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AUTHOR Richards, Irving; And Others
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ABSTRACT

Offering participation in courses via modem can benefit both colleges, which are often coping with downsizing or insufficient classroom space, and students, who may face prohibitive work schedules, a need to remain at home, physical handicaps, or incarceration. This study assembles demographic information on higher education students who participate in computer/modem instruction: their age range, gender, employment status, part-time or full-time enrollment status, and final grades achieved compared to "traditional" students. The inquiries also provided a forum for these distance education students to express reasons why they chose to take a course via modem, disadvantages they might feel in the lack of face-to-face interaction with the instructor, or suggestions they might offer for instructional improvements. A survey was sent to 217 computer/modem students and 263 students enrolled in traditional on-campus versions of the same classes. Ten randomly selected computer/modem students were also interviewed. Findings in this case indicated that the typical computer/modem student was part-time (64%), female (71%), older than the traditional student (26-35 years old), white (76%), and employed full-time (49%). Traditional students tended to be younger and unemployed. More computer/modem students (63%) achieved a grade of 8 or better than traditional students (27%). Large groups of respondents (54%) saw no difference in the difficulty of computer/modem classes versus traditional ones and 56% claimed not to miss the social aspects of classroom interaction. In addition, 79% of respondents felt their basic educational needs were met by the format. Most cited the convenience and self-paced nature of the format as assets, and online time limitations and delays in instructor feedback as chief barriers to success. The prevailing suggestion for improvement was to offer classes in more subject areas. Questions used in both the survey and the interviews are provided along with summaries of comments. Six figures illustrate the data. (Contains 74 references.) (BEW)

A Study of Computer-Modem Students: A Call For Action

A Presentation at The American Educational Research Association Annual Conference San Francisco, California, April 22, 1995

by

Irving Richards
Dennis Gabriel
Ambrose Clegg

Introduction

Little is known about offer distance education via modem classes. There are limited data on computer/modem students--their backgrounds, reasons for enrollment, and drop-out rate. As late as 1991, Keegan (1991) concluded that distance education is little known and little studied. Burge wrote the first doctoral dissertation on computer/modem instruction at the University of Toronto in 1993.

Higher education faces a number of important issues as reported by U.S. News & World Report--Fifth Annual Guide to Colleges (1991, September 30, pp. 78-82). These include rising operating costs coupled with diminishing revenues; eliminating, downsizing; restrictions on course offerings.

One solution to some of problems in higher education is computer/modem instruction--computer/modem instruction changes educational delivery. Students attend lectures at their convenience, ask questions, communicate privately with faculty and classmates, edit, complete and submit assignments via the bulletin board service. Faculty are able to post the class syllabus, assign course work, hold lectures, communicate with students, conduct online forums, and receive assignments via the bulletin board service. Institutions, can provide students with options to traditional on-campus instruction. Student enrollment can be increased without the need for additional classrooms. Colleges may gain reputations as innovative institutions.

Given the realities of employment requirements, including travel, shift work, caring for small children or aged family members, handicaps, and incarceration, individuals take distance education classes.

Little is known about computer/modem students--age, sex, marital status, full or part-time enrollment, dependents, employment, ethnic composition, reasons for enrollment, and educational status. As a result, institutions of higher education find it difficult to target this group.

Computer/modem students enjoy advantages: attending lectures at their convenience, post anonymous questions, communicate privately with faculty, communicate with classmates, participate in online forums.

Colleges and universities benefit from computer/modem instruction: the instruction will encourage enrollment among non-traditional students; increase student enrollment without additional investment in physical facilities; develop and improve computer skills among students and faculty.

To learn more about the demographics of those who use computer/modems in college classrooms, this study addressed the following questions:

What is the age range of computer/modem students?

What is the gender of computer/modem students?

What is the employment status of computer/modem students?

What is the student enrollment status (full-time or part-time) of computer/modem students?

Why do students enroll in computer/modem classes?

How do students learn about the availability of computer/modem classes?

Is the lack of face-to-face student/instructor interaction in computer/modem classes a disadvantage to those enrolled?

What student suggestions might make the class more effective, interesting, and informative?

Do students perceive computer/modem classes to be as challenging as traditional classroom experiences?

What are the major reasons students enroll in computer/modem classes?

Is there a difference in the final grade achieved for students enrolled in computer/modem classes compared to students enrolled in like traditional classes?

Subjects

The 217 students in the control group were enrolled in computer/modem English 101, English 102, or Marketing 201 at a large urban multi-campus community college. The comparison group of students consisted of 263 students enrolled in traditional classes.

Review of the Literature

The literature on computer/modem classes goes to 1982. Since that time, only a limited number of colleges have offered

computer/modem classes and a still fewer number offer undergraduate degree programs through computer/modem instruction.

Computer/modem Instruction

The range of class offerings via computer/modem has been quite varied. Hiltz (1984) pointed out that courses in engineering and sociology via computer/modem are taught at the New Jersey Institute of of Technology.

Student acceptance of computer/modem instructional technology has been continuous and may be related to several factors. Phillips and Pease (1987) noted that students' interests in computer education was the primary reason for enrolling in computer/modem classes. Second, students may not see computer/modem instruction as impersonal. Verduin and Clark (1991) concluded that individuals are more willing to delve into emotional or personal matters via computer modem than they would be in person.

Many students can benefit from computer/modem instruction--students in rural areas without easy access to postsecondary education, reserve and active military personnel, the unemployed and underemployed, those seeking new skills for employment advancement, retirees, those whose employment requires frequent or travel, injured, disabled.

Burge (1993), in the first doctoral dissertation study on computer/modem instruction, noted that individuals in computer/modem classes felt in control of their learning process and exhibited high achievement drives, self confidence, and a commitment to success.

Students enjoyed the convenience of computer/modem instruction and the comforts of learning at home. Burge also stated that students enjoyed peer interaction avail le through the bulletin board service when it was actively used and missed it when there were periods of student inactivity.

Among the earliest institutions of higher education to offer degree programs through computer/modem instruction was the New York Institute of Technology in 1983. American Open University utilized text materials, course outlines, and assignments. Degree programs are offered by The New York Institute of Technology in general studies, business administration, and behavioral science. The New School for Social Research began a degree program Connected Education in 1985. The University of Oregon has offered graduate credit in education for computer/modem classes offered by the International Society For Technology in Education (ISTE). George Washington University offers a number of graduate courses and a Master of Arts in Educational Technology Degree via Computer/modem. The University of Phoenix has offered a course of study, taught solely via computer/modem, leading to the Master of Business Administration degree. The University of Phoenix also offers a B.A. via computer/modem.

Verduin and Clark (1991) mention TeleLearning System which operates the Electronic University and acts as a clearinghouse for computer/modem courses offered by various colleges and universities. Some courses are on floppy disks while others are offered on-line. Students and faculty converse using both computer/modems and

electronic mail. Both Regents College and Empire State College offer bachelor's degrees through the Electronic University. On-line libraries and information data bases are available.

Canada established Athabasca University as a distance education university in 1978. Bachelor's degrees can be obtained in liberal arts and administrative science via computer/modem.

As noted by Gabriel (1992), certain elements advance innovation. First, the administration must be open to change, reward change in terms of workload and recognition, and support change with money for hardware and software. Second, faculty must be willing to experiment with new technology.

Research Methodology

This descriptive study focuses upon the nature of students in a series of computer/modem classes--who these students are, why they enroll, what difficulties they encounter, and how their performance compares to students enrolled in on-campus classes.

This study employed questionnaires and interviews.

The sample for this study consisted of 217 students enrolled in 12 sections of English 101, English 102, and Marketing 201 at a large urban community college during Fall 1991, Winter 1992, Spring 1992, and Fall 1992 quarters. Students preselected themselves by enrolling.

Enrollment in the computer/modem classes was no higher than 29 students due to an administrative decision to cap class size.

Figure 1-1

Computer/modem and Comparison Class Data

Computer/modem Class	Fall 1991 N	Winter 1992 N	Spring 1992 N	Fall 1992 N	Total
English 101	22	21	22	21	86
English 102	23	19	21	22	85
Marketing 201	6	12	14	14	46
Total	51	52	57	57	217

Traditional Comparison Classes	Fall 1991 N	Winter 1992 N	Spring 1992 N	Fall 1992 N	Total
English 101	25	27	24	28	104
English 102	20	22	25	25	92
Marketing 201	15	14	18	20	67
Total	60	63	67	73	263

The attrition rate in the comparison group was 7% compared to the computer/modem classes' 6% attrition rate. Attrition was due to employment, financial, and family reasons according to student withdrawal records. The size of the sample after attrition used for analysis of data is shown in Figure 1-1. The faculty members conducting the computer/modem courses were selected based upon teaching experience, interest, and computer literacy. Faculty teaching the control group of traditional on-campus classes were selected at random from among the full-time faculty who taught comparable classes.

Methodology

Students in computer/modem classes receive instruction on modem settings, how to log on to the computer, downloading and uploading. English 101 students wrote and uploaded four essays; students used the conference portion of the Bulletin Board Service to discuss individual writing problems. English 102 students wrote two essays and one research paper; students used the conference portion of the bulletin board service to discuss class reading assignments. Marketing 201 students used the conference portion of the Bulletin Board Service to discuss 11 case studies with each other and with the instructor. Students read and commented regularly on each other's work. Faculty read the written assignments, made comments, offered suggestions, and assigned grades. Students used the bulletin board service 24 hours a day.

A survey was sent to 216 computer/modem students to learn more about their backgrounds, reasons for enrollment, experiences, and suggestions for improvement.

Data Collection and Recording

Data were obtained from student questionnaires, admission records, grade records, and the Bulletin Board Service. Students (n=217) in the modem classes received mailed questionnaires. Students enrolled in traditional on-campus English 101, English 102, and Marketing 201 (n=263) completed similar questionnaires. The random student interviews were selected from ten students who completed the

computer/modem classes.

Null Hypotheses:

1HO: There is no significant difference between the average age of students enrolled in computer/modem classes and the average age of students enrolled in equivalent traditional campus classes.

2HO: There is no significant difference between the employment status of computer/modem students and the employment status of students enrolled in equivalent traditional campus classes.

3HO: There is no significant difference between the average number of males and females enrolled in computer/modem classes and the average number of males and females enrolled in equivalent traditional campus classes.

4HO: There is no significant difference between the ethnic background of students enrolled in computer/modem classes and the ethnic background of students enrolled in equivalent traditional campus classes.

5HO: There is no significant difference between the academic status (full-time or part-time) of students enrolled in the traditional classes and the academic status of students enrolled in the computer/modem classes.

6HO: There is no significant difference between the final grade of students enrolled in computer/modem classes and the final grade of students enrolled in the equivalent traditional campus classes.

Limitations

This study is limited to twelve sections of three computer/modem classes. Students from across the district enrolled in the modem classes; however, the traditional students in the study were campus students.

Data Analysis

A total of 217 surveys were sent to students who had enrolled in computer/modem English 101, English 102, and Marketing 201. Of these surveys, 58% were returned.

Quantitative Comparison

Figure 1-2 provides a comparison of computer/modem students and traditionally enrolled students.

The typical computer/modem student was a part-time student (64%), female (71%), slightly older than the traditional student (26-35 years old), white (76%), and employed full-time (49%).

The traditional student was a part-time student (71%), female (65%), younger than the computer/modem student (18-25 years old), white (92%), and not employed (46%).

Computer/modem students achieved higher grades in comparable English and business classes than traditional students (63% of the computer/modem students earned a grade of B or better compared to 27% for traditional students). Computer/modem students were more likely to attend classes full-time (33% compared to 29% for traditional students).

The quantitative survey information was analyzed using a t-test for independent samples; see Figure 1-2.

Figure 1-2

Student Comparisons

	Computer/Modem Students (N = 126)		Traditional Students Western Campus (N = 11,000)	
Demographics	N	%	N	%
Gender				
Male	36	24	4000	37
Female	90	71	7000	63
Age				
Under 18	1	1	1500	14
18-25	32	25	3000	28
26-35	44	35	2000	18
36-45	45	36	1500	14
Over 46	4	3	2800	26
Employment Status				
Employed FT	64	51	2000	18
Not Employed	32	25	5000	46
Employed PT	30	24	3000	27
Ethnic background				
Afro-American	14	11	263	2
White	96	76	10000	92
Hispanic	1	1	220	2
Asian	6	5	192	2
American Indian	1	1	75	1
Unknown	8	6	70	1
Final Grade Achieved				
A	33	26	2000	18
B	30	24	2000	18
C	52	41	5000	46
D	6	5	2000	18
F	5	4	330	3
Student Status				
Attending FT	42	33	3000	29
Attending PT	84	67	8000	71

t-Tests of Differences Between Means of Selected Variables for Computer/Modem and Traditional Students

Variable	Significant (at the .05 level, 1.960) Level of Significance	Significant
1. Age: C/M and Traditional Students	7.030	Y
2. Employment C/M and Traditional Students	6.993	Y
3. Gender C/M and Traditional Students	1.564	N
4. Ethnic C/M and Traditional Students	1.262	N
5. Full-Time/Part-Time Enrollment C/M and Traditional Students	3.019	Y
6. Final Grade C/M and Traditional Students	5.029	Y

As the above analysis shows, age, employment, full-time/part-time enrollment, and final grade showed significant differences between computer/modem students and students traditionally enrolled in the same classes.

There was no significant difference in gender and ethnic make up of students enrolled in computer/modem classes and traditional students as measured by at t-test of independent samples.

Figure 1-3

Test of Mean Differences of the Variable AGE Between Computer/Modem and Traditional Students

Group	N	Mean	SD
Traditional Students	126	2.492	0.927
Computer/Modem Students	126		0.769
T = 5.029	DF = 250	P = .000	

There is a significant difference is the age of computer/modem students compared to traditional students enrolled in comparable classes. The data confirms that students enrolled in computer/modem classes are 26-35 years of age compared to traditionally enrolled students who are 18-25 years of age. Figure 1-2

Test of Mean Differences of the Variable Gender Between Computer/Modem and Traditional Students

Group	N	Mean	SD
Traditional Students	126	1.579	0.496
Computer/Modem Students	126	1.675	0.470
T = 1.564	DF = 250	P = .119	

There is no significant difference in gender in computer/modem classes compared to traditional class enrollment. Male and female enrollment is almost equal.

Figure 1-4

Test of Mean Differences of the Variable Employment Between Computer/Modem and Traditional Students

Group	N	Mean	SD
Traditional Students	126	2.254	0.737
Computer/Modem Students	126	1.579	0.794
T = 6.993	DF = 250	P = .000	

There is a significant difference between the two groups of students. Computer/modem students are more likely to be employed on a full-time basis while traditional students are more likely to be employed both full- and part-time. Figure 1-4

Test of Mean Differences of the Variable Full-Time Part-Time Enrollment between Computer/Modem and Traditional Students

Group	N	Mean	SD
Traditional Students	126	1.595	0.493
Computer/Modem Students	126	1.770	0.423
T = 3.019	DF = 250	P = .003	

There is a significant difference in enrollment between computer/modem and traditional Students. Computer/modem students are more likely to enroll and attend classes on a part-time basis than are their traditionally enrolled counterparts. Figure 1-4

Test of Mean Differences of the Variable Ethnic between Students enrolled in Computer/Modem Classes and traditional students

Group	N	Mean	SD
Traditional Students	126	2.111	0.596
Computer/Modem Students	126	2.024	0.497

T = 1.262 DF = 250 P = .208

There is no significant difference in the ethnic composition of computer/modem classes compared to traditional classes.

Figure 1-4

Test of Mean Differences of the Variable Final Grade between Computer/Modem Students and traditional Students

Group	N	Mean	SD
Traditional Students	126	2.492	0.927
Computer/Modem Students	126	3.032	0.769

T = 5.029 DF = 250 P = .000

There is a significant difference in final grades for computer/modem students and traditional students'. Computer/modem students tend to achieve grades of B or better compared to traditional students who tend to achieve below a grade of B.

Analysis of Means of Selected Variables

Age

As measured by a t-test of independent samples (t= 7.030) computer/modem students are older than students enrolled in traditional classes.

Gender

There is no significant difference in the gender of students enrolled in computer/modem classes compared to students in

traditional classes.

Employment

An independent t test (t= 6.993) shows that computer modem students are more likely to be employed full-time as compared to traditional students who are likely to be employed both full- and part-time.

Full-time/Part-time Enrollment

Computer/modem students are more likely than traditional students to be attending classes on a part-time basis.

Ethnic

There is no significant difference in the ethnic composition of composition of computer/modem classes compared to traditional classes.

Final Grade

There is a significant difference between the final grade of computer/modem students and traditional students as measured by a t-test of independent samples (t= 5.029). Computer/modem students achieve higher grades compared to traditional students.

Summary

As noted above, significant differences were found in age, employment, enrollment, and final grade between computer/modem students and traditional students.

No significant differences were found in gender and ethnic make up between the two groups. These differences were measured using a t-test of independent samples.

Additional data suggest that computer/modem students attain

somewhat higher grades than traditional campus students, are older, and are more likely to be employed--see figure 4-4 and 4-6. We know that computer/modem students do better than traditional students.

The surveys provided a number of student responses in narrative form that are of interest.

1. "Would you enroll in another computer/modem course?"

Of the 126 responses, an 89% or 112 respondents stated that they would enroll in another computer/modem instructional class. One student would definitely not enroll, seven respondents or 9% were uncertain, and six (7%) did not provide a response.

2. "Why did you enroll in a computer/modem instead of a classroom course?"

The responses indicate that work schedule and convenience were the key factors in enrollment. Work schedule was noted by 37 respondents which represents 29% of the replies, and convenience was listed by 64 students or 51% of those responding. Four students noted a lack of transportation or distance problems which represents 3% of respondents, and 11% or 14 students noted scheduling conflicts. Six students representing 5% of respondents left the response blank.

3. "What is your gender?"

Survey analysis indicate that 24% or 30 are males, and 71% or 90 are female. Six individuals or 5% failed to respond. College demographics provided by student records indicate 37% male and 63% female enrollment.

4. "What is your age?"

No respondents were under age 18, but 25% or 32 individuals were

18-25; 35% or 44 students were between ages 26-35; 32% or 40 persons were ages 36-45; 3% or four persons were 46 or over; six individuals or 5% did not respond.

5. "Do you have children at home?"

Almost half, 49% of respondents or 62 students had children at home. However, a similar number (46% or 58 students) did not. Six students representing 5% of responses did not respond.

6. "If yes, please indicate the number of children for each age category listed below."

Over half (52% or 66) this question blank. Of those responding, 3% or four students indicated newborn children at home; 16 % or 20 responses noted children aged one to five; 13% or 16 students listed children age six to ten, and 16% or 20 responses noted children aged 11 or older.

7. "What was you major purpose in enrolling in a computer/modem course?"

The major factor noted by 73% or 92 students was to complete a degree requirement. Skills upgrading/personal improvement was listed by 14% or 18 students. Vocational training was noted by three individuals representing 2%; transfer credit or other were each noted by 3% or four individuals each.

8. "What is your employment status?"

Almost half, 49% or 62 individuals are employed full-time; 25% or 32 indicated they were not employed, and 21 % or 26 indicated part-time employment. Six individuals representing 5% of those responding did not reply.

9. "As of the end of this term, how many Independent Learning courses, including computer/modem, will you have completed?"

Almost half, 49% or 62 noted that the computer/modem class was the first course they had completed; 19% or 24 individuals indicated that this would be their second class, 11% or 14 students noted that this was their third class, and 16% or 20 students stated that they had completed four or more classes.

10. "What is your ethnic background?"

Responses indicate that 11% or 14 individuals were Afro-American; 76% or 96 individuals were white; no Hispanic individuals were tabulated; 5% or six individuals were Asian, and 11 individuals representing 8% did not respond.

11. "Are you a single parent?"

Over one out of five students (21% or 26) was a single parent. Twelve individuals did not respond.

12. "How did you find out about computer/modem courses?"

Eleven percent or 14 students were told about the classes by a friend. The largest number--75% or 95 individuals--read the announcement in the schedule book; 3% or four individuals saw a posted announcement, and 6% or eight individuals were told by a counselor. Five percent or six did not respond to the question.

13. "Did you interact with other students enrolled in the computer/modem course?"

Only 13% or 16 interacted with other students on the computer; 30% or 38 students stated they occasionally interacted; 16% or 20 respondents tried it once or twice, but 37% or 47 students stated

that had not interacted at all with other individuals.

14. "How would you rate the degree of difficulty compared to traditional classroom experience of the computer/modem course?"

None of the respondents rated the classes as extremely difficult, but 21% or 26 individuals rated the classes as difficult; 54% or 68 students rated the classes as equal to traditional courses; 19% or 24 individuals believed the computer/modem classes were easier than traditional classes.

15. "Did you miss the social experience of the computer/ modem course(s) compared to your experience in the traditional classroom setting?"

Thirteen percent or 16 individuals indicated that they missed the social interaction very much; however, the largest group--41%--or 52 respondents did not miss the social aspects of classroom interaction. The next largest group representing 22% of the group or 28 individuals did not feel that the social aspects of the computer/modem class were any different from the classroom experience; indeed, 19% or 24 students, stated that they preferred the social interaction of the computer/modem classes.

16. "Overall opinion of the computer/modem course."

Of those responding, 48% or 60 responses rated the courses as excellent; 40% or 50 called the classes good; 6% or eight rated the courses as fair, and 2% or two students said the classes were poor.

17. "Did you feel that your basic learning needs were being met through the computer/modem course?"

The largest group, 79% or 100 individuals, felt that their basic

learning needs were being met; 2% or three stated they were not, and 14% or 18 responses were uncertain.

18. "What suggestions do you have for improving computer/modem courses?"

Students commented on the advantages of computer/modem instruction--convenient, self-paced, and the opportunity to complete coursework at home. The most popular suggestion, offered by 120 individuals or 95% was to offer classes in different subject areas.

19. "Availability of instructor--by telephone, in person, or by computer/modem."

Students liked the fact that computer/modem faculty were available: excellent, 37% (N =47); 21% rated availability good (N = 26); 8% (N = 11) rated availability as average; 5% (N = 6) rated availability as both fair or poor.

20. "Course materials including textbooks, and study guides."

The responses from 38% or 48 students rated materials as excellent; 27% or 34 responses indicated good; 3% or four students evaluated it as average; and 2% or three individuals gave it a fair; 5% or six responses classified it as poor.

21. "Instructions for working independently, syllabus, and instructor guidance."

The largest number of responses (N = 53 or 43 percent) rated the instructions as excellent; 25% or 32 responses rated the instructions as good; 3% or four responses rated them as average. No response was given by 25% (32 surveys).

22. "In your computer/modem class, from which site did you send you

projects?"

Most students worked from home (75% or 95 students); 10% or 13 individuals used the computer/modem at their place of employment, and 6% or eight persons used the computer/modem in one of the three campus library sites.

23. "Did you feel a need for face-to-face contact with the instructor or other class members?"

Twenty-nine percent said yes (37 responses); 56% or 71 responses stated no, and 8% or 11 individuals responding were uncertain.

24. "Would it be of value for the class to meet at least once prior to the start of the academic quarter to socialize and discuss the course requirements and expectations?"

Results of the survey indicated that 46% or 58 individuals said yes; 41% or 52 students said no; 5% or six responses were uncertain.

25. "Was the computer/modem conference board system easy to learn and operate?"

Student responses from 71% of the surveys or 89 students indicate yes; 17% or 21 students indicating no; no response was provided by 11% or 14 students.

26. "Did you use the Conference portion of the board at least once each week to communicate with other students in computer/modem classes?"

Only 38% of those responding or 48 individuals indicated that they communicated with other students at least once each week; 14% or 18 stated they never communicated with students; and 40% or 50 indicated they did so occasionally--less than once each week; no

response was provided by 8% or 11 individuals.

27. "Did you read the Conference Board comments at least once each week in computer/modem classes?"

The majority or 71% representing 89 responses indicated they read the board at least once each week; 8% or 10 students stated they never read it; 11% or 14 students read the board occasionally--less than once each week; no response was noted by 10% of the respondents or 13 individuals.

28. "How educational was the use of the Conference Board? Did it contribute substantially to the class?"

Of the students, 38% or 48 individuals said yes; 41% or 52 students said it contributed some; 11% or 14 individuals stated not much; 2% or three persons stated not at all; no response was provided by 8% or 11 individuals.

29. "Was privacy of communication to the instructor and others in the computer/modem class an important issue to you?"

Yes--very important was noted by 16% or 20 responses; 29% or 37 responses stated somewhat important; 35% or 44 responses stated it was not a factor; 11% or 14 individuals did not give it a thought; 10% or 13 individuals provided no response.

30. "Did the knowledge that other students in the class would see and examine your written assignments result in better presentations?"

The responses from 16% or 20 students indicate yes; 37% or 47 students indicated somewhat; 27% or 34 students noted it was not a factor; 11% or 14 responses stated it did not affect their presentations; and 10% or 13 students did not respond.

Student Narrative Summary

Most (89%) computer modem students would enroll in another computer/modem class for reasons, such as employment, family, distance, and scheduling conflicts. Respondents were 71% female compared to traditional students whom student enrollment records indicate were 63% female. Responses indicate that the largest single group of computer/modem students (35%) were aged 26-35. Thus, computer/modem students were older than their traditionally enrolled counterparts. Almost half, 49% of those responding, indicated that they had young children at home. The implication is that child care could be a problem for those who attend on-campus classes.

The primary reason for computer/modem course enrollment was to complete a degree requirement, upgrade skills, obtain vocational training, or obtain transfer credit for another institution. Almost half, 49% of the respondents indicated full-time employment; 21% noted part-time employment, and 25% indicated they were not employed. Responses indicate that for 49% of students this computer/modem course was the first distance learning course completed. The ethnic make up of the computer/modem classes were 76% white, 11% African-American, and 5% Asian. One out of five respondents were single parents. The majority or 75% of those responding learned of the computer/modem classes from the quarterly schedule booklets.

Peer interaction was not widely practiced in the computer/modem classes; only 13% of those responding indicated that they frequently interacted; 38% stated they occasionally interacted; 16% tried it, but 37% noted that they had not interacted with others in the class.

Only 13% of respondents indicated that they missed the social interaction; 41% did not miss classroom interaction.

The overall opinion of the computer/modem classes provided by 48% of respondents was excellent; 40% rated the classes good; 6% rated the classes as fair, and 2% said the classes were poor. The largest group of those responding, 79% of computer/modem students further stated that they felt their basic learning needs were met; 2% stated they were not, and 14% were uncertain.

The response offered by 95% of students for improving computer/modem instruction was to offer more classes in different subject areas.

Students liked the availability of computer/modem faculty--by telephone, in person, or by computer/modem; 37% rated availability as excellent; 21% rated availability as good; 8% rated availability as average; and 5% rated availability as fair or poor. Students rated the availability of course materials as 38% excellent; 27% good; 3% rated the availability as average; and 7% rated it as fair or poor.

Most computer/modem students worked from home as indicated by 75% of those responding; 10% worked from their place of employment, and 6% used the library facilities at a campus sites. The majority or 71% read the conference board comments at least once each week.

Student Interviews

Out of the 167 students enrolled in the six computer/modem classes, eighteen were asked if they would be interviewed regarding their computer/modem class experiences. In order to obtain the ten

student interviews, sixteen interviews were actually scheduled.

Student Responses

Question One:

"How did you first become aware of the computer/modem classes being offered by a local Community College?"

Regarding student awareness of computer/modem class offerings, seven students read about them in the course schedule book, and three heard about them from friends. The schedule book, with its ability to feature and display information prominently, is an important factor.

Question Two:

"Prior to your enrollment, what were your initial thoughts or opinions regarding computer/modem education?"

Interviewees indicated excitement and interest about computer/modem instruction.

Question Three:

"Prior to exposure to computer/modem education, what did you perceive to be its possible strengths or advantages?"

Students were able to see advantages prior to the start of class: time, travel, family obligations, and convenience.

Question Four:

"Prior to your exposure to computer/modem education, what did you perceive to be its possible weaknesses or disadvantages?"

Social interaction between students and instructor, lack of assignment feedback, difficulty contacting the instructor, computer

problems, and student organizational skills were among the concerns of the interviewees at this point.

Question Five:

"Thinking back to your initial computer contact, what steps or actions do you think were most helpful and why?"

Nine out of the ten interviewees mentioned the syllabus which is mailed to each student enrolled in the class prior to its start.

Question Six:

"What suggestions, if any, do you have to improve the initial computer/modem experience?"

Five had no suggestions. However, three students suggested a pre-meeting for those students who are interested to provide hands-on experience with the computer.

Question Seven:

"Please discuss your specific experience with computer/modem education from three standpoints: the initial, middle, and final stages. What were the most positive and negative aspects of each, and what suggestions do you have for improvement or change?"

Several interviewees criticized the time limit (30 minutes) for the system.

Question Eight:

"Did you interact more or less with the computer/modem instructor than you might have in a traditional class?"

Five of the ten students stated that they interacted less with the computer/modem instructor, although none felt that this was necessarily a negative aspect of the instructional process.

The other five students interviewed stated that they interacted more with the instructor in the computer/modem class than in a traditional class.

Question Nine:

"From the standpoint of understanding course content and grade achievement, do you think you did better, worse, or about the same as you would have done in a traditional on-campus class? Why?"

All ten commented that they understood the course content as well or better than in a traditional class and achieved the same or better grades than they would have earned in a traditional classroom setting.

A significant factor noted by all is the student-teacher interaction and the opportunity to think prior to providing responses.

Question Ten:

"In the past, instructors have used computer/modem education to communicate with students. What is your opinion about taking objective examinations over the system? If so, how might this work? What are the good points about such a system? What are the problems one might encounter with such a system?"

All ten responses were generally favorable to the idea of taking examinations online. Several noted concern over the mechanics all were in favor of trying the process.

Question 11:

"Do you see computer/modem education as possibly the next step beyond telecourses--that is, potentially eliminating the need for a

student to ever attend a class or have any face-to-face contact with a faculty member? Why or why not?"

Opinions were mixed as to the future of computer/modem instruction. Eight felt that computer/modem instruction could replace a number of classes that are frequently offered. Two individuals felt that the interaction that takes place in the classroom would be difficult to replace.

Question 12:

"Can you recall any problems that you might have encountered with computer hardware or software? Can you provide details of any serious difficulties you may have experienced?"

Three reported no difficulty with either hardware or software during the computer/modem course. The other seven individuals encountered various degrees of difficulty with software.

Question 13:

"Any minor difficulties?"

Seven of the students answered no. Two individuals mentioned the time limit as a minor problem, and one noted problems with making written corrections to her bulletin board correspondence.

Question 14:

"Was there anything else you did not like about the computer/modem class or the Bulletin Board Service?"

Six students answered that there was nothing they did not like about the computer/modem class.

Question 15:

"If you were thinking about the benefits of computer/modem

education, what would be a few of the advantages you would want others to know?"

The respondents reacted favorably to this question noting such things as time savings, travel, convenience, comfort, and working and studying at one's own pace, accessibility, and one-on-one student instructor contact.

Question 16:

"If you could make changes and improvements in computer/modem education, what one thing would you want to change most?"

Three individuals indicated no changes. Seven responses from three individuals suggested adding phone lines to the BBS. One suggested a computer lab prior to the start of classes to demonstrate class computer skills.

Question 17:

"Do you have other suggestions or comments about the computer/modem class you recently completed at [the institution]?"

Two had no additional comments. All would like to see other classes made available through computer/modem instruction.

Summary

Each of the ten students in the interview learned about the classes through the schedule book or from instructors who mentioned the computer/modem classes in their traditional classes.

Interviewees noted advantages to computer/modem instruction: convenience, freedom from travel, availability of computer/modem equipment at their place of work, time flexibility, instructional

feedback, peer interaction and one-on-one interaction between student and teacher. Computer/modem students have the convenience of taking the class at any time of the day or night. Classes may be accessible from an employer's work place or home. Instructional feedback is rapid (within hours not days) and provided one-on-one between student and instructor.

Students noted disadvantages of computer/modem instruction: computer fear, instructional feedback, and time management.

Computer fear is a problem for some students but rapidly disappears as the student uses the computer. Peer interaction is via computer/modem and not face-to-face. Instructional feedback is provided to students within hours rather than days as in a traditional class room setting. Students must return to the electronic classroom earlier than if they were in a traditional class. This has also meant to some students that feedback should be immediate; a wait of hours for an instructional response is now considered by them as too long. Direct, immediate interactive feedback is not provided unless the student and instructor agree to meet on-line at a specific day and time.

All of those interviewed noted the usefulness of the syllabus package. It contains information on the courses, modem settings, directions as to uploading and downloading information, and hints on using the computer. It is updated each quarter.

Students could interact with each other and the instructor as much or as little as they wished in a computer/modem class. This was perceived by some as an advantage and by others as a disadvantage.

One student commented that the computer/modem class eliminated any physical bias of the part of all participants. Respondents felt that from the standpoint of understanding course content and grade achievement they obtained the same results or better than they would have in a traditional class room setting.

Student difficulties encountered during the computer/modem class were all minor and dealt with modem settings and telephone access lines.

All of the students stated that they would like to see additional computer/modem classes offered by the college.

Figure 1-6

Student Perceived Features, Advantages, and Disadvantages of Computer/Modem Instruction as derived from student interviews.

Advantages	Convenience (time, place, availability), flexibility, availability of printed copy of all student/faculty communications, instructor availability, rapid feedback, and peer interaction.
Disadvantages	Time flexibility (no requirement to logon at a particular time--requires discipline), limited offerings, lack of peer interaction, accessibility, and slow turn-around time.
Features	Time flexibility, class can be taken from home or office, printed copy of all communications available to students, accessibility, no face-to-face discussion, peer interaction.

Students saw strengths and weaknesses in computer/modem instruction. Points of contention included peer interaction, time flexibility, and rapid feedback. At times, those interviewed viewed peer interaction as an advantage and at other times they missed the social interaction of a classroom situation. Since students are not required to be in class at certain times, students must develop good work habits; for some students, the flexible schedule allows them to work when they are able; for other students, the flexible time lines require a degree of personal discipline which not all of those interviewed admitted having.

Student use of the bulletin board for communication with each other and faculty was not a widespread as it might be. This could be

due to initial shyness that was not overcome or simply a lack of desire to know each other. Instructional comments provided by the instructors to students were questions, suggestions, ideas, critiques, comments, and opinions regarding the assigned cases studies for analysis.

Greater student interaction through the bulletin board could be encouraged; group projects and case analysis studies might be assigned. Grades and comments could be addressed to the group rather than the individual student. Using group projects improves the social interaction between individual students and initiates cooperation and teaches problem solving skills. This could be done in future computer/modem classes.

Discussion, Conclusions, And Recommendations

This study was undertaken to learn more about students who enroll in computer/modem classes--grades, employment status, full-time part-time enrollment status, course completion rate, and gender, as compared to students enrolled in the same classes taught traditionally.

Discussion

During the Spring, Summer, Fall, and Winter Quarters of AY 1991-92, 220 students enrolled in eight sections of computer/modem 101 and 102 English and 201 Marketing at a large midwest, multi-campus, urban community college. The method of instruction was by computer/modem utilizing an electronic bulletin board system (BBS). Students working from home, office, or other locations phoned

a college BBS. Upon logging in, students downloaded or uploaded assignments. Students read each other's assignments and offered comments and suggestions through the BBS.

Computer/modem instruction is a viable method of instruction. The students' reasons for enrollment included travel, illness, employment, incarceration, family difficulties, and scheduling conflicts. Of the 126 respondents, all but two would like to see more courses made available through computer/modem instruction.

Faculty time spent in computer/modem class preparation, on-line, and with students far exceeds that spent in traditional classes. Garbiel (1993) stated that initial preparation for computer/modem classes takes 50% more time than preparation for a traditional class. Computer/modem students enjoy a one-to-one faculty relationship.

At present, each of the three English classes operates at maximum capacity of 29 students. The two business classes enroll 10-15 students.

As noted earlier, a number of colleges offer degrees solely via computer/modem. These include The University of Phoenix and The New York Institute of Technology. However, at present, no community college offers a degree via computer/modem.

In order to ascertain more about the student population enrolled in computer/modem classes, the investigator sent 217 survey questionnaires to students in computer/modem English 101, English 102, and Marketing 201.

A total of 126 completed surveys were returned out of the 217 that were mailed. This represents a 58% survey response.

The information from the surveys was analyzed using a t-test for independent samples to determine the significance (.05 level) of age, gender, course completion rate, employment, enrollment status, ethnic background, final grade, and a comparison of on-campus traditional students and computer/modem students. This information is summarized in table 4-3. It was found that the variables of age, employment, enrollment, and final grade showed a significant difference between computer/modem students and traditional students. Two variables, gender and ethnic, showed no significant difference between computer/modem students and traditional students.

In addition to the questionnaire responses selected for statistical evaluation, the surveys also provided a number of narrative responses that are of interest.

Narrative Response Summary

Most participants, as measured by an 89% response, would enroll in additional computer/modem classes. Of those responding, 71% were female and 24% male. Almost half had children at home aged 11 or younger, and one in five was a single parent.

The purpose for enrollment for almost 75% of respondents was to complete a degree requirement or for skills improvement, and to obtain transfer credit. Half indicated that they were employed full-time and that this computer/modem class was their first distance learning experience.

Peer interaction was limited. Almost half of respondents indicated that they did not interact with other students in the

class; 30% of those answering stated that they occasionally interacted, and some noted that they tried it once or twice. Most individuals indicated that they did not feel a need for face-to-face contact with other class members or the instructor. Most students rated the computer/modem experience as difficult or equal to traditional courses they had experienced. In fact, 88% of respondents rated the courses as excellent or good, and 79% felt that the course had met their basic learning requirements.

Respondents noted the advantages of computer/modem instruction as convenience, scheduling, the ability to work at one's own pace, and the availability of the instructor by telephone, in person, or by computer/modem. Student responses rated the faculty as excellent or good in 68% of responses with no response provided by 25% of individuals.

The conference board was judged easy to learn and use by 71% of those answering; the same number or respondents, 71%, indicated that they read the messages on the board at least once each week. Ninety percent of the students felt that the conference board contributed to the class and that the lack of privacy on the conference board was not a draw back.

Computer/Modem Student Interviews

Two hundred seventeen students were mailed questionnaires; 18 of these students were phoned at random and asked if they would consent to be interviewed regarding their experiences in their computer/modem class. The first ten individuals to agree were selected.

Ten computer/modem students were randomly selected for personal interviews. The interviews ranged from 45 to 90 minutes.

Awareness

Each interviewee learned of the computer/modem classes from the schedule book or an instructor in a traditional class.

Advantages

The interviewed mentioned advantages of computer/modem instruction: convenience, absence of travel, availability from work, home, or campus library, time flexibility, rapid instructional feedback, peer interaction, transcript availability, and one-on-one interaction between student and instructor.

Disadvantages

Also noted were disadvantages: technology or computer fear, peer interaction or socialization, time flexibility, organization required, software and hardware limitations, and instructional

Each noted the usefulness of the course syllabus package for computer/modem studies. This package contains a syllabus for each computer/modem class and information regarding the courses, modem settings, directions for uploading and downloading files, and a variety of hints on using the computer, software, and bulletin board service.

Difficulties encountered by students in the computer/modem classes were limited to their own time management problems and to

problems with the system--learning how to use the system during the first weeks of the academic term and telephone access during periods of high demand. Since only one telephone line was available to the BBS it is necessary to place time limits of 30-40 minutes per day on student access. This can cause time delays during peak demand periods.

Results of the study indicate that convenience in terms of employment demands, family obligations, travel, and scheduling conflicts are among the reasons for computer/modem instruction enrollment. Students in computer/modem classes are typically older than traditionally enrolled students, female, possibly a single parent, employed full-time, attending college part-time, and achieved higher grades compared to those enrolled in like traditional classes.

Student difficulties included time limits, computer/modem settings, misreading the syllabus, and time management.

This study demonstrates that instruction via computer/modem was effective in reaching students who might otherwise not enroll in higher education classes due to a variety of factors. Student interviews demonstrated that students' learning needs were being met in computer/modem classes. During interviews, students evaluated computer/modem classes as equal to or superior to comparable traditional classes. Students liked the one-on-one instruction provided by computer/modem faculty and the rapid feedback of 48 hours or less compared to that typically offered in traditional classroom instruction.

Limitations

The conclusions and generalizations of this study were limited by the following considerations.

1. The conclusions may not be applicable to other classes.

2. Survey results may not be representative of the college's student population.

3. A study conducted at a smaller institution may produce different results.

4. Students in the computer\modem classes self-selected themselves into the classes.

Recommendations to Other Researchers

Other areas of research might include the relationships between course completion and gender, age and course completion rate, and GPA and course completion rate.

Summary

Computer/modem classes offer an opportunity to students who otherwise might not be able to attend on-campus classes. This includes students who are handicapped, ill, individuals who travel, those whose work schedules prevent regular class attendance, individuals who must care for family members including the elderly and very young, those who live some distance from the campus or who cannot find transportation, and the incarcerated.

The study suggests a call for action on several fronts:

1. Are the conclusions applicable to other classes?

2. Do survey results represent the college's student population?

3. Would a study conducted at a smaller institution produce different results?

Considering the history of computer/modem instruction and the absence of research on computer/modem education and enrollment information, this research project has extended awareness and added to the sparse body of knowledge of students enrolled in computer/modem instruction.

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