

## STUDYING AGRICULTURE THROUGH VIDEOTAPE: LEARNER STRATEGIES AND COGNITIVE STYLES

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### Abstract

*The purpose of this study was to describe learning strategies used by students enrolled in videotaped courses and to explore associations between selected learning strategies and cognitive style. Results suggest that students took advantage of the convenience that videotaped instruction affords by controlling when, where and for how long instruction took place. Furthermore, the distant learners tended to study independently and learned by viewing the videotape, completing reading assignments, and reading class notes. They rarely studied with others and rarely called the instructor. Since learners relied heavily on the videotapes, recommendations were made about how the quality of communication in videotaped courses could be enhanced. Students adopted a relatively consistent approach to learning from videotape. Instructors should be made aware of the learning strategies employed by their distant students and in some cases may wish to recommend alternative approaches. Field-dependent and field-independent students employed very similar learning strategies. Differences were noted that were consistent with the learning style literature. Further research was recommended to determine if practical associations exist between learning strategies and cognitive style in the context of other distance learning delivery media.*

Teaching and learning are complex processes composed of interactions among teachers, students, instructional content, and the environment. Teaching and learning have been researched extensively, but much remains to be learned about the process (Riddle, 1992). This is particularly true for teaching and learning in agriculture (Crunkilton, 1988). The need for research-based knowledge related to learners and learning is especially important in the distance education context, but most of the literature in distance education is anecdotal (Scholsser & Anderson, 1994).

Students approach learning tasks differently. This is true also of adult learners enrolled in distance education programs (Wong, 1992). Learning strategies are the techniques or skills used by an individual in accomplishing a learning task (Fellenz, 1989). Learning strategies influence achievement, but students generally have a limited repertoire of learning strategies, some of which may not be effective (Ehrman, 1990). What learning strategies are commonly used by agricultural distant

learners? Researchers (Miller & Honeyman, 1994; Miller, 1995a) have explored basic learning strategies used by students enrolled in videotaped courses, but additional research is needed to more comprehensively identify alternative learning strategies successfully used by distant learners in agriculture. Such information would be of value to students and teachers in that instruction in appropriate learning strategies can improve student achievement (Fellenz, 1989).

Learning strategies are intimately related to learning styles (Ehrman, 1990). In fact, learning style may be defined as a propensity to select a learning strategy despite the demands of a given learning task (Dillon & Schmeck 1983). Even so, learning strategies are to some extent a function of a particular situation and are more amenable to change than are cognitive styles (Henderson, 1984).

Learning styles research conducted by agricultural educators has generally focused on the field dependence/independence psychological

dimension (Miller, 1995b). Garton (1993) developed a detailed comparison of field-dependent and field-independent learner preferences. In this comparison, Garton suggested that field-dependent learners prefer externally defined goals and organization, prefer a spectator approach to learning, value positive reinforcement from the teacher, have well-developed social skills, favor extrinsic motivation, and prefer collaboration. In contrast, field-independent learners can provide their own structure for learning, prefer trial and error, do not typically respond to teacher reinforcement, have poorly developed social skills, are intrinsically motivated, and prefer competition. Both field-dependent and field-independent learners can be successful in a variety of learning environments. However, it is likely that different learning tasks and learning contexts are better handled with strategies associated with one or the other cognitive style. How, if at all, are learning strategies employed by agricultural distant learners associated with cognitive style?

### **Purpose and Objectives**

**The** purpose of this study was to describe learning strategies used by students enrolled in videotaped courses and to explore associations between selected learning strategies and cognitive style. The following research objectives guided the study: (1) Describe learning strategies used by students enrolled in videotaped courses; (2) Determine whether agricultural distant learners were consistent in their approach to learning from videotape over time; (3) Describe associations between the use of selected learning strategies and the cognitive style of agricultural distant learners.

### **Procedures**

**The** population for this descriptive correlational study consisted of all students seeking a degree and/or advanced formal training in agriculture through videotaped course offerings of the Iowa State University College of Agriculture. The

sample (n=157) consisted of all undergraduate and graduate students who enrolled in one or more of eight agricultural courses delivered through videotape during Spring and Fall Semesters of 1995. Courses in agronomy (3), agricultural systems technology, animal science, animal ecology, sociology, and biochemistry were offered.

A learning strategies for videotaped instruction instrument was developed by the researcher. The instrument sought both quantitative and qualitative data about the learning activities of distant learners. Content and face validity were established by a panel of experts in agricultural education, and the instrument was field-tested for suitability with a group of 10 students who had formerly enrolled in videotaped courses through the off-campus program. The instrument required students to record data related to their learning activities over a seven-day period.

The Group Embedded Figures Test (GEFT) (Witkin, Oltman, Raskin, & Karp 1971) was used to determine the preferred cognitive style of the distant learners. The GEFT is a standardized instrument with a reliability estimate of .82. Concurrent validity with the Embedded Figures test was .82 for males and .63 for females. To compare field-dependent and field-independent students' qualitative descriptions of their learning strategies, a median split was used (Spanier & Tate, 1988; Thompson & Knox, 1987). Students who scored below the group median of 14 were labeled field-dependent, and those with scores equal to or greater than the median were labeled field-independent.

Identical data collection procedures were used for both Spring and Fall Semesters. Learning strategies data were collected by mailed questionnaire. Approximately five weeks after the first mailing, a follow-up mailing was sent to all respondents and nonrespondents. Respondents were asked to complete the learning strategies instrument for a second time, and nonrespondents were encouraged to provide data on at least this

occasion. A total of 132 (84%) students completed the learning strategies instrument once, while 83 (53%) completed the instrument on two separate occasions.

The GEFT was administered by proctors during a regularly scheduled examination. A letter was sent to all students included in the sample (n=157) approximately one week before the GEFT was administered to explain the purpose of the study and to encourage their participation. Eighty (51%) students completed the GEFT and at least one copy of the learning strategies instrument.

### Analysis of Data

All data were analyzed with the SPSS personal computer program. Appropriate statistics for description (frequencies, percentages, means, standard deviations, Pearson correlations, point biserial correlations, phi coefficients, and Cramer's V statistic) were used. The magnitude of all relationships was interpreted using Davis' (1971) descriptors.

### Results

How were the videotaped lessons used by students? Most of the students (n=85, 64.4%) indicated that they viewed the videotaped lesson whenever they had time rather than viewing it immediately after it was received (n=7, 5.3%), or putting it aside until a predetermined viewing time (n=40, 30.3%). On average, students viewed the two-hour videotape for 127 minutes or 106.3% of the tape length with a standard deviation of 35.4% (Table 2). Most students paused the tape while viewing (n=121, 91.7%) and took notes (n=114, 87%). Less than 50% of the students viewed the tapes in segments (n=53, 40.2%), or viewed the tape more than once (n=58, 43.9%) (Table 1).

How did students approach the learning task in videotaped courses? Students, on average, spent 272.7 minutes engaged in learning activities during the one week period and spent less than 3% of their

time studying with others. Approximately 19% (25) of the students called the instructor an average of 1.2 times during the seven-day period (Table 2). As for study practices, most students viewed the videotaped lessons (n=126, 95.5%), read assigned readings (n=102, 77.3%), and read class notes (n=88, 66.7%). Fewer than half the students outlined class notes (n=28, 21.2%), read unassigned related literature (n=20, 15.2%), studied with one other person (n=9, 6.8%), or studied with a group of persons (n=6, 4.5%) (Table 1).

Table 1. Frequency and Percent of Students Who Utilized Selected Learning Strategies During a Seven Day Period (n=132)

Strategy	f	%
Viewed the videotape in segments.	53	40.2
Took notes while viewing the videotapes.	114	87.0
Viewed the videotape more than once.	58	43.9
Paused the videotape while viewing.	121	91.7
Read class notes.	88	66.7
Outlined class notes.	28	21.2
Read assigned readings.	102	77.3
Read unassigned related literature.	20	15.2
Viewed videotaped lessons.	126	95.5
Studied with one other person.	9	6.8
Studied with a group of students.	6	4.5
Called the instructor.	25	18.9

Pearson correlations, phi coefficients, and Cramer's V statistic were used to determine whether agricultural distant learners were consistent in their approach to learning from videotape over

Table 2. Means and Standard Deviations for Selected Learning Related Variables (n=132)

Variable	Mean	S.D.
Number of videotape courses taken.	2.73	3.15
Viewing time as a percent of video length.	106.34	35.44
Total amount of time spent studying over the seven day period.	272.73	186.72
Number of times the student called the instructor.	1.20"	.50
Total percentage of time spent studying with other people.	2.67	9.27

Note a n=25.

time. Students' learning activities were measured at an interval of five weeks. Relationships between students' first and second responses were calculated for 18 variables. Two of the associations were very strong, five associations were substantial, and eight of the associations were moderate. Three low associations were found and related to: (1) whether the student called the instructor, (2) whether the student outlined class notes, and (3) whether the student read unassigned related literature. (Table 3).

Pearson correlations, point biserial correlations, and Garner's V statistic were used to describe associations between the use of selected learning strategies and the cognitive style of the distant learners. Seventeen relationships were examined that ranged in magnitude from negligible to moderate. Nine associations were negligible, five were low, and three were moderate. Field-dependent learners were more likely to view a videotape immediately after it was received and tended to spend a greater proportion of their study

time with others when compared with the field-independent learners. Field-independent learners were more likely to put the tape aside until a predetermined viewing time, were more likely to list viewing the videotape as a learning strategy, and were more likely to telephone their instructor (Table 4).

Students were asked to describe specific learning strategies or activities that had worked especially well for them over the specified seven-day period. Both field-dependent and field-independent learners controlled the pace of instruction by rewinding and pausing the tape, found creative ways to work around their family responsibilities, and found ways of applying what they had learned to their occupations. Field-independent learners were more reflective and gave more thorough descriptions of their learning activities. And surprisingly, it was the field-independent learners who expressed in writing a desire to have on-campus laboratory sessions to meet the instructor and to work with other students. Several field-dependent learners described efforts to create their own structures for learning. One field-dependent learner wrote "I plan study times for each class and try to heed to those times for that class, Wednesday is a day for study, computer work, videotape review and reading."

### Conclusions and Recommendations

One of the often cited benefits of videotaped instruction is the convenience that it affords students. Students who participated in this study took advantage of this as they exercised their ability to control when, where, and for how long instruction took place. Furthermore, students exercised control over the pace of lessons. Convenience and student control of the learning environment must be fostered by distance education programmers. Acceptability of the videotape medium is related to these variables (Miller & Honeyman, 1994, Miller, 1995a).

Table 3. Relationships Between First and Second Response for Selected Learning Related Variables (n=83)

Variable	Association	Magnitude
Type of viewing schedule followed.	.66 <sup>a</sup>	Substantial
Time of day when students were more likely to view the tape.	.47 <sup>a</sup>	Moderate
Proportion of reading assignments completed.	.55 <sup>a</sup>	Substantial
Viewed the videotape in segments.	.62 <sup>b</sup>	Substantial
Took notes while viewing the videotapes.	.70 <sup>b</sup>	Very Strong
Viewed the videotape more than once.	.50 <sup>b</sup>	Substantial
Paused the videotape while viewing.	.36 <sup>b</sup>	Moderate
Read class notes.	.56 <sup>b</sup>	Substantial
Outlined class notes.	.23 <sup>b</sup>	Low
Read assigned readings.	.44 <sup>b</sup>	Moderate
Read unassigned related literature.	.14 <sup>b</sup>	Low
Viewed videotaped lessons.	.39 <sup>b</sup>	Moderate
Studied with one other person.	.49 <sup>b</sup>	Moderate
Studied with a group of persons.	.39 <sup>b</sup>	Moderate
Called the instructor.	.23 <sup>b</sup>	Low
Viewing time in minutes.	.70 <sup>c</sup>	Very Strong
Total amount of time spent studying over the seven-day period.	.42 <sup>b</sup>	Moderate
Number of times the student called the instructor.	.41 <sup>b</sup>	Moderate
Total percentage of time spent studying with other people.	.46 <sup>b</sup>	Moderate

Note. <sup>a</sup>Cramer's's V. <sup>b</sup>phi <sup>c</sup>Pearson.

As a group, the distant learners tended to study independently and learned by viewing the videotape, completing reading assignments, and reading class notes. They rarely studied with other individuals or groups and rarely called the instructor. This low level of interaction and high level of dependence on the videotape suggests a need for high quality communication. Instructors and video production specialists should be aware of the importance of clear communication and should develop and employ strategies to enhance the quality of communication in videotaped courses. One approach could involve inviting a trusted colleague of the instructor to each taping. The colleague could interact with the instructor, ask questions, and identify potential communication problems. Taping on-campus courses for videotape delivery may be another promising alternative. The on-campus students, through questions and

nonverbal cues, may be able to assist the instructor in communicating lessons more effectively to the distant learner.

Students adopted a relatively consistent approach to the task of learning from videotape. Instructors should be made aware of this and may wish to recommend different strategies to their students. Additional research is needed to describe relationships between learning strategies and achievement in agricultural courses delivered by videotape. Besides quantitative comparisons, qualitative data are needed to identify unique approaches to learning from this medium. Research should be conducted to determine if students enrolled in videotaped courses rely more on surface or deep approaches to learning (Fenwick & McMillian 1992; Henderson, 1984) and whether depth is related to achievement of intended learning

Table 4. Relationships Between Learning Style and Selected Learning Related Variables (n=80)

Variable	Association	Magnitude
Type of viewing schedule followed.	.44 <sup>a</sup>	Moderate
Viewed the videotape in segments.	-.13 <sup>b</sup>	Low
Took notes while viewing the videotapes.	.05 <sup>b</sup>	Negligible
Viewed the videotape more than once.	-.07 <sup>b</sup>	Negligible
Paused the videotape while viewing.	-.04 <sup>b</sup>	Negligible
Read class notes.	-.07 <sup>b</sup>	Negligible
Outlined class notes.	-.14 <sup>b</sup>	Low
Read assigned readings.	-.15 <sup>b</sup>	Low
Read unassigned related literature.	.03 <sup>b</sup>	Negligible
Viewed videotaped lessons.	.30 <sup>b</sup>	Moderate
Studied with one other person.	.02 <sup>b</sup>	Negligible
Called the instructor.	-.01 <sup>b</sup>	Negligible
Viewing time as a percent of video length.	.01 <sup>c</sup>	Negligible
Total amount of time spent studying over the last seven days.	-.12 <sup>c</sup>	Low
Number of times the student called the instructor.	.37 <sup>c</sup>	Moderate
Total percentage of time spent studying with other people.	-.20 <sup>c</sup>	Low
Number of videotape courses taken.	.04 <sup>c</sup>	Negligible

Note. Learning style was treated as an interval scaled variable. Scores on the GEFT can range from 0 to 18. Higher scores are associated with field independence.” Cramer’s V. <sup>b</sup> point biserial. <sup>c</sup> Pearson.

outcomes for specific videotaped courses. In any case, students should be informed of the relationship between learning strategies and achievement and should be informed of a variety of effective strategies for learning from videotape. Learning strategies workshops would not likely be of interest to students (Bernt & Bugbee, 1990), but embedding learning strategies instruction into the regular curriculum materials and training instructors to incorporate learning strategies into regular classroom presentations (Weinstein & Underwood, 1985) may be useful approaches in the agricultural setting.

Field-dependent and field-independent learners employed very similar strategies for learning from videotaped lessons. However, results of this study suggest that field-dependent learners spent a greater proportion of their study time with others and were more likely to establish their own structures for learning. These findings are consistent with the

theoretical preferences of field-dependent learners (Garton, 1993, Torres, 1993). While the videotape medium may impose certain logistical and pedagogical limitations that favor the field-independent learner, field-dependent learners who participated in this study were able to create, on their own, social interactions and structures that supported their preferred learning style. Further research is needed to determine if practical associations exist between learning strategies and cognitive style in the context of other distance learning delivery media.

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