careers. They identified three metacognitive strategies (skimming material, self-testing, and test-taking strategies) and three resource management strategies (developing study patterns, maintaining high levels of motivation, and communicating with the instructor) that held promise for enhancing distance learner success.

An important question remains concerning Pilcher and Miller's (2000) work, however. Can the six learning strategies be presented to adult distance learners in such a way as to influence their success in distance learning courses?

Purpose

The purpose of this study was to determine whether providing information about learning strategies to agricultural distance learners through a professionally developed videotape would result in their achieving intended learning outcomes to a greater degree and result in increased satisfaction with the distance learning experience. The study was guided by two objectives and three hypotheses:

Objectives

1. Describe and compare the demographic characteristics of students who participated in the study by experimental group.
2. Describe attitudes of students in the treatment group toward the learning strategies that were promoted in the

videotape.

Hypotheses

1. Agricultural distance learners who viewed a videotape designed to promote six learning strategies will report having used the strategies to a greater extent than learners who did not view the videotape.
2. Agricultural distance learners who viewed a videotape designed to promote six learning strategies will earn higher grades in their off-campus course(s) than learners who did not view the videotape.
3. Agricultural distance learners who viewed a videotape designed to promote six learning strategies will be more satisfied with their distance learning experience than learners who did not view the videotape.

Procedures

Population

The population consisted of undergraduate and graduate students who were enrolled in Iowa State University College of Agriculture off-campus courses during the fall semester of 1999 and the spring semester of 2000. Class lists for all off-campus college of agriculture courses were obtained from extended and continuing education with assistance from the college of agriculture's Director of Distance Education. Course lists in agricultural education and selected courses in agronomy were not used. Courses in agricultural education were not used because of student involvement in the instrument development process. Courses in agronomy that were designed specifically for the off-campus Master's of Science Degree Program in Agronomy were not used because they were the focus of an ongoing research program coordinated by the Iowa State University College of Education. Persons who were sharing course videotapes, lived at the same residence as another off-campus student, or participated in developing materials for the study were purged from the list. This step was taken to limit the possibility of persons in the control group being exposed to the

treatment, and the possibility of an internal validity threat based on subjects' attitudes toward the nature of their involvement in the study (Ary, Jacobs & Razavieh, 1996). High school students were also purged from the list. Students who were included in the study during the fall of 1999 were not studied again in the spring of 2000. It was not considered to be appropriate nor practical to use a repeated measures design.

A master list of unduplicated student names for both semesters was developed and yielded an accessible population of 218 students. Students were enrolled in one or more of 25 courses offered by 14 different departments. Thirteen of the courses were open to both undergraduate and graduate students, six courses were offered at the graduate level, and six were offered at the undergraduate level. A majority of the students (63.6%) were experiencing courses delivered by videotape, 20% were experiencing courses offered on the Internet, 5% were experiencing courses delivered by an interactive communications network, 5% were experiencing courses delivered by CD-ROM, and the remaining 6.5% were experiencing courses delivered by more than one delivery medium.

Design

A post-test only control group design was used to test the hypotheses (Campbell & Stanley, 1963). A simple random sample of 110 students was selected to receive the treatment, while the remaining 108 students served as the control group. At the beginning of both semesters, a letter, videotape, and bookmark were sent to all members of the treatment group. The letter explained the purpose of the videotape and bookmark, and informed students that they would be receiving a questionnaire near the end of the semester that would be used to evaluate the videotape. The videotape was developed to promote the use of six learning strategies identified in the literature as potential contributors to off-campus learner success. The bookmark included a list of the six strategies and was intended to serve as a reminder of the content addressed in the videotape. The strategies included communicating with the instructor, developing study patterns, skimming

material, self-testing, test-taking, and maintaining motivation (Pilcher & Miller, 2000). The 10-minute videotape was produced by a professional videographer. Four off-campus students communicated the strategies through examples from their own learning experiences. The Director of Distance Education for the College of Agriculture provided a summary of the key points at the end of the tape.

Instrumentation

The questionnaire was developed by the researchers. The complete version was used with the experimental group and included a question to determine whether students actually watched the videotape (Part 1), a Likert-type scale to determine the extent to which the strategies suggested in the videotape were used during the semester (Part 2), a Likert-type scale to measure students' attitudes toward the learning strategies presented in the videotape (Part 3), a Likert-type scale to measure students' attitudes toward the distance learning experience (Part 4), and a series of demographic questions (Part 5). The questionnaire used with the control group included only Parts 2, 4, and 5.

Nine students enrolled in a graduate-level course, "Distance Teaching and Learning in Agriculture," served as a panel of experts to evaluate the questionnaire for content and face validity. Their judgment was sought after they completed a unit on distance learners and learning. They also were given a detailed description of the study and specific directions on how to conduct their review. All panel members agreed that the questionnaire possessed content and face validity. Ten graduate students enrolled in an "Introduction to Research in Agricultural Education" course pilot-tested the complete questionnaire. They viewed the videotape and received a bookmark at the beginning of the semester. In the seventh week of fall semester 1999, they were asked to complete the questionnaire. Students participating in the pilot test were reminded of the study's purpose, informed that their responses would be used to evaluate the questionnaire, informed that their responses would be anonymous, and encouraged to participate

so their data could be used in class as a tool for learning about reliability. Cronbach's alpha was used to assess the internal consistency of Parts 2, 3, and 4 resulting in coefficients of .89, .84, and .91, respectively.

Data Collection

In the 14th week of the fall 1999 and spring 2000 semesters, a package containing a cover letter, questionnaire, and return envelope was mailed to students in the treatment and control groups. After two weeks, a complete follow-up of all nonrespondents was conducted. Nonrespondents were sent a new cover letter, a second copy of the questionnaire, and a return envelope. Of the 110 students in the experimental group, 72 completed and returned the questionnaire for a response rate of 65%. Sixty-seven students of the 108 in the control group completed and returned the questionnaire for a response rate of 62%.

Cumulative grade point averages at the beginning of the semester for which each student who was a subject of this study and their off-campus course grades for the semester were obtained from the Registrar's office. There is often a delay in grade reporting for off-campus students, and many off-campus students receive incompletes. To obtain as many semester grades as possible, the researchers made a final request of the Registrar's office for fall 1999 and spring 2000 semester grades in the fall of 2000. Data on course delivery media associated with each course was obtained from the Director of Distance Education for the college of agriculture.

According to Miller and Smith (1983), one method of handling nonresponse is to compare respondents and nonrespondents on known characteristics. For this study, respondents and nonrespondents were compared on their cumulative GPA at the beginning of the semester, on their GPA for off-campus courses taken during the semester, and on the method(s) of course delivery that they experienced. Data revealed that the respondents ($M = 3.12$, $SD = .88$) had significantly higher beginning GPA's than nonrespondents ($M = 2.81$, $SD = .72$), $t(153) = -2.25$. Respondents ($M = 3.52$, $SD = .64$) also

achieved significantly higher semester GPA's than nonrespondents ($M = 2.67$, $SD = 1.27$), $t(64) = -4.55$. Equal variances for the semester GPA's were not assumed; therefore, degrees of freedom were reduced from 155 to 64 (SPSS, 1998). There was a negligible and nonsignificant association (Cramer's $V = .18$) between method of course delivery experienced and whether a student responded to the questionnaire.

Data Analysis

All quantitative data were analyzed with the SPSS for Windows Release 8.0 personal computer program. Frequencies, percentages, means, standard deviations, and appropriate correlational statistics were used for descriptions. The rules of thumb established by Ary et al. (1996) were used to interpret relationships between variables. Tests of statistical significance included chi-square and the independent samples t-test. The alpha level was set *a priori* at .05.

Preliminary analysis revealed that only 36 of the 72 respondents in the treatment group reported actually having watched the learning strategies videotape. For the purpose of addressing the objectives and hypotheses of the study, the 36 students who viewed the videotape were considered to be members of the treatment group and all other respondents were members of the control group.

Limitations

This study began with a post-test only true experimental design. However only 65% of the subjects that were randomly assigned to the experimental group and 62% of the subjects randomly assigned to the control group completed and returned the questionnaire. In addition, only 36 of the 72 students who received the videotape and responded to the questionnaire reported having viewed the videotape. Therefore, the study became quasi-experimental using the static group comparison design. A major threat to the internal validity of this design is selection. To address this threat, treatment and control groups were compared on several potentially extraneous variables (Tables 1 & 2). No differences were found between treatment and control groups on any of these variables. One additional

comparison was made to determine whether experimental mortality (Ary et al., 1996) was a threat to the internal validity of the study. Data show that there was a negligible and nonsignificant association (Cramer's $V = .04$) between treatment group and whether a student responded to the questionnaire.

Regarding external validity, a comparison of early and late respondents revealed that respondents had significantly higher beginning and semester GPAs than nonrespondents. Therefore, the findings of this study apply only to respondents and generalizations to the population or beyond are not recommended.

This study was designed to determine whether the videotape had broad applicability. It was tested across student academic level, various faculty, various departments and different methods of course delivery. The choice of design and analysis is a limiting factor in this study. As an example, there could be an interaction between treatment and method of course delivery.

Results

Objective 1: Describe and compare the demographic characteristics of students who participated in the study by experimental group.

Tables 1 and 2 present findings

concerning the demographic characteristics of students in each experimental group. The data reveal that treatment and control groups did not differ significantly on any of the 10 characteristics that were measured. The majority of students were male. More than half of the students held graduate classification, and only about 6% of the students were freshmen or sophomores. The most frequently cited primary occupation of students was "other." Students who selected this response option were asked to write in the name of their occupation. Many of these "other" occupations were agriculture-related, but some clearly were not. For example, students listed the following occupations: homemaker, air traffic controller, police officer, military, forensic scientist, and athletic trainer. The second most frequently selected primary occupation was agribusiness followed by full-time student, farming, agricultural extension, and agricultural education teacher. Students were on average 35 years of age and entered the semester with a cumulative grade point average higher than 3.0. Regarding the number of courses taken in the last three years, students had taken the greatest number of courses on campus followed by courses delivered by videotape, computer, and an interactive communications network. Students had taken the fewest number of courses delivered by a combination of technologies.

Table 1
 Comparison of Selected Demographic Characteristics for Students in the Treatment and Control Groups

Characteristic	Treatment		Control		Association	<i>p</i>
	<i>f</i>	%	<i>f</i>	%		
Gender					.01^a	.89
Male	22	61.1	63	62.4		
Female	14	38.9	38	37.6		
Classification					.14^b	.65
Freshman	1	2.9	2	2.1		
Sophomore	1	2.9	4	4.1		
Junior	3	8.8	16	16.5		
Senior	5	14.7	20	20.6		
Graduate Student	24	70.6	55	56.7		
Occupation					.15^b	.67
Farming	6	17.1	13	13.0		
Agribusiness	7	20.0	19	19.0		
Agricultural Extension	0	0.0	6	6.0		
Agricultural Education Teacher	1	2.9	3	3.0		
Full-Time Student	5	14.3	20	20.0		
Other	16	45.7	39	39.0		

^a=Phi, ^b= Cramer's *V*.

Table 2
 Comparison of Selected Demographic Characteristics for Students in the Treatment and Control Groups

Characteristic	Treatment			Control			<i>t</i>	<i>p</i>
	<i>M</i>	<i>SD</i>	<i>n</i>	<i>M</i>	<i>SD</i>	<i>n</i>		
Age	36.89	10.82	35	34.33	9.77	101	1.30	.20
Beginning GPA	3.23	.69	25	3.09	.93	74	.73	.47
Number of courses taken in the last three years								
By computer	.72	1.03	36	.83	1.03	100	.54	.59
By videotape	1.61	1.79	36	1.75	2.23	100	.34	.74
By interactive communications network	.53	.97	36	.61	1.29	100	.35	.73
By a combination of technologies	.50	1.38	36	.42	1.42	99	.28	.78
On-campus	5.08	9.24	36	4.93	8.57	96	.09	.93

Objective 2: Describe attitudes of students in the treatment group toward the learning strategies that were promoted in the videotape.

Table 3 shows the distribution of attitude scores provided by members of the treatment group toward the learning

strategies promoted in the videotape. Most (85.3%) held positive or strongly positive attitudes toward the strategies. About 15% of the students expressed attitudes that were neutral. No student expressed a negative attitude toward the learning strategies presented in the videotape.

Table 3
Attitudes Held by Members of the Treatment Group Toward the Learning Strategies Promoted in the Videotape

Attitude	Mean Score ^a	f	%
Strongly Negative	1.00-1.50	0	0.0
Negative	1.51-2.50	0	0.0
Neutral	2.51-3.50	5	14.7
Positive	3.51-4.50	24	70.6
Strongly Positive	4.51-5.00	5	14.7

Note. Mean = 3.93, SD = .53

^a 1 = strongly disagree, 2 = disagree, 3 = undecided, 4 = agree, 5 = strongly agree.

Hypothesis Testing

Hypothesis 1. Agricultural distance learners who viewed a videotape designed to promote six learning strategies will report having used the strategies to a greater extent than learners who did not view the videotape.

Students in the treatment and control groups reported having used the learning strategies to the same extent (Table 4). Therefore, hypothesis one was not supported by the data.

Hypothesis 2. Agricultural distance learners who viewed a videotape designed to promote six learning strategies will earn higher grades in their off-campus course(s) than learners who did not view the videotape.

Overall, students attained high marks for their performance in off-campus courses for

the semester that they were involved in this study. There was no statistically significant difference between treatment and control groups on their off-campus course(s) grade point averages (Table 4). Hypothesis two was not supported by the data.

Hypotheses 3. Agricultural distance learners who viewed a videotape designed to promote six learning strategies will be more satisfied with their distance learning experience than learners who did not view the videotape.

Students in both groups expressed satisfaction with their distance learning experience. There was no statistically significant difference between treatment and control groups on their level of satisfaction with the distance learning experience (Table 4). Hypothesis three was not supported by the data.

Table 4
Comparison of Treatment and Control Groups on Key Dependent Variables

	Treatment			Control			t	p
	M	SD	n	M	SD	n		
Extent of use ^a	2.93	.82	36	2.93	.78	95	.01	.99
Off-campus course(s) GPA	3.47	.67	24	3.54	.63	81	.42	.67
Satisfaction ^b	4.04	.49	36	4.10	.54	99	.59	.56

^a Extent to which students reported using the six learning strategies and based on the following scale: 1 = not at all, 2 = once or twice, 3 = about one to three times each month, 4 = about once each week, 5 = more than once each week.

^b 1 = strongly disagree, 2 = disagree, 3 = undecided, 4 = agree, 5 = strongly agree.

Conclusions and Recommendations

Students enrolled in distance education courses offered by the Iowa State University College of Agriculture are considerably older than the traditional on-campus student. A significant proportion of these students are employed in agriculture-related occupations. Less than one-fifth are full-time students. When taking courses off-campus, they are more apt to choose asynchronous delivery technologies such as videotape, and less likely to take courses delivered synchronously on an interactive communications network. Students enrolled in off-campus courses offered by this college of agriculture are satisfied with their distance learning experience.

When compared to an earlier study (Miller & Honeyman, 1993) of off-campus learners in this same College of Agriculture, data revealed that the number of female students has increased by approximately 25% and the number of students who identified their primary occupation as farming has declined by approximately 29% over a period of seven years. It is recommended that student demographic characteristics be regularly monitored, and that college of agriculture faculty and administrators consider the characteristics of the students who take their off-campus courses in arriving at program-related decisions.

Students who watched the videotape gave the learning strategies that it promoted high marks. Even so, watching the videotape did not lead to their using the strategies more frequently, achieving higher off-campus course grades, or being more satisfied with their distance learning experience. Why would the videotape be rated highly, but not influence learning strategy usage, grades, and satisfaction? Students who chose to participate in the study by completing the questionnaire achieved a semester GPA 32% higher than those who did not participate. This restriction in the range of student performance may have been partially responsible for the failure to observe differences between the treatment and control groups. The persons who may have been able to benefit most from the videotape

chose not to participate. Of course it may simply be the case that the videotape is not an effective tool for influencing learning strategy usage, grades, or satisfaction. Some students wrote related comments on the questionnaire. One indicated that the videotape was interesting but not particularly useful since she/he had already developed good study habits. Another student noted that he/she watched the videotape near the end of the semester and would recommend it, but she/he predicted that students who would view and pay attention to it would do well anyway.

Gibson (1998) indicated that academic self-concept was an important factor in distance learner attrition. An important issue related to self-concept for adult distance learners entering off-campus programs after an extended absence from formal education is a concern about whether their repertoire of learning strategies will be adequate for success in the new learning environment. While data from this study clearly do not support a conclusion that the videotape had a positive effect on learning, most of the students who viewed the videotape held positive or strongly positive attitudes toward the strategies that it promoted. The videotape might provide a positive influence for some individuals while doing no harm to others. It is recommended that the videotape be made available to instructors who teach off-campus courses in the Iowa State University College of Agriculture. They should be encouraged to consider integrating it into their course material so that students who might benefit would be more apt to see it. The videotape is available in digital format and could be adapted for use in a variety of distance delivery platforms. It was also recommended that further research be conducted to determine whether providing the videotape and accompanying bookmark to returning adult distance learners when they begin their first off-campus course will have a positive effect on their achievement and satisfaction with the distance learning environment early on. Later a comparison of retention rates between those receiving and not receiving the videotape and bookmark should be made.

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