International Students' Need For Microcomputer Skills

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Abstract

Microcomputing education needs of international students in a College of Agriculture and Forestry were determined using the Borich needs assessment model. Microcomputing background of the international students was also examined. International students were found to be in substantial need of microcomputer education, especially in the areas of statistical analysis and spreadsheet applications. Conclusions and implications are offered for college teachers and administrators.

Introduction

Microcomputers are playing an increasingly important role in the management of world agricultural and forestry resources, both in developed and developing countries. The economic and social development of all countries will depend on the availability of trained professionals who are computer literate. The Board of Science and Technology for International Development (1986) stated:

> . . . the microcomputer represents the first significant technological advance that a developing country can assimilate and exploit with a relatively low capital investment and without prior knowledge or involvement in other technologies. Unfortunately this new technology represents not only an opportunity if properly exploited but a threat if ignored. The widespread and increasing incorporation of microcomputers into all aspects of the developed countries represents a major technological advance and an inevitable social change. If a developing country fails to take advantage of the opportunity that microcomputer technology represents, its level of development in relation to developed countries will be significantly lowered. (iii)

Agriculture in the United States is the most technologically advanced in the world (Rasmussen, et al., 1985). It is for this reason that agricultural students and professionals from around the world come to colleges and universities of the United States to study agriculture. For these colleges and universities to maintain their leading role in educating present and future professionals in the fields of agriculture and forestry, it is imperative that their curricula be structured to adequately train international students in microcomputer applications that will be beneficial to them and their countries.

There are two primary ways that agricultural microcomputer technology is being offered to international students. The first is to send trained technicians or faculty to other countries to conduct seminars or courses. This method has the advantage of allowing students to study regional problems close to their source (Rasmussen, et al., 1985).

The second method is to ". . . enable students to come from their own countries to a U.S. university to be trained in the use of computers and the programs applicable to their work in their own countries" (Rasmussen, et al., 1985, p. 66). This method, although having the advantage of incorporating microcomputer applications into the overall academic program of the students, frequently does not take into consideration the level of technology or the environmental diversity present in the international student's country. The Board of Science and Technology for International Development (1986) explains the difficulties that these diversities often present for microcomputer applications in agriculture.

> The use of microcomputers in agriculture is limited because the needs of farmers vary widely from place to place. The computer needs of farmers in tropical developing countries are not necessarily the same as those of farmers in temperate industrialized countries; the crops, the soils in which these crops are grown, and the climate are all different. Thus, most of the software applicable to the needs of farmers in the United States . . . would need to be rewritten to apply to the needs of farmers in developing countries. (pp. 39-40)

The West Virginia University College of Agriculture and Forestry has a long history of international student enrollment. With the increasing importance that microcomputers play in all areas of agriculture and forestry management today, it is imperative that agriculture and forestry curricula evolve to meet the educational and professional needs of international students.

Purpose and Objectives

This study sought to describe the microcomputer competencies possessed and needed by international students in the West Virginia University College of Agriculture and Forestry. Specific objectives of the study were:

1. to determine the microcomputing background of interna-

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tional students in the College of Agriculture and Forestry.

2. to determine the microcomputing educational needs of international students in the College of Agriculture and Forestry by comparing the microcomputing competencies possessed by these students with their perceived importance of the microcomputer competencies.

Methodology

Descriptive survey research, in the form of a census study, was used to obtain data for this study. A questionnaire modeled after one administered at The Ohio State University by Sherman (1986) was developed. The questionnaire was reviewed and verified by a panel of experts consisting of faculty members of the College of Agriculture and Forestry to determine its content validity. A four point rating scale of 3 = high, 2 = medium, 1 = low, and 0 = not able or not important was used to determine students' perceived ability and importance levels for each microcomputer competency. A pilot test was conducted and the internal consistency, using Cronbach's alpha, resulted in a coefficient of r = .95 for both the ability and importance sections of the questionnaire. Microcomputing competencies were grouped into five categories to help identify areas of educational need. The five categories were: general, word processing, data base, spreadsheets/statistics, and "other". The "other" skill category consisted of communication, programming and presentation skills.

To prioritize international students' computing education needs, Borich's (1980) Priority Needs Index [PNI = (I-A) x I] was used to determine the magnitude of discrepancies between students' perceptions of the importance of the microcomputer skills and their abilities to perform the skills. The *importance score* (I) for each item was defined as the student's perceptions of the importance of personally being able to use a microcomputer to perform a specific skill or job task. The *ability score* (A) for each item was defined as the student's perceptions of his/her personal ability to use a microcomputer to perform a specific skill or job task. The student computing education *need* (PNI) for each item was defined as the discrepancy between the importance score and the ability score multiplied by the mean importance score (Sherman, 1986). The instrument also contained questions designed to gather background information from respondents. This information included demographic, educational and microcomputing characteristics.

The population for this study consisted of all international students (N=63) enrolled in the College of Agriculture and Forestry at West Virginia University. An initial and follow up mailing resulted in return of 53 (84.13%) questionnaires, of which 52 (82.54%) contained usable data. Early respondents were compared to late respondents to determine if nonresponse was a threat to the external validity of the study. A t-test analysis of early and late respondents' answers found no significant differences ($p < .05$) between these groups. Therefore, the assumption was made that results of the study would be representative of the entire population (Miller & Smith, 1983).

Results

While nearly 70% of the students had completed a baccalaureate degree before coming to West Virginia University, less than 30% had previous microcomputing experience, and less than 20% had received this experience via their high school and undergraduate educations. Over 70% of the respondents stated they had received no microcomputer instruction at West Virginia University, or that instruction received had been inadequate. Lack of time and lack of access to equipment were the most frequently cited barriers to learning more about microcomputers. Half of the students reported having an intermediate or advanced level of microcomputing ability. The other half reported being beginners or non-users. A majority of the students indicated they were returning to their home country after completing their studies and that they would have access to microcomputers when they returned.

The second objective of this study was to determine the microcomputing educational needs of international students in the College of Agriculture and Forestry by comparing the microcomputing competencies possessed with the perceived importance of the microcomputer competencies.

The mean ability score recorded for each skill was below the medium ability level (scale of 3=high, 2=medium, 1=low, and 0=not able), and over half of the skills were rated below the low level of ability (Table). Skills receiving the highest ability scores were those that would be used most frequently with normal microcomputer use [i.e., use a printer (μ=1.95) and keyboard (μ=1.71), set up and put the microcomputer into operation (μ=1.74), use a word processing program (μ=1.69), and copy a disk (μ=1.69)]. Skills receiving the lowest ability scores were those associated with communication, evaluation and programming activities [i.e., hook up the microcomputer to communicate with other computers (μ=.43), evaluate software (μ=.43) and hardware (μ=.38) in your discipline, and use a programming language to create software (μ=.41)].

Students perceived the importance of being able to perform each microcomputer skill as greater than their ability to perform the skill. A majority of the skills had a perceived importance score higher than the medium importance level (scale of 3=high, 2=medium, 1=low, 0=not important). In general, students reported the highest ability scores for those skills which they perceived as most important, and reported the lowest ability scores for those skills which they perceived as least important (Table). Skills receiving the highest importance scores were: load programs into the computer (μ=2.76), use the computer keyboard (μ=2.74), use a word processing program (μ=2.74), create graphs, charts, and diagrams (μ=2.74), and set up and put the microcomputer into operation (μ=2.69). Those skills which students rated least important were: generate directories of telephone numbers, etc. (μ=1.62), assist in personal tasks and scheduling (μ=1.64), generate mailing labels (μ=1.74), and analyze writing through word counts (μ=1.76).

A Priority Needs Index (PNI) was computed to determine the microcomputing education needs of the interna-

Table. Ability, Importance and PNI Scores for Microcomputer Skills by Skill Category

Statement	Ability Score μ	Ability Score σ	Importance Score μ	Importance Score σ	PNI by Skill μ	PNI by Skill σ	PNI by Category μ	PNI by Category σ
General							2.38	1.99
Evaluate hardware in my discipline	0.38	0.66	1.86	1.10	2.94	2.06		
Load programs into the computer	1.62	1.13	2.76	0.58	2.92	3.01		
Evaluate software in your discipline	0.43	0.67	1.88	1.06	2.80	2.04		
Format a disk	1.52	1.17	2.67	0.65	2.77	2.94		
Locate free microcomputer software	0.67	0.95	2.02	1.02	2.72	2.63		
Use the computer keyboard	1.71	1.02	2.74	0.54	2.53	2.89		
Set up and put the microcomputer into operation	1.74	1.13	2.69	0.60	2.48	3.36		
Transfer files from one disk to another	1.41	1.17	2.45	0.74	2.26	2.74		
Locate information about microcomputers	0.79	0.95	1.93	1.05	2.20	2.22		
Copy a disk	1.69	1.18	2.55	0.71	1.96	2.61		
Use a printer	1.95	1.08	2.62	0.66	1.56	2.95		
Assist in my personal tasks and scheduling (e.g., calendar, to do list)	0.69	0.84	1.64	1.01	1.51	2.15		
Word processing							2.78	2.07
Create bibliographies which can be easily up-dated or converted to different style formats	0.81	0.89	2.48	0.77	4.20	2.76		
Create and edit a long document such as a report or manuscript	1.38	1.08	2.57	0.80	3.26	2.79		
Create and edit a technical or scientific document	1.12	1.04	2.45	0.86	3.22	2.57		
Generate outlines for use in speeches or presentations	0.69	0.98	2.21	1.03	3.10	2.45		
Integrate data into a personalized letter (e.g., reports, lab assignments, etc.)	1.14	0.95	2.38	0.62	2.98	2.30		
Check documents for typographical, spelling, and minor grammatical errors	1.55	1.15	2.60	0.70	2.90	2.99		
Use a word processing program	1.69	1.20	2.74	0.63	2.85	2.87		
Create and edit instructional materials (e.g. course syllabus, tests, etc.)	1.24	1.08	2.33	1.00	2.56	3.27		
Collect and retrieve notes	1.43	1.06	2.43	0.77	2.38	2.73		
Create form letters which can be personalized and merged with a mailing list	0.64	0.79	1.81	0.89	2.10	2.17		
Analyze writing through word counts, sentence lengths, etc.	0.62	0.80	1.76	1.08	2.04	2.09		
Create, edit, and produce a short document such as a memo or letter	1.67	1.12	2.41	0.73	1.67	2.64		
Spreadsheets/statistics							3.55	2.09
Perform advanced statistical analyses	0.69	0.90	2.50	0.83	4.56	2.77		
Use a statistical analysis program	0.95	0.99	2.62	0.76	4.37	2.95		
Create graphs, charts and diagrams	1.07	1.02	2.74	0.67	4.30	2.91		
Develop budgets for projects or lab assignments so as to explore "what if"	0.50	0.77	2.00	1.04	3.22	2.30		
Use a spreadsheet program	1.10	1.03	2.41	0.91	3.12	2.65		
Perform mathematical calculations	0.88	0.99	2.21	1.00	2.90	2.56		
Perform financial analyses	0.55	0.74	1.81	1.19	2.40	2.14		
Data base							2.58	1.78
Search computer databases related to my field	0.67	0.87	2.36	0.88	4.17	2.43		
Use a data management program	1.02	0.90	2.45	0.83	3.46	2.55		
Generate mailing lists	0.83	0.91	1.91	0.85	1.95	2.30		
Generate mailing labels	0.67	0.82	1.74	0.89	1.85	2.08		
Generate directories of telephone numbers, names, ages, etc.	0.91	0.96	1.62	1.10	1.30	2.00		
Other							3.38	2.07
Transfer and receive files from other computers	0.60	0.91	2.43	0.83	4.44	2.62		
Create overheads to use in instructional or professional presentations	0.93	1.05	2.50	0.83	3.61	2.90		
Hook up the microcomputer to communicate with other computers	0.43	0.80	2.12	0.94	3.55	2.37		
Use a programming language to create software	0.41	0.89	2.02	1.05	3.34	2.36		
Use computer assisted instructional programs	1.21	0.98	2.19	0.92	1.98	2.58		

Ability and Importance Score Rating Scale: 3=High; 2=Medium; 1=Low; 0=Not Able or Not Important. PNI (Priority Needs Index) Formula: [Importance Score - Ability Score] * Mean Importance Score = PNI

tional students. It should be noted that this measurement is not an indicator of perceived ability or importance levels that respondents had for a skill, but rather a weighted value indicator of the education needed to satisfy the discrepancies between students' perceived abilities and importance of the skills. For example, of the ten skills reported as having the highest importance to students, only two were included in the ten skills receiving the highest mean PNI scores (Table). Conversely, of the ten skills reported as having the lowest ability by students, only three were included in the skills receiving the ten highest PNI scores. This indicates that while a student (or group of students) may have a low ability level or a high importance level for a particular skill, it is not necessarily the standard by which education needs should be determined. Microcomputer skills showing the greatest education need were: perform advanced statistical analyses (PNI=4.56); transfer and receive files from other computers (PNI=4.44); use a statistical analysis program (PNI=4.37); and create bibliographies ... (PNI=4.20). Skills having the least education need were: generate directories of telephone numbers, names, ages, etc. (PNI=1.30); assist in personal tasks and scheduling (PNI=1.51); use a printer (PNI=1.56); and create, edit and produce a short document such as a memo (PNI=1.67).

Conclusions

Conclusions are based on interpretations of the data presented. Most international students in agriculture and forestry have no prior microcomputer experience. Microcomputer literacy should not be assumed with BS, MS or Ph.D. degrees. While most students use microcomputers, a majority have received little or no microcomputer instruction at West Virginia University. Lack of time, lack of microcomputer facilities, and limited operating hours at available facilities are factors prohibiting increased knowledge and utilization of microcomputers.

Half of the international students in the College are beginners or non-users of microcomputers. Most students plan to return to their country after completing their studies and most will have access to microcomputers. Importance of being able to perform the microcomputer skills is rated higher by students than their actual abilities to perform those skills. Consequently, there is an educational need for every microcomputer skill investigated. The greatest education need exist for the spreadsheet, statistics and "other" (communication, programming, and presentation) skill categories.

Recommendations

The following recommendations are based on the results of this study.

1. The microcomputer competencies of international students enrolling in the College should be discerned as early as possible. This should be done either by requesting the necessary information during the application process, or immediately after enrollment in the University. Workshops or seminars should be provided to students having no previous microcomputer experience before classes begin, or incorporated into the student's first semester of classes.

2. Each Division should advise international students of locations and operating hours of microcomputer facilities within the College, and should investigate the feasibility of expanding facilities and/or extending hours of operation.

3. Education needs were found to exist for every microcomputer skill investigated in this study. Educational and instructional activities should be expanded or intensified in all areas of microcomputer application, with an emphasis placed on spreadsheets, statistics, communication, programming and presentation skills.

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Faculty Assessments Of Video Technology

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Abstract

This article summarizes the results of a video technology survey in the College of Agricultural and Environmental Sciences at the University of Georgia. Faculty perceptions and use of alternative video systems are presented. Impacts of video technology on faculty activities and productivity are examined. Faculty adoption of video technology are described in a human capital framework. The study found that enhanced video technology would increase faculty productivity, involve more faculty in teaching activities, reduce travel time and costs, and improve communications within the college. Strategies for developing enhanced video communications are discussed.

Colleges of Agriculture are experiencing a revolution in instructional technology, unprecedented in the history of higher education. The arrival of *user-friendly* microcomputer, video, and communication technology has converted the traditional classroom to a multi-media environment for instruction and learning. Teaching techniques, once limited to lectures and chalk boards have given way to interactive microcomputer, video and communications technology. This technology has enabled teachers to transcend the traditional bounds of the classroom and use materials, exercises, and specialists, far removed from the classroom.

Despite its potential, the adoption of new instructional technology is not taken for granted. That is, the availability of new technology alone is necessary but not sufficient for its adoption. The adoption of new technology depends on the relative costs and benefits of the technology. In a world of imperfect knowledge and foresight, the assessment of costs and benefits is a subjective process, dependent upon faculty perceptions and opinions. Since the adoption of instructional technology requires that teachers be willing participants in the process, their perceptions and judgements are central to the adoption process.

Recent articles in this *NACTA Journal* emphasize the growing potential of instructional technology, in general, and video technology, in particular. The use of video in

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