ABSTRACT
        Almost half of the students at Nova Southeastern
University (Florida) are enrolled in field-based programs taught
through distance education. Technology of one kind or another has
been the backbone for delivering masters and doctoral level education
for students at a distance from the Fischler Center for the
Advancement of Education at Nova Southeastern University since its
inception in 1964. Two programs that rely heavily on technological
delivery are the Graduate Teacher Education Program leading to a
Master of Science degree and the Child and Youth Studies program
leading to a Doctor of Education degree. Facilitated classes using a
combination of audio teleconferencing discussions, individual phone
calls, and a local facilitator are a recent approach for the master's
program. The computer-assisted format of the doctoral program uses a
combination of national cluster sessions twice a year with
electronically delivered interaction through various means in the
intervals. A survey of 25 students in two clusters suggested that
e-mail was the most popular student communication choice. Student
satisfaction with delivery systems was generally high, even though
many had entered the program with minimal or no computer experience.
An appendix presents the student survey. (Contains four tables and
seven references.) (SLD)

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TECHNOLOGY AND GRADUATE EDUCATION:

APPLICATIONS IN A MASTERS AND DOCTORAL PROGRAM

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<u>Introduction</u>

Distance education is a delivery concept that has been used with increasing success for

over 300 years. Accounts of early correspondence courses, the earliest form of education at a

distance from the teacher, can be found in the March 20, 1728, *Boston Gazette* (Battenberg,

1971) and in the delivery of Isaac Pitman's shorthand courses in 1840 England (Dinsdale, 1953).

Rumble (1986) identifies organizations such as Chautauqua, the International Correspondence

Schools, and later offerings by traditional schools such as Illinois Wesleyan and the University of

Wisconsin as instrumental in helping distance education for the adult learner to become a

significant factor of the educational scene in the United States.

Distance education relies upon the premise that effective learning will take place given

appropriate individualized instruction, combined with the individual's personal discipline and

motivation to work independently. The value of individualization is realized when a student can

engage in learning at any time or in any place that may fit the individual's own unique needs,

whether at home, at work, or in a center for learning. Researchers in effective learning styles

would whole heartedly agree with this position. Moore (1968), in his discourse on tutoring,

provided as a major insight the discovery that traditional school methods are unavoidably

inadequate because they are applied to many people at once, ignoring any individual differences

in background, culture, or learning styles. Carroll (1963) contended that homogeneous grouping

was actually an impossibility due to individual learning rates and capacities.

While the debate concerning whether the student can receive maximum benefit and adequate learning from instruction in which interaction with the instructor is partially or wholly mediated by a technological device, the computer has precipitated the entrance of an age of learning that is fundamentally independent. The concept is no longer considered to be avant garde. Many long established institutions of learning are beginning to present courses of study through the use of cable television or computer-mediated formats. Freels and Patton (1992) note that while only 10 states in this country were investing in distance learning in 1987, two-thirds of the states were reporting involvement by 1989. Fulton (1993) reported that by 1992 the Department of Education listed educational technology efforts in 59 nationally funded activities conducted by six separate operating components.

Distance Learning and Nova Southeastern University

Almost half of Nova Southeastern University's 16,000 students are enrolled in field-based programs. These programs are delivered in a variety of ways, ranging from regional cluster locations where students meet once-a-month for all-day Saturday classes with a professor flown to the site by the University, to the student working at home using a personal computer and modem to communicate electronically over a regular phone line. Technology of one kind or another has been the backbone for delivering masters and doctoral level education for students at a distance for the Fischler Center for the Advancement of Education (FCAE) at Nova Southeastern University since its inception in 1964. The center has continually explored and employed those technologies that could facilitate access to its graduate programs by students not only within the borders of the United States but for those from other countries as well.

Two programs that rely heavily on technological delivery systems at FCAE are the

Graduate Teacher Education Program (GTEP) leading to a Master of Science degree, and the

Child and Youth Studies (CYS) program leading to the Doctor of Education degree. Both

programs employ to greater or lesser extent telephone and computer-supported delivery systems,

as well as face-to-face contact. These systems include the use of audiobridge, videotapes,

audiotapes, the telephone, electronic mail (E-mail) and compressed video. In addition, NSU

utilizes three facilities specific to its university-wide mainframe that include electronic library

access, a bulletin board, and the Electronic Classroom. Following is a description of distance

education tools used by the two programs.

Audiotapes: Although not used extensively, some commercial audiotapes and some tapes

of Nova sessions have been duplicated and shared with the students for their home listening.

Since this is such an economical medium and students like to have tapes for review in their car

tape players, greater use may be made of this medium in the future.

Videotapes: Traditional half-inch VHS videotapes are prepared in the Nova TV Studio

and duplicated for loan to the students. These are viewed at home and then discussed online, in

the audiobridge, or at the various "live" class sessions. Student involvement is often built-in, as

many tapes require the student to stop the tape every 15 minutes or so and complete various

activities.

Telephone: Although rather traditional and low tech, the telephone enables faculty and

students to enjoy one-to-one contact for specific discussions or clarification. Students can call-in

on a toll-free number when they have questions or need extra help.

Audiobridge: A technique to enable students to call a central, toll-free number from their home telephones and to be connected with their instructor and classmates for a two-way discussion period on a pre-specified topic. The institution receives a bill from a commercial provider for the long distance connections and use of the audiobridge technology.

Electronic Mail (E-mail): Much of the two-way interaction between students and faculty (and between students) who have access to a personal computer and modem occurs through the use of E-mail. E-mail has a major advantage over the telephone, eliminating the need to play phone tag. The correspondent leaves a message and the recipient receives and replies to it whenever they find it convenient to logon. The instructor can set-up an alias (group of addresses) and mail a message to an entire class as easily as writing to one student.

Electronic Classroom (ECR): Perhaps the most unique feature of Nova's online delivery system is the ability to simulate an actual class setting while the students participate from their homes located almost anywhere in the world. In 1985, Nova staff created the "Electronic Classroom." Utilizing the Unix operating system, it provides an electronic forum in which the teacher and students interact simultaneously. Two-thirds (16 lines) of the screen is allotted to the teacher to display previously prepared material, or to enter questions and comments in real time. The remaining one-third of the screen (4 lines) displays the names of students who have logged into the class. The student is given use of that portion of the screen when "called on" by the teacher. Thirty or more students can interact simultaneously with their faculty and classmates using the computer screen as their "virtual classroom."

Compressed Video: An alternative to "high-tech" (and high-cost) interactive television

(ITV) systems that offers equivalent educational effectiveness at a lower cost, through two-way audio and video signals transmitted to multiple sites. The interactive telecourse equipment includes television screens, remote-controlled cameras, and audio reception that is sound-activated. An inset screen allows students at one location to see themselves as well as another location on camera simultaneously. The screen display can move between sites automatically as students begin to speak, and facilities exist to show graphic material such as charts, maps or photos without interrupting the on-screen picture.

Another interactive technology that is being explored allows two persons to view the same document simultaneously on each of their computer monitors, each with the ability to enter or delete material, with the added advantage of audio contact. This "audiographics" approach over regular telephone lines is being offered by several companies. Future possibilities include expansion of such software to provide multipoint access, allowing three or four persons to share the same electronic environment.

Technology uses in the Masters Program

GTEP uses almost all of the previously mentioned online tools. In fact, a combination of two or more tools has proved to be more beneficial than using a single tool. For instance, students may be sent a videotape and after viewing it at the comfort of their home, they can discuss it with their professor during an audiobridge or an ECR session. An exam may be reviewed in an audiobridge and the review followed by a summary of the important points missed by students and some feedback in an ECR session or just E-mail.

Facilitated classes, using a combination of audio teleconferencing discussions, individual

phone calls, and a local facilitator, provided a new instructional mode at NSU beginning in 1991.

This included computer augmentation of the audiobridge, such as subgrouping and polling,

during the teleconference. In subgrouping, the instructor breaks the class into small groups to

discuss topics, one topic per group. The instructor uses the computer keyboard to move from

group to group to facilitate discussion. When it is time to bring the whole class together again,

the instructor notifies the audiobridge operator.

Polling is an audiobridge discussion tool that allows all students to participate

simultaneously. The instructor poses a question and gives the students a choice of responses.

The instructor sees the students' responses on the computer screen and initiates discussion based

on those responses.

The ECR program can be scheduled and used by GTEP faculty to discuss assignments,

concepts, controversial issues, or just to hold a "rap session" with students while on line. An

online tutorial shows first time users how to ask the instructor questions, how to get help, and

how to prepare questions in a buffer which they may subsequently display when called on by the

instructor.

In 1994, GTEP started using compressed video as another mode of interactive, online

instruction. Currently, linked GTEP sites are in Florida, Arizona, and Nevada. Using

compressed video, the instructor can teach a "live" class at one site while connected to one or

two other classes at distant locations.

Another example of a mixture of the above and other related distance education

technologies that has been used by GTEP students and faculty in the past incorporates the

Electronic Teacher/Electronic Student (et/es) system. This system, developed by NSU, will let students submit their assignments electronically. The instructor can subsequently view and even grade their assignments. Grades and any feedback can later be seen (electronically) by the students and perhaps discussion about an assignment (or exam) may follow through an ECR or telephone session or just through E-mail.

There are currently over 10 majors in the GTEP program. In addition to live classes, all GTEP majors offer one or more courses in the distance education format and all use some form of technology to do this. Technologies that GTEP uses to support distance education are:

1.   Audiotape/videotape

2.   Telephone/audiobridge

3.   Electronic mail

4.   Electronic classroom (ECR)

5.   Compressed video

Almost all GTEP majors use the phone as a distance education tool. Some of the majors use more than one of the above technologies. For instance, the Computer Science Education (CSE) major is currently using the phone (audiobridge), telecommunications (email), ECR, and it has plans to use compressed video. On the other hand, the English major is currently using only phone and compressed video.

The trend seems to be that more and more of the GTEP majors will be using compressed video. The following table summarizes the GTEP majors that have used (or are scheduled to use) the above supportive technologies:

Table 1.   Technology use with GTEP

MAJOR	Technology: 1. Audiotape/videotape 2. Telephone/audiobridge 3. Electronic mail 4. Electronic classroom (ECR) 5. Compressed Video Have used or have been scheduled to use:				
General Courses	1	2			
Computer Science Education	1	2	3	4	5
Educational Leadership	1	2	3	4	5
Educational Media	1				
Elementary Education	1	2			5
English Education	1	2			5
Exceptional Student Education	1	2			5
Mathematics Education	1	2	3		5
Prekindergarten/Primary Education	1	2			5
Reading	1	2			5
Science Education	1	2	3		
Social Studies Education	1	2			
Teaching English to Speakers of Other Languages	1	2			

Uses in the CYS Doctoral Program

In 1991 the CYS program began an alternative delivery system for students who lived too

far from any established geographical site to participate in the doctoral program. The computer-

assisted cluster format utilized by CYS, referred to as the "National Cluster" approach, uses a

combination of the standard cluster format balanced with electronically delivered interaction.

National Cluster students meet twice-a-year on campus for a 3 to 5 day period to interact with the

professor responsible for a specific study area. During the following 3 to 4 months, students and faculty interact through a variety of technological resources and online tools supported by telecommunications. These tools have included audiobridge, video tape, E-mail, electronic library, the Notesfile bulletin board, and electronic classroom (ECR).

While it is obviously to the student's advantage to come with some computer skills, no one has ever been denied entrance to the national cluster on that basis. Instead, the first on-campus instructional period includes one and a half days in an intensive training program designed to provide students with the understanding and practice necessary to perform successfully online when they return home. This first session addresses an overview of telecommunications in general, accessing their personal accounts, introduction and practice in using some of the basic Unix commands, practice in using the online electronic mail facility "Pine," and its accompanying editor "Pico," using the University's bulletin board program "Notesfile", and participating in the ECR environment.

During the week following the instructional period, each student is expected to get online from his or her home computer and participate in an ECR session. The session provides review and reinforcement of the skills learned in the on-campus telecommunications sessions, as well as assuring that each student's modem setup is correct and that they can connect with the university through the AT&T, Internet or commercial system that they have selected.

Two additional days of telecommunications training are provided for National Cluster students: one day during their next return to campus, the second day of training during their second year in the program. Training during these sessions takes them into advanced Unix

commands, review/reinforcement of the Pine and Pico programs, experience using the instructor

mode in an ECR session, using the online text assessment package called Writer's Workbench,

conducting online research using the University's Electronic Library facility, and an opportunity

to explore the Internet.

The Study

The first National cluster of CYS doctoral students began in February of 1991. The

second and third clusters began in February and October of 1992, the fourth and fifth clusters in

February and October of 1993, the sixth National cluster in October of 1994, and the seventh

cluster in October, 1995. At this point the first and second National Clusters have completed

their three-year program of study. This has prompted us to begin asking several questions about

the delivery methods presently being used with National Cluster students. A survey was

developed to assess the influence that technology, especially telecommunications, has had on

their ability to complete their course of study, their career and/or work status, and their personal

interaction with friends and colleagues.

Overview of the Survey Population

Cluster 46 began its study in February of 1991 with 18 students. Thirteen of those

students completed their course work in February of 1994. Cluster 50 began its study in

February of 1992 with 16 students. Twelve of those students completed their course work in

February of 1995. The survey was sent to cluster students on March 28, 1995. A follow-up

letter with a second copy of the survey was sent to students on May 8, 1995. Of the 25 students,

22 (88%) had returned the survey by May 31, 12 from Cluster 46, 10 from Cluster 50. Data was

entered the following week using the Quattro Pro Spreadsheet. A copy of the survey is included in the appendix.

Results of the Study

The survey was divided into three parts. The four questions of Part I attempted to determine the students' level of computer experience at the beginning of the program, and what change, if any, had taken place by the completion of the program. Question 1 asked students to rate their entering computer skills. Most rated those skills at a low level; 66% of Cluster 46 rated their skills as none or limited, compared to 50% of cluster 50. The remainder responded that they had used word processing and some other application software experience, but no one felt they had a solid background, nor any proficiency with application programs or programming languages.

Question 2 queried student experience using telecommunications. Little difference was evident in this area, with over 80% responding that they had no experience what ever in the use of telecommunications. Only one person reported using the UNIX operating system, while two others had minimal experience with a commercial on-line service.

Question 3 revealed some interesting data regarding personal computer equipment upon entering their doctoral program. While students were fully aware of what equipment would be needed to pursue this program using telecommunications only 40% owned a computer, and only two reported having and using a modem. The remaining 60% did not as yet own a personal computer, and only half of that group were actively engaged in acquiring one for their personal use. Upon completing doctoral studies, however, only one student reported never purchasing a

computer, and only one was still using the equipment with which they started the program. All others had either purchased new equipment, or anticipated doing so in the near future. Table 2 below displays student responses to part I of the survey

Table 2.   Part I

Computer Experience Background

Question/Response	Percent of Responses		
1. Technical/computer abilities prior to entering Cluster	Cl. 46	Cl. 50	Total
Had never used a computer	9	30	18
Had used the computer for simple, limited applications	58	20	41
Had used the computer for word processing, computer application programs	33	50	41
Had a fairly solid background in computer applications, & programming	0	0	0
Was proficient in the use of the computer for various tasks including the use of one or two programming languages.	0	0	0
2. Familiarity with telecommunications prior to entering the Cluster	Cl. 46	Cl. 50	Total
Had never used telecommunications	84	80	81
Had used telecommunications to access commercial system (e.g., Prodigy)	8	10	9
Had limited experience with telecommunications, mostly e-mail	8	0	5
Was familiar with telecommunications, including e-mail and UNIX	0	10	5
Was very familiar with UNIX, e-mail, and other online programs	0	0	0
3. Home computer capability prior to entering the National Cluster?	Cl. 46	Cl. 50	Total
Did not own a PC	33	20	27
Did not own a PC but planned to use one in my work area.	0	10	5
Was in the process of buying a PC & modem	25	30	27
Owned, used a PC with some frequency, had not obtained/used a modem.	42	20	32
Owned/ used a PC and modem for some time prior to entering program.	0	20	9

Question/Response	Percent of Responses		
4. home computer capabilities on completing your CYS program?	Cl. 46	Cl. 50	Total
Have never purchased a personal PC	8	0	5
Still using the same computer and modem with which I began the program	0	10	5
Have updated my original computer with additional hardware and software.	17	0	9
Have invested in a new computer and modem since starting the program.	67	80	73
Anticipate replacing present system with the new MS-DOS or MAC system	8	10	9

The 6 questions of Part II were concerned with computer use in pursuing their course of study. Questions asked how often and to what degree students used the Unix system programs, E-mail, the online bulletin board, the Electronic Classroom, and the online research capabilities.

While all students reported using both ECR and E-mail as the main vehicles for interacting with faculty, cluster coordinators, practicum advisors and staff in question 1, only 30% confined themselves to that mode. Nearly 70% used a broad selection of tele-communication capabilities, and over 30% began exploring the Internet. As to the ability to participate in the ECR environment, responses to question 2 showed that all students were able to ask and answer questions, some more actively than others, as would occur even in a face-to-face situation. Cluster 50 responses disclosed a higher comfort level with this group, as 40% felt quite capable of working not only as a student, but also assuming the role of teacher and personally conducting an ECR.

As might be expected, responses to question 3 indicated that E-mail was the most popular choice for communication with faculty, staff, coordinators and class mates, preferred over telephone contact. The level and variety of E-mail use was broad. Nearly half of the students

used E-mail for contact beyond just program requirements for completing instruction.

Question 4 indicated only one student who was not comfortable using the UNIX operating system. The "mmunix" menu provided easy access to UNIX commands by simply selecting a numbered choice. While three students used that method, nearly 80% were comfortable entering commands from the keyboard, and 50% were able to use the "talk" program to engage in real-time interaction with others.

Responses to question 5 showed significant differences in use of the university's on-line electronic library. Some of this is due to the limited capabilities of that offering in 1991 and 1992 when these clusters began their study. By 1993, however, the library resources were expanded considerably, and when First Search was added late that year, the ability to access a broad number of databases was possible, and students could not only read but print out selected abstracts, as well as send an on-line request for articles to be ordered by the library. The mmunix menu also provided access to hytelnet through its Internet connection. While more than half of the reporting students from Cluster 46 relied heavily on traditional library facilities for research, 70% of Cluster 50 students used Nova Southeastern's on-line library access for research.

Question 6 revealed interesting differences between clusters in the amount of time students spent on-line. Responses showed that while only 2 students reported using telecommunications only one to two hours a month, 60% of Cluster 46 students assessed their on-line usage at 6 to 8 hours a month. Cluster 50 students reported 30% on-line usage of 6 to 8 hours, and 40% 9 to 15 hours monthly. Table 3 contains student responses to Part II of the survey.

Table 3. Part II

Use of the Computer in your Educational Program

Question/Response	Percent of Responses		
1. Which online applications did you use during your course of study	Cl 46	Cl. 50	Total
Electronic Classroom (ECR)	0	0	0
ECR and E-mail	17	10	14
ECR, E-mail and the online library resources	17	20	18
ECR, E-mail, online library, UNIX programs "Writers Workbench," "talk."	42	20	32
ECR, E-mail, online library, UNIX programs and the Internet.	25	50	36
2. Rate your ability to participate in the Electronic Classroom	Cl. 46	Cl. 50	Total
Followed the online lesson, uncomfortable in actively participating.	0	0	0
Followed lesson,participated with questions/answers/comments on occasion.	33	10	23
Followed lesson, and asked/ answered several times during ECR sessions.	58	40	50
Actively participated in the ECRs, reviewed ECRs from the online library.	0	10	5
Was an active in ECR sessions and able to act as teacher in the ECR	8	40	23
3. How would you rate your use of e-mail	Cl 46	Cl. 59	Total
Rarely used e-mail, preferred the telephone.	0	0	0
Used only to contact study area/practicum faculty,/cluster coordinator.	0	0	0
Used to contact study area/practicum faculty/cluster coordinator, on occasion to communicate with cluster mates.	33	0	18
Used almost evenly divided between faculty/coordinator/business needs and personal contact with cluster members.	33	40	36
Used with study area/practicum faculty, cluster coordinator, cluster members, other NSU users, other (e.g., Prodigy, AOL, Internet, other Universities).	33	60	45
4. How would you rate your use of the UNIX system?	%	%	%
Rarely if ever used UNIX system commands.	8	0	5
Rarely used UNIX commands, but able to use the "mmunix" menu.	17	10	14
Comfortable using basic commands ("ls," "who," "clear",) & mmunix menu	33	10	23

Question/Response	Percent of Responses		
Comfortable using UNIX commands, the mmunix menu, and "talk."	42	60	50
Comfortable using UNIX, mmunix menu, "talk," text editor (e.g., ex, PICO).	0	20	9
5. How would you rate your use of online research capabilities	**Cl. 46**	**Cl. 50**	**Total**
Rarely if ever used electronic research resources; preferred local library	25	0	14
Used NSU electronic resources two/three times, mostly local library.	33	10	23
Used NSU electronic research resources and local library about equally.	17	20	18
Used NSU electronic research resources for the major part of research needs.	8	50	27
Used Nova's electronic research resources, also commercial online resources	17	20	18
6. Estimate the average amount of time spent online during program	**Cl. 46**	**Cl. 50**	**Total**
Between 1 to 2 hours per month	17	0	9
Between 3 to 5 hours per month.	17	30	23
Between 6 to 8 hours per month.	58	30	45
Between 9 to 12 hours a month	0	20	9
13 or more hours per month.	8	20	14

The 10 questions of Part III investigated the degree to which student involvement with technology had an effect (if any) on their career status. In addition, the survey asked what level (if any) of transfer of technology information to the individual's work place was contingent upon their use of technology in their doctoral program.

In question 1, only one student reported that, at present there was no use of technology in their work area, and one other reported limited use on an individual basis. 36% reported moderate use of technology, and 45% reported broad and inno.ative uses in their work areas. Question 2 indicated that 95% of responding students are now using technology for both personal and work-related activities. 41% reported that technology plays a major role in such

activities. Question 3 revealed that while three students have only had the opportunity to take a

small role in promoting the use of technology in their work areas, The majority of students (85%)

have taken a major leadership role in promoting the use of technology in their educational

situations.

Question 4 responses indicate that, on the whole, students from both clusters have

developed considerable expertise with the use of computers. Over 60% of Cluster 50 students

rated themselves a daily users of technology in some way. Even though they have completed

their formal studies in the Child and Youth Studies doctoral program, and have either finished or

are in the process of finishing their final practicum, students of Clusters 46 and 50 continue to

use their on-line accounts at least monthly. Responses to question 5 indicate that 32% are on-

line weekly, and 36% several times a week. All students of Cluster 50 reported using their

accounts at least weekly, and 50% of that group several times a week.

Telecommunication appears to have had an marked influence on the development of

personal relationships for all students responding to the survey, according to responses to

question 6. While the majority of Cluster 46 students (58%) reported limited use in developing

relationship with one or two colleagues, all students in Cluster 50 reported that the use of

telecommunications has been instrumental in developing very strong personal relationships with

colleagues, not only those in their own doctoral program, but also with a network of colleagues

in other venues. Question 7 indicated that this influence was evident in professional contacts

also. While 68% reported that professional networking aided by telecommunications was

primarily confined to students and faculty they had met through their doctoral program at Nova

Southeastern University, 18% had expanded their network beyond those environs. Three

students of Cluster 46 responded that telecommunications had no effect on their professional

network. This may be due to the specific work area of these students, that may not as yet have

felt the influence of telecommunications, and therefore provides little opportunity for colleague

networking in this mode. Since the survey did not require entry of any demographic information,

this would be difficult to assess. Since we plan to continue requesting responses from the next

two National clusters, 54 and 59, that will be completing their course work in the fall of 1995

and the spring of 1996, this is perhaps an important section to add to the survey.

Of great importance to the writers was student satisfaction with the distance education

mode of the National Cluster format. Responses to question 8 indicated that, while it is an

advantage to have some computer skills before embarking on a distance education program such

as this, the vast majority of students, 77%, would highly recommend the program regardless of

previous computer background, and 18% indicated that they would probably recommend.

Following are student responses to Part III of the survey.

Table 4. Part III

Continuing Use of Technology

Question/Response	Percent of Responses		
	Cl. 46	Cl. 50	Total
1. What is the technology use situation at your work area			
No use of technology in my work area	8	0	5
Very limited use of technology in my work area, only on an individual basis	0	10	5
Moderate use of technology for administrative needs	0	20	9

Question/Response	Percent of Responses		
Moderate use of technology for both administrative and client needs	42	30	36
Broad and innovative use of technology, both administrative and client needs	50	40	45
2. What is your personal use of technology at this point	Cl. 46	Cl. 50	Total
Seldom use technology for personal or work area activities	0	0	0
Use technology for personal applications only on a limited basis.	8	0	5
Use for both personal and work-oriented activities on a limited basis.	33	10	23
Use for both personal and work-oriented activities on a frequent basis.	25	40	32
Technology has a major role in both personal and work-oriented activities.	33	50	41
3. Have you taken a role in promoting technology use in your work area?	Cl. 46	Cl. 50	Total
I have taken no role in promoting the use of technology.	0	0	0
I have had a small role in promoting the use of technology.	8	20	14
I have had a moderate role in promoting the use of technology	17	20	18
I have had an active role in promoting the use of technology	26	0	14
l have had a major leadership role in promoting the use of technology	50	60	55
4. Rate your technical/computer capabilities on completing the program	Cl. 46	Cl. 50	Total
Have not developed much expertise with the computer	0	0	0
Use the computer on a limited basis, personal and/or professional activities.	0	10	5
Fairly proficient with the computer, especially with word processing	25	0	14
Have considerable expertise with the computer & various kinds of software.	50	30	41
Use almost daily for a wide variety of applications and programs	25	60	41
5. Rate your telecommunications activities on completing your program	Cl. 46	Cl. 50	Total
Rarely if ever use telecommunications	0	0	0
Use Nova account or a commercial online program once every 2 or 3 months	17	0	9
Use Nova account or a commercial online program 1 or 2 times a month	42	0	23
Use Nova account or a commercial online program on a weekly basis	17	50	32
Use Nova account or a commercial online program several times each week.	25	50	36

Question/Response	Percent of Responses		
6. Has telecommunications played a role in maintaining or promoting your relationship with other NOVA colleagues?	**Cl. 46**	**Cl. 50**	**Total**
Has had no effect on my relationships with colleagues.	0	0	0
Somewhat instrumental in developing personal relationships with one or two colleagues	58	10	36
helped to develop fairly close personal relationships with a majority of the members of my cluster.	8	20	14
Instrumental in developing strong personal relationships with members of my cluster and other colleagues in the CYS program.	25	40	32
Iinstrumental in developing personal relationships with NSU and non-NSU colleagues	8	30	18
7. Has telecommunications played a role in your ability to network professionally with other colleagues?	**%**	**%**	**%**
Has had no effect on my professional network.	25	0	14
Helped me develop a professional network with 1 or 2 NSU colleagues	33	30	32
Helped me develop a professional network with 5 to 10 NSU colleagues.	25	30	27
Instrumental in developing a broad professional network of NSU colleagues	8	10	9
Instrumental in developing prof. network with NSU, non-NSU colleagues	8	30	18
8. Based upon your experiences, would you recommend National cluster?	**Cl. 46**	**Cl. 50**	**Total**
Would never recommend.	0	0	0
Would recommend only if no other option was available.	8	0	5
Would recommend only for those with an established computer background	0	0	0
Would probably recommend, regardless of previous computer background.	17	20	18
Would highly recommend regardless of previous computer background	75	80	77

The final three questions of the survey were essay questions. While somewhat more difficult to analyze, and recognizing that some students might not be willing to respond in this manner, the survey asked students to relate personal observations of positive or negative

experiences with the use of telecommunications. Question 9a asked for any positive reactions.

All but two students of Cluster 46 responded to this question. Without exception, students

commented positively on the importance of E-mail for maintaining not only professional contact

but the sense of camaraderie and community that developed for the group. Four students

particularly mentioned the importance of using "talk" for real-time interaction during times of

stress.

Cluster 50 experienced a particularly traumatic situation during their course of study,

when one of their classmates was diagnosed with cancer and subsequently passed away just prior

to the end of their program. Seven of the respondents from this cluster specifically singled out

that situation and commented on how important it had been to keep in contact with that student

as well as other cluster members while going through that experience. Students wrote at length

about the feeling of connection to the others in the group. Other incidents supported by the use

of telecommunications mentioned were the interaction of two directors of boys homes, one in

Canada, the other in Alaska, which led to an exchange program that has resulted in some ground-

breaking activities. Another group whose members lived in Canada, The United States and the

Virgin Islands were able to work on a joint project with great success by sharing their work and

research through telecommunications. One student referred to scheduling and implementing

ECRs for study groups, and taking turns as the group leader. It was clear that the use of on-line

resources was a significant factor in their well-being both as colleagues and as students.

Fewer students responded to question 9 which asked for negative experiences. Of the

seven from Cluster 46 who did respond, two mentioned some frustration when early attempts at

getting on-line were unsuccessful. Two students commented on lack of cluster coordinator support, citing minimal use by that person in providing more contact and relay of information, while one respondent had negative remarks about the usefulness of the ECR. Respondents from Cluster 50 in most cases wrote "none," or used the area to add positive comments.

The final question asked if technology had had any influence in making a change in salary, job status or career. One Cluster 46 student related very positive effects of technology on her career, noting that she was honored as Texas cable teacher of the year, received a significant salary increase, and had expanded her horizons by starting a consulting business. Four others noted that while no tangible change had been experienced to date, there was a big change in their own personal abilities and confidence, as well as respect for those abilities from others. Respondents from Cluster 50 also related the feeling of personal growth and satisfaction they felt, and cited ways that the use of technology was increasing their effectiveness in their particular work arena.

Conclusions

Preliminary analysis of the survey data indicates that while students in these first two clusters entered with minimal or no computer skills, their instruction enabled them to perform in a positive way throughout their three years of study. These two groups were intentionally capped at 15 to 18 students, as we were learning with them what would be the most effective and important interactive forms of telecommunications to use for distance delivery, and how intensive instruction needed to be to develop the necessary skills to interact in those environments. Student skill levels obviously increased, and the carry-over to their work place is

evident. Technology continues to play an important part for them in both personal and

professional venues, and very few negative attitudes toward technology as used in their doctoral

program were expressed.

Since the start of the first National cluster in 1991, new processes have been incorporated

into student instruction, and an additional half day has been added. The acquisition of the E-mail

program Pine with its user-friendly word processing style has made a dramatic difference in the

frequency of E-mail communications not only with National cluster students but with members

of traditional geographically-based clusters. The increased capabilities of Nova Southeastern

University's electronic library system has made on-line research more convenient and effective.

The computer-based, distance education component of the Ed.D. Program in Child and

Youth Studies and the Graduate Teacher Education Program appears to be an effective and

productive manner for students to pursue graduate education. The impact made on students

involved in these programs has already been significant and the approach being used has become

the starting point for other masters and doctoral programs of the Fischler Center for the

Advancement of Education. The research upon which we have embarked should begin to

provide important information to help us make revisions that are indicated in the future.

Nova Southeastern University recognizes the urgent need to provide better access

to education for adult learners, especially as the gap between the necessary job skills and the

education of the adult population increases. The increased mobility of our society adds another

dimension to that problem. The programs begun by Nova southeastern University to provide

access to masters and doctoral level study through the use of technology are but two examples of

the various distance education graduate degree programs available through NSU. It is hoped that

our research will provide information that will allow us to offer that education in ways that

continue to be appropriate and successful.

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APPENDIX

NATIONAL CLUSTER TELECOMMUNICATIONS SURVEY

INSTRUCTIONS: Please darken the box before the statement that is closest to your response to that item.

Part I.   Computer Experience Background:

1.   **What were your technical/computer abilities prior to entering the CYS National Cluster?**

☐   Had never used a computer
☐   Had used the computer for simple, limited applications.
☐   Had used the computer for word processing and other computer application programs
☐   Had a fairly solid background in computer applications and computer programming.
☐   Was quite proficient in the use of the computer for various tasks including the use of one or two programming languages.

2.   **What was your familiarity with telecommunications prior to entering the CYS National Cluster?**

☐   Had never used telecommunications
☐   Had used telecommunications to access a commercial system (e.g., Prodigy, Knowledge Index).
☐   Had limited experience with telecommunications, mostly E-mail
☐   Was familiar with telecommunications, including E-mail and the UNIX operating system.
☐   Was very familiar with UNIX, E-mail, and other online programs.

3.   **What was your home computer capability prior to entering the National Cluster?**

☐   Did not own a PC
☐   Did not own a PC but planned to use one in my work area.
☐   Was in the process of obtaining a PC and modem.
☐   Owned and used a PC with some frequency, but had not as yet obtained or used a modem.
☐   Owned and used a PC and modem for some time prior to entering the CYS program.

4.   **What are your home computer capabilities on completing your CYS program?**

☐   Have never purchased a personal PC
☐   Am still using the same computer and modem with which I began the program.
☐   Have updated my original computer with additional hardware and software.

☐   Have invested in a new computer and modem since starting the program.

☐   Anticipate replacing my present system with the newest MS-DOS or MAC system within the near future.

Part II.   Use of the Computer in your Educational Program:

1.   **Which online applications did you use during your course of study?**

☐   The Electronic Classroom

☐   The Electronic Classroom and E-mail

☐   The Electronic Classroom, E-mail and the online library resources

☐   The Electronic Classroom, E-mail, online library resources and UNIX programs such as "Writers Workbench" and "talk."

☐   The Electronic Classroom, E-mail, online library resources, UNIX programs such as "Writers Workbench," "talk," "Notesfile," and the Internet.

2.   **How would you rate your ability to participate in the Electronic Classroom:**

☐   Followed the online lesson, but was uncomfortable in actively participating.

☐   Followed the online lesson, and participated with questions/answers/comments on occasion.

☐   Followed the online lesson, and asked/answered several times during ECR sessions.

☐   Actively participated in the ECRs and reviewed ECRs from the online library.

☐   Was an active participant in ECR sessions and able to act as teacher in the ECR environment.

3.   **How would you rate your use of E-mail?**

☐   Rarely used E-mail, preferred to use the telephone.

☐   Used E-mail only to contact study area or practicum faculty, or cluster coordinator.

☐   Used E-mail primarily for contact with study area or practicum faculty and the cluster coordinator, and on occasion to communicate with cluster members.

☐   Used E-mail almost evenly divided between faculty/coordinator business needs and personal contact with cluster members.

☐   Used E-mail for a variety of contact needs, not only with study area/practicum faculty, the cluster coordinator and cluster members, but also with other online users at Nova and other online institutions (e.g., Prodigy, Online America, Internet, other Universities).

4.   **How would you rate your use of the UNIX system?**

□   Rarely if ever used any UNIX system commands.

□   Rarely used UNIX commands, but able to use the "mmunix" menu.

□   Was comfortable in using the basic system commands such as "ls," "who," "clear" and "passwd," as well as the mmunix menu.

□   Was comfortable using UNIX commands, the mmunix menu, and "talk."

□   Was comfortable using UNIX commands, the mmunix menu, "talk," and an online text editor (e.g., ex-editor or PICO).

5.   **How would you rate your use of online research capabilities?**

□   Rarely if ever used electronic research resources; preferred to use the local library

□   Used Nova's electronic research resources two or three times but spent more time using local library resources.

□   Used electronic research resources and local library facilities about equally.

□   Used Nova's electronic research resources for the major part of my research needs.

□   Used Nova's electronic research resources as well as commercial online resources to provide for my research needs.

6.   **What is your estimate of the average amount of time spent online during your program?**

□   Between 1 to 2 hours per month.

□   Between 3 to 5 hours per month.

□   Between 6 to 8 hours per month.

□   Between 9 to 12 hours a month.

□   13 or more hours per month.

Part III.   Continuing Use of Technology:

1.   **What is the technology use situation at your work area?**

□   There is no use of technology in my work area

□   There is very limited use of technology in my work area, and only on an individual basis.

□   There is moderate use of technology for administrative needs

□   There is moderate use of technology for both administrative and client needs

□   There is broad and innovative use of technology for both administrative and client needs.

2.   **What is your personal use of technology at this point?**

□   Seldom if ever use technology for personal or work area activities.

□   Use technology for personal applications only on a limited basis.

□   Use technology for both personal and work-oriented activities on a limited basis.

□   Use technology for both personal and work-oriented activities on a frequent basis.

☐   The use technology has a major role for both personal and work-oriented activities.

3.   **Have you taken a role in promoting the use of technology in your work area?**

☐   I have taken no role in promoting the use of technology.
☐   I have had a small role in promoting the use of technology.
☐   I have had a moderate role in promoting the use of technology
☐   I have had an active role in promoting the use of technology.
☐   I have had a major leadership role in promoting the use of technology.

4.   **How would you rate your technical/computer capabilities on completing your CYS program?**

☐   Have not developed much expertise with the computer
☐   Use the computer on a limited basis for personal and/or professional activities.
☐   Have become fairly proficient with the computer, especially with word processing
☐   Have developed considerable expertise with the computer and various kinds of software.
☐   Use the computer almost daily for a wide variety of applications and programs.

5.   **How would you rate your telecommunications activities on completing your CYS program?**

☐   Rarely if ever use telecommunications
☐   Use my Nova account or a commercial online program occasionally (once every two or three months)
☐   Use my Nova account or a commercial online program one or two times a month
☐   Use my Nova account or a commercial online program on a weekly basis
☐   Use my Nova account or a commercial online program several times each week.

6.   **Has telecommunications played a role in maintaining or promoting your relationship with other NOVA colleagues?**

☐   Telecommunications has had no effect on my relationships with colleagues.
☐   Telecommunications had been somewhat instrumental in developing personal relationships with one or two colleagues.
☐   Telecommunications has helped me develop fairly close personal relationships with a majority of the members of my cluster.
☐   Telecommunications has been instrumental in developing strong personal relationships with members of my cluster and other colleagues in the CYS program.
☐   Telecommunications has been instrumental in developing personal relationships with Nova and non-Nova colleagues.

7.   **Has telecommunications played a role in your ability to network professionally with other colleagues?**

☐   Telecommunications has had no effect on my professional network.

☐   Telecommunications had played a role in developing a professional network with one or two colleagues at NOVA.

☐   Telecommunications has helped me develop a professional network with a group of 5 to 10 NOVA colleagues.

☐   Telecommunications has been instrumental in developing a broad professional network of NOVA colleagues.

☐   Telecommunications has been instrumental in developing a professional network with both Nova and non-Nova colleagues.

8.   **Based upon your experiences, how would you recommend the National cluster to a colleague?**

☐   Would never recommend.

☐   Would recommend only if no other option was available.

☐   Would recommend only for those with an established computer background.

☐   Would probably recommend, regardless of previous computer background.

☐   Would highly recommend regardless of previous computer background.

9a.   **Please relate at least one anecdote relating to an incident during your time in the program where you were able to support a colleague, form a personal relationship, or other event that might indicate that telecommunication is not a cold and impersonal medium:**

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9b.   **If you experienced a negative relationship or in any way found telecommunications**

to be cold and impersonal, please describe that event below:

10.   Has the use of technology had any influence, direct or indirect in making a change
      in your salary, job status, or career direction? If so would you please describe