The literature (Johnson & White, 1981; Witkin et al., 1977; Witkin & Moore, 1974; Witkin et al., 1971) eludes to educational implications from knowledge of cognitive style. Related to problem solving abilities, field dependent individuals (international students) may not do as well solving problems in which an essential element must be separated from the context in which it is presented and used in a different context; however, field independent students (domestic students) are more likely to spontaneously organize material lacking structure, be less reliant on teacher imposed structure and prefer their own strategies.

Considering interaction with people, field dependent individuals (international students) are very socially sensitive, interested in others, verbal, and may be more easily influenced by peer pressure. Field independent individuals (domestic students) are inclined to be less attuned to social cues, have more theoretical and abstract interests, be less verbal, and may be more individualistic.

Related to preferred subject matter, field dependent (international) students more easily learn socially oriented materials, like personal application of concepts, and avoid majors in science. Field independent (domestic) students more easily learn impersonal material, tend to have a difficult time with detail, and avoid majors in social and behavioral sciences.

Students whose cognitive styles are mismatched with the nature of the curricular content in their major may need assistance in adapting their cognitive style to the content of that discipline.

References Cited

Escolme, K. M. (1988). Cognitive style of international and domestic graduate students in agricultural education and agricultural economics. Master's thesis, The Ohio State University, Columbus, OH.

Goldstein, K. M. & Blackman, S. (1978). *Cognitive style: five approaches and relevant research.* New York: Wiley.

Johnson, K. A. & White, M. D. (1981, April). *Cognitive style in library information science education.* Paper presented at the Annual Meeting of the American Educational Research Association, Los Angeles, CA, ERIC # 203 863.

Keefe, J. W. (1979). Learning styles: An overview. *Student learning styles. Diagnosing and prescribing programs.* Reston, VA: National Association of Secondary School Principals, ERIC # 182 859.

Newcomb, L. H. & Trefz, M. (1987, December). *Levels of cognition of testing and student assignments in the College of Agriculture,* The Ohio State University. Paper presented at the meetings of the American Vocational Association, Las Vegas, NV.

Witkin, H. A.; Moore, C. A.; Oltman, P. K.; Goodenough, D. R.; Friedman, F. & Owen, D. R. (1977, February). *A longitudinal study of the role of cognitive styles in evolution during the college years.* GRE Board Research Report GREB No. 76-10R.

Witkin, H. A. & Berry, J. W. (1975). Psychological differentiation in cross-cultural perspective. *Journal of Cross-Cultural Psychology.* 6, (1), 4-87.

Witkin, H. A. & Moore, C. A. (1974). *Cognitive style and the teaching/learning process.* Princeton, NJ: Educational Testing Service. ERIC # 097 356.

Witkin, H. A.; Oltman, P. K.; Raskin, E. & Karp, S. A. (1971). *A manual for the embedded figures test.* Palo Alto, CA: Consulting Psychologists Press.

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NATIONAL SURVEY

Student Access to Instructional Computers As Viewed by Heads of Agricultural Economics

Kim Jensen, Burton English
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Abstract

A national survey of Agricultural Economics department heads revealed that the goals and methods of using microcomputers instructionally varied by whether the user was to be an undergraduate or a graduate student. Differences in the stated goals of using microcomputers instructionally may have effect upon the way resources are allocated to instructional use of microcomputers in the future.

Introduction

The use of microcomputers has become an integral part of the education process in the field of Agricultural Economics. Studies have examined the role of microcomputers in Agricultural Economics curriculum (Litzenberg), evaluated students' computer literary (Curtis, Gardner, and Litzenberg), and have discussed the potential impact of students' computing skills upon their employability (Litzenberg and Schneider; Ray and Li). These studies have primarily focused on the instructional use of microcomputers for undergraduates. However, a 1988 survey of heads over Agricultural Economics Departments in the U.S. revealed that the goals and methods of using microcomputers varied by whether they were being used as an instructional tool for undergraduates or graduates.

Identifying the goals of using microcomputers for instructional purposes is an important first step in planning the computer needs of instructional units, as well as those of the students. Analysis of the currently formulated goals may provide some explanation for the allocation of computing resources and suggest future allocations.

Objectives

The objectives of this paper are to identify, from the survey, some of the differences in how microcomputers are used for instructional purposes for undergraduate students versus graduate students in Agricultural Economics programs. While there are many factors which may influence differences in use, this study focuses on three primary areas: 1. enumerating the differences in the goals for using microcomputers for instruction, 2. discussing the general availability of microcomputers and software, 3. evaluating the range in instructional environments.

Procedure

A mailing was made to heads of Agricultural Economics departments in the U.S. The survey was designed to collect information on availability of microcomputers, type of computer facilities, equipment and software used, and goals of using microcomputers. A follow up postcard and letter were also sent. Only information from departments with undergraduate and graduate teaching programs were included in the survey results.

Results and Discussion

A total of 69 questionnaires were mailed out, with 37 being returned, a return rate of 54 percent. Three differences were identified in use for instructional purposes between undergraduate and graduate levels: 1. reasons for using microcomputers varied between undergraduate versus graduate levels, 2. the number and type of computers available were different, and 3. the setting in which microcomputers were available varied depending upon whether the user was an undergraduate or a graduate student.

Department heads were asked to rank possible reasons for using microcomputers instructionally by graduate and undergraduate categories. A ranking of 1, indicated the reason to be the most important, with higher numbers indicating lesser importance. Summarized results are in Table 1. Reasons viewed as being most important varied by whether the instruction was for undergraduate or graduate students. Department heads believed that making students coming out of their programs more competitive with students from other programs was a primary consideration for using microcomputers instructionally with respect to undergraduates. This reason ranked lower for graduate students than preparing them for future research projects.

Table 1. Reasons for Using Microcomputers for Instructional Purposes[a]

Reason	Respondents Ranking Most Important for: Undergraduates (%)	Graduates (%)
Enables the instructor to more effectively cover course materials	25.7 (N=35)	11.8 (N=34)
Makes students coming out of the program more competitive with students from other programs	57.1 (N=35)	35.3 (N=34)
Perceive that most other Ag Econ/Agbusiness programs are using them	6.1 (N=33)	3.1 (N=32)
Prepares the students for future research projects they may encounter	14.3 (N=35)	55.9 (N=34)

[a] N is the total number of responses to a question.

The average number of microcomputers available within departments per undergraduate student was considerably lower than that for graduate students (Table 2). In addition, the percentage of microcomputers with hard drives were also lower for undergraduates versus graduate students.

Table 2. Number of Microcomputer Set Ups Available to Students Within the Department[a]

	Undergraduate	Graduate
Total Departmental Computers Available per Student	.067 (N=35)	.112 (N=36)
Percent With Hard Drive	31.8 (N=35)	53.1 (N=36)

[a] N is the total number of responses to a question.

The environment in which microcomputers were available to students for instructional use also differed between undergraduate or graduate users. Nearly 50 percent of the department heads indicated that there were instructional labs within their departments. The estimated average percentage use by undergraduates was 65 percent compared with 35 percent for graduate students. A more common setting for graduate student use of microcomputers was in a research lab designated for graduate students. Responses indicated that this type of setting was primarily where microcomputers were available to graduate students (51.4 percent). Only about 10 percent of others did not have departmental instructional labs or one close by.

The survey collected software information, including spreadsheet applications, statistical and mathematical programming packages, word processing packages, and communications packages. Lotus was by far the most common spreadsheet, used in about 2/3 of the responding departments with instructional labs in the department or nearby. Similarly, WordPerfect was used in 16 out of 25 responding departments. Linear programming packages were dominated by LINDO, with 7 out of 14 respondents and the remainder divided among MPS-PC, MPSX, LP88, DHLLP, and Quick Quant. Less consensus of preference for other types of packages was evident, with no one package being used predominantly. Common statistical packages included SAS, RATS, SHAZAM, TSP, and LIMDEP. Less common statistical packages used were GAUSS, Microcomputerstat, Minitab, Mystat, and SPSS. Procomm was the most common communications program, and Harvard Graphics was mentioned most often as other available software.

When asked about prioritization of future available funds for microcomputers, instructional needs were given more number one rankings than other potential departmental needs, including individual faculty and secretarial computer needs. About 30 percent of the responding department heads gave instructional labs a number one ranking. Similarly, about 30 percent gave graduate needs a number one ranking as a priority if additional funds became available.

Conclusions

The survey indicates that Agricultural Economics department heads view microcomputers as a tool for learning with different end objectives in mind, depending upon whether the student was an undergraduate or a graduate. The respondents believed that making students more competitive with those from other programs is a key reason for using microcomputers as an instructional tool for undergraduates. However, respondents indicated that microcomputers as a learning tool for graduate students should primarily be for the purpose of preparing the students for future research projects.

The level of availability and setting for use tend to reflect these varying concerns. The results suggested that microcomputers were primarily available to undergraduates in a specialized instructional setting. The microcomputers, which

were available to graduate students, were often found in a multi-purpose graduate student lab, with at least partial use for graduate students' research, and with a greater number of microcomputers per student dedicated to use specifically by graduates.

There appeared to be some consistency across departments regarding the types of software packages available. Nearly all departments with intra-departmental instruction labs, or with labs nearby, had some type of statistical or word processing package available. Fewer had more specialized types of software, such as linear programming or communications packages available.

A strong prioritization of the microcomputer needs of one student group over the other in the event of additional funding was not apparent. However, overall student needs were a top priority, receiving a higher percentage of number one rankings than the needs of other groups such as faculty, staff, or other support personnel.

Two issues regarding instructional use of computers which were not considered as part of this study, but which merit future research, are: 1. potential effects of requiring every student to have access to microcomputers, and 2. how innovative faculty will be supported in instructional use of microcomputers in teaching many students in large classrooms at one time. These issues could have strong impacts on curriculum, student enrollment, and funding allocations in Agricultural Economics departments.

References

Curtis, P., F. Gardner, and K. Litzenberg. 1986. "Measuring Computer Literacy in Colleges of Agriculture." *National Association of Colleges and Teachers of Agriculture (NACTA) Journal*. 30: 18-22.

Litzenberg, K. 1982. "Computer Use in the Agricultural Economics Classroom." *American Journal of Agricultural Economics*. 64: 970-977.

Litzenberg, K. and V. Schneider. 1988. "Educational Priorities for Tomorrow's Agribusiness Leaders." *Agribusiness: An International Journal*. 4: 187-195.

Ray, D. and E. Li. 1987. "Integrating Microcomputer Applications Into Undergraduate Quantitative Methods Courses." *National Association of Colleges and Teachers of Agriculture (NACTA) Journal*. 31: 18.

Appendix 1
Abridged Survey

1. Current Number in Department:

Graduate Students (current or most recent semester or quarter) _____

Undergraduate Students (current or most recent semester or quarter) _____

2. Please indicate the number of microcomputers setups which are avail-able to the user groups:

	Graduate Students	Undergraduate
Students		
Monochrome, 1 or 2 floppy drives, no hard disk.	_____	_____
Monochrome, 1 or 2 floppy drives, with hard disk.	_____	_____
Color monitor, 1 or 2 floppy drives, with hard disk.	_____	_____
Other (please explain)	_____	_____

3. Are micros which are available to graduate students primarily (please put an X by the appropriate answer):

in a micro lab specifically for graduate students? _____

in an all purpose micro lab? _____

on the individual graduate student's desk or nearby (3 or less users)? _____

none of the above (please explain)? _____

4. Is there a microcomputer lab within your department which is designed for instructional purposes?

Yes ____ No ____ No, but one exists nearby ____

5. What percentage of the instructional lab is from:

graduate students? ____ % undergraduate students? ____ %

6. Please put X's by the types of software which are in the lab.

		Name of Most Used Package
Spreadsheet	___	_____
Statistical Package	___	_____
Linear Programming	___	_____
Word Processing	___	_____
Communication	___	_____
Other (Please List)	___	_____

7. Please rank the following reasons for using microcomputers for instructional purposes (1=most important, 2=next most important, etc.) at each level of instruction, undergraduate and graduate.

	Undergraduate	Graduate
Enables the instructor to more effectively cover course materials	_____	_____
Makes students coming out of the program more competitive with students from other programs	_____	
Perceive that most other Ag Econ/Agbusiness programs are using them	_____	_____
Prepares the student for future research projects they may encounter	_____	_____

8. If more funds became available, please rank in order of priority, where you would attempt to increase accessibility to microcomputers (1=most important, 2=next most important, etc.)

General Lab Facilities ____

Instructional Lab Facilities ____

Graduate Students' Research Lab Facilities ____

Individual In-office Faculty Microcomputers ____

Secretarial Facilities ____

Computer Support Personnel's Facilities ____

No Alteration, Am Satisfied With Accessibility ____