TELEHEALTH COURSES: STUDENT COSTS AND SATISFACTION

By

Stephanie A. Ahrens RN, BSN

A research paper submitted in partial fulfillment of the requirements for the degree of:

MASTER OF NURSING

Washington State University-Spokane
Intercollegiate College of Nursing

May, 2001
To the faculty of Washington State University:

The members of the Committee appointed to examine the project of Stephanie A. Ahrens find it satisfactory and recommend that it be accepted.

Michael Rice, PhD, ARNP
Anne Mealey, PhD, ARNP
Elizabeth LeCuyer-Maus, PhD, ARNP
Acknowledgments

To Dr. Michael Rice whom without all of your help and guidance I would have not made it through Graduate school. You are a mentor to me and I appreciate all of your generosity and vast clinical knowledge.

To Dr. Elizabeth LeCuyer-Maus and Dr. Anne Mealey, thank you for being so supportive and flexible while working on my clinical project.

To Margaret Ruby, thank you for always being helpful and kind. You definitely go “beyond the call of duty”.

To Dad, Ken, for letting me move back home so I could afford to attend graduate school and for motivating me to always better myself in your own unique way. I love you.

To Mom, Bonne, for always being a constant source of support and encouragement. You are a great mother and a wonderful friend. Thank you for reminding me that I can be anything I want to be. I love you.

To K.C., my little brother, whom I look up to and admire. I thank you for always giving me words of encouragement and for believing in me. I love you.

To my fiancé, Mohammed, thank you for emotionally and financially supporting me through this challenging process. I love and appreciate you.

To my friends and family, thank you for understanding my absence at many parties and other gatherings due to my school commitments.

Finally thank you to my beautiful Persian cat, Remington, for always being by my side while I worked many late nights reading or on the computer.
TELEHEALTH COURSES: STUDENT COSTS AND SATISFACTION

By

Stephanie A. Ahrens RN, BSN
Washington State University-Spokane

May, 2001

Abstract

Chair: Dr. Michael Rice

Identifying cost effectiveness will help evaluate which populations need access and financial support to attend Graduate nursing school. Education via telehealth modalities can provide educational access to students who are unable to commute to universities or move to larger cities. Yet, there are no studies that evaluate the students’ indirect costs associated with televideo courses. The existing studies focus solely on the operational costs associated with setting up potential course sites.

The purpose of this study was to examine student’s indirect costs and satisfaction related to attending graduate school via telehealth connections. The items developed for this survey were modified from the Flashlight Project and administered to 30 students enrolled in a psychiatric differential diagnosis course.

Analysis of the data indicated that the availability of convenient course locations minimized the students’ costs while attending school. The high satisfaction rating of the course offered via televideo supports the benefits of telehealth education in rural settings. The data in this study encourages developing rural televideo sites, which decreases indirect costs and aids in retaining students.

This study was partially supported by grant # D09 HP 00159-02 to Michael Rice from HRSA.
TABLE OF CONTENTS

Acknowledgments iii
Abstract iv
List of tables vi
Introduction 2
Evaluation Framework for Telehealth Initiatives 3
Studies on Telehealth Satisfaction 4
Cost Analysis Studies 7
Statement of Problem 8
Purpose of Study 8
Procedure 9
Results of Study 9
Discussion 16
Nursing Implications 18
References 19
Appendix 21
LIST OF TABLES

Table 1- Age of Respondents
Table 2- Race/Ethnic Background of Respondents
Table 3- Sex of Respondents
Table 4- How far do you live from this course delivery site?
Table 5- Costs of food per week while at class or due to traveling to class site?
Table 6- Approximate costs of childcare while at school?
Table 7- Approximate costs of gas per week traveling to and from school-class site?
TELEHEALTH COURSES: STUDENT COSTS AND SATISFACTION

Stephanie A. Ahrens RN, BSN
Psychiatric Nurse Practitioner Graduate Student

Washington State University
Intercollegiate College of Nursing

May, 2001
Introduction

Imagine a Registered Nurse who lives 60+ miles away from a major hospital or college who wants to obtain her Master’s degree, but believes she cannot commute the 60+ miles. She is approached by her supervisor inquiring if she would be interested in taking a graduate level course at work. She agrees to take the course and contacts the instructor. She is sent information about the graduate program and given information about the course. She registers online and takes her courses at her current work site via televideo. The class is offered at a time which allows her to adjust her work schedule at the community hospital. If someone were unable to leave his/her community due to prior obligations, then telehealth is a perfect solution.

Telehealth is “The use of telecommunications and information technology to provide access to health assessment, diagnosis, intervention, consultation, supervision, education, and information across distance” (Nickelson, 1998, p527). Education via telehealth modalities can benefit rural students who are unable to commute to universities or move to larger cities. Brown (1999) defines telehealth as a linkage to regional, national and international markets in a live two-way audiovisual interaction. Interactive telecommunication is linking two or more locations where students participate in classes while interacting simultaneously with one another.

Robbins (1999) discusses the Remote Communities Services Telecentre (RCST) project, a model for widespread implementation of wireless solutions for worldwide rural communities. The concept of RCST is to provide a telecommunications resource facility in small remote communities that have limited communications infrastructure. The intent
of RCST is to use the experience of rural practitioners in the teaching of students in the medical and nursing school at Memorial University of Newfoundland.

Recruitment and retention of qualified health professionals is a difficult obstacle to overcome in rural and remote communities. Telehealth enables direct teaching and consultation in a real time mode to communities and decrease gaps in education and access to psychiatric care. While there is a proliferation of telehealth systems to address rural health care needs, there has been limited work on the evaluation of the cost effectiveness and satisfaction with the telehealth systems.

**Evaluation Framework for Telehealth Initiatives**

Field (1996) proposed a number of relevant telemedicine evaluation questions in order to evaluate: 1) quality of care and health outcomes 2) access to care 3) health care costs and cost-effectiveness 4) patient’s overall satisfaction and 5) staff and student’s overall satisfaction. Field emphasizes that evaluation should be understood as a cumulative and forward-looking process for building useful knowledge and as a tool for implementing program or policy improvements.

Scott, Coates & McCarthy (1999) reports that evaluation attempts have been hampered by rural areas being sparsely populated, and telehealth projects’ inability to generate sample sizes large enough to warrant statistical analysis. Yet, telehealth conferences or meetings are delivered every couple of weeks in the United States.

Legislative action regarding telehealth is increasing. According to Nickelson, Kirby, and Hardesty (1998) in the 104th Congress from 1994-1996, 15 pieces of legislation were introduced that addressed telehealth system development and policy.
Telemedicine Information Exchange (TIE) reports that the online legislative Web contains eighty telemedicine bills. Of those eighty bills, only fourteen have been enacted into law (Wachter 2001). Washington State has no pending laws concerning telehealth at this time.

Studies on Telehealth Satisfaction

West Georgia’s distance learning program is a part of the Georgia Statewide Academic and Medical System (GSAMS), which is the largest distance learning and healthcare network in the world. GSAMS has more than 370 sites in Georgia, including K-12 schools, colleges, universities, hospitals, prisons, and veterinary settings at Zoo Atlanta. Hill (1997) evaluated the cost effectiveness and quality analysis of distance learning utilized by the College of Education at the State University of West Georgia. Hill administered surveys to faculty and students that measured attitudes toward distance learning, perceived class quality, student demographic information, and enrollment information. Of 198 students, 129 students responded to the survey. Out of a possible 25 faculty, 21 completed surveys were returned.

Hill’s study measured the correlation between student satisfaction and satisfaction with the instructor, age of the student, distance of the student from the home site, the number of total sites, and the total number of students enrolled in a course. “The farther away the student was from the main campus, the more positive his or her attitude was toward distance learning” (Hill, 1997, p2). Older students appeared to report a higher satisfaction with distance learning courses than were their younger classmates. “Neither
the number of sites nor the number of students in a course appeared to have an impact on student satisfaction” (Hill, 1997, p2).

Faculty also reported an overall satisfaction with teaching a course through distance education. Eighty-seven percent reported that they had a positive attitude toward distance learning at the end of teaching the course. Faculty cited many reasons for wanting to use distance education such as the ability to reach students who cannot commute to the main campus, the ability to utilize technologies not available in traditional classrooms, reduction of travel time, and the need to keep up with emerging technologies. Faculty reported frustration about transporting materials between sites, scheduling courses, helping students register, time spent on emailing students, and getting material for courses delivered on time to other course sites.

“More telehealth projects are being implemented because they respond to community needs, rather than from the need to test or justify new technologies” (The Telehealth Industry in Canada, 2000, p15). Nesbitt, Hilty, Kuenneth, and Siefkin (2000) studied a total of 657 consecutive patients who consented to a telemedicine consultation, using telemedicine televideo units provided by UC Davis Health system. The UC Davis medical center and several urban or suburban primary care clinics, rural hospitals, and clinic affiliates were involved. Patients and physician satisfaction were measured on a 5-point Likert scale. Patients and physicians reported high levels of satisfaction. Rural clinics requested more specialty consultations than urban or suburban clinics. “A driving force behind the growth and development of telemedicine programs across the country has been the need to increase access to medical services in rural settings” (Nesbitt et al., 2000, p169). Nesbitt et al. found that in the area of psychiatric care where acceptance
rates were expected to be low, 29% of patients chose telemedicine for the initial visit, whereas 35% chose telemedicine for follow-up care.

"South Australia has a ratio of psychiatrists to population of 1:8500, but all psychiatrists reside and work in Adelaide except one" (Clarke, 1997, p12). Psychiatrists travel to distant towns once a month. Nurses and social workers support the communities the rest of the time. Televideo connections at Glenside Hospital began in 1994, in order to link three rural towns. The telemedicine was used to provide clinical consultations, staff training, and community health activities. After the videoconference was completed general practitioners and nurses were asked to rate their satisfaction. When asked the usefulness in clarifying diagnosis, 52% of physicians and 82% of nurses reported it was very helpful. On the usefulness in developing a formulation, 40% of physicians and 72% of nurses reported the videoconference was very helpful. The number of professionals interviewed was not given. Forty-three patients were involved with this study. Fifty percent of the patient group returned their questionnaire. Eighty-eight percent reported they would use the service again. Ninety-three percent reported no difficulty with the sound delay and 93% had no difficulty with the picture blurring.

Dunn (1999) performed an empirical study using televideo on 2200 pathology cases, which showed how increasing use of televideo systems decreased case turnaround times from 2.46 days to 1.5 days, without any drop in the level of accuracy. LaMendola (1997) identified 30 telemental health programs operating in frontier and rural areas. The majority of the programs were in Alaska, Colorado, Kansas, Montana, Nebraska, and South Dakota. The services provided through telemedicine were education, consultation, therapy, and administration. Education services included continuing education and
training. Consultation services included medication reviews, assessments, psychiatric supervision, case review, and involuntary commitment appraisals. Meetings, record sharing, information transfer, and utilization review were covered in administration services. Ninety-three percent of the sites offered consultative services, 70% offered education services, 43% offered administrative services, and 17% offered therapy services. Only 2 (7%) offered all four services.

Scott et al. (1999) report that in the past few years' growth in rural telemedicine and telehealth network development has been rapid. “For example, the Association of Telemedicine Service Providers (ATSP) data on 96 active telemedicine sites in over 40 U.S. states indicates that the number of telemedicine consults in 1996 (21,000) tripled that of 1995, and in the first quarter of 1997 over 11,000 consults in over 40 specialties have been registered” (Scott et al. 1999, p40).

Cost Analysis Studies

Hill (1997) completed a cost analysis of The State University of West Georgia’s distance education courses. The benefit was determined by multiplying the number of students, who said they would not have taken the course if they had to commute to the main campus, by the amount of tuition paid per student. The benefit was compared to the overhead costs of the distance learning program and any additional costs related to mailings, travel etc. Overhead costs include salary and benefits of the distance learning coordinator, student facilitator wages, telecommunications charges, travel expenses, and supplies. Based upon these calculations there was a tuition gain for the University, which ranged from $3234 to $8764. Hill’s study reported an overall satisfaction with distance
education by the students and faculty. Economic benefits for The State University of West Georgia were also observed. “It must be noted that the greatest benefits of the distance learning program, its far-reaching effects on teachers receiving higher education, the children they teach and the entire educational system, are simply not measurable” (Hill, 1997, p4).

Statement of Problem

There are few studies that evaluate cost vs. effectiveness of telehealth courses. The existing studies focus on equipment, fiber optic wire cost, salaries for technical support staff, and miscellaneous costs for setting up potential course sites. There were no studies found that evaluated student costs for commuting, food, gas, childcare, and other costs related to attending school.

Purpose of Study

The purpose of this study was to examine costs and satisfaction related to attending graduate school via distance televideo learning methods. The survey focused on the satisfaction and costs related to the location of course site and the use of the Intercollegiate College of Nursing (ICN), Medically Indigent Rural Area (MIRA) Network for televideo connections. The ICN MIRA Network is a system of newly developed Internet Protocol (IP) televideo connections in Washington State used for course delivery. The system in this study included the Washington Higher Education Television System (WHETS) and IP connections. Student demographics, commuting
time, childcare costs, gas and food costs, and other costs excluding tuition were included in the survey.

Procedure

A survey modified to telehealth systems was based on the Flashlight evaluation program. The Flashlight program is a computerized database of questions about electronic education. Initially funded by the Andeberg foundation, the Flashlight database has been validated in 251 national studies. The items developed for this survey were modified and administered to 30 students attending Intercollegiate College of Nursing (Appendix I). The modified survey was approved by IRB. A total of 32 students were enrolled in a course entitled Medical Mimics (N544) during the spring semester of 2001. A total of 30 students (N=30) completed the survey, one student withdrew from the course and one student refused to answer the survey.

Results of Study

Analysis of the data indicated that the survey respondents had a mean age of 40-49 years of age with a range of 20 to 59 years of age (Table # 1). The respondent’s ethnic backgrounds were; Caucasian (86.7%), Hispanic (3.3%), African American (3.3%), and 3.3% answered other (Table # 2). The majority of the population were female (86%) with 10 percent male (Table # 3). Since, 60% of the total sample were under the age of 49, they are in an age bracket most likely to have children at home.
Table # 1: Age of Respondents

<table>
<thead>
<tr>
<th>Age</th>
<th>Frequency</th>
<th>Percent</th>
<th>Valid Percent</th>
<th>Cumulative Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>20-29</td>
<td>1</td>
<td>3.3</td>
<td>3.3</td>
<td>3.3</td>
</tr>
<tr>
<td>30-39</td>
<td>5</td>
<td>16.7</td>
<td>16.7</td>
<td>20.0</td>
</tr>
<tr>
<td>40-49</td>
<td>12</td>
<td>40.0</td>
<td>40.0</td>
<td>60.0</td>
</tr>
<tr>
<td>50-59</td>
<td>10</td>
<td>33.3</td>
<td>33.3</td>
<td>93.3</td>
</tr>
<tr>
<td>No Answer</td>
<td>2</td>
<td>6.7</td>
<td>6.7</td>
<td>100.0</td>
</tr>
<tr>
<td>Total</td>
<td>30</td>
<td>100.0</td>
<td>100.0</td>
<td></td>
</tr>
</tbody>
</table>

Table # 2: Race/Ethnic background

<table>
<thead>
<tr>
<th></th>
<th>Frequency</th>
<th>Percent</th>
<th>Valid Percent</th>
<th>Cumulative Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Other</td>
<td>1</td>
<td>3.3</td>
<td>3.3</td>
<td>3.3</td>
</tr>
<tr>
<td>Hispanic/Latino</td>
<td>1</td>
<td>3.3</td>
<td>3.3</td>
<td>6.7</td>
</tr>
<tr>
<td>Caucasian</td>
<td>26</td>
<td>86.7</td>
<td>86.7</td>
<td>93.3</td>
</tr>
<tr>
<td>African-American/Black</td>
<td>1</td>
<td>3.3</td>
<td>3.3</td>
<td>96.7</td>
</tr>
<tr>
<td>Refused to answer</td>
<td>1</td>
<td>3.3</td>
<td>3.3</td>
<td>100.0</td>
</tr>
<tr>
<td>Total</td>
<td>30</td>
<td>100.0</td>
<td>100.0</td>
<td></td>
</tr>
</tbody>
</table>

Table # 3: Sex of Respondents

<table>
<thead>
<tr>
<th></th>
<th>Frequency</th>
<th>Percent</th>
<th>Valid Percent</th>
<th>Cumulative Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Female</td>
<td>26</td>
<td>86.7</td>
<td>86.7</td>
<td>86.7</td>
</tr>
<tr>
<td>Male</td>
<td>3</td>
<td>10.0</td>
<td>10.0</td>
<td>96.7</td>
</tr>
<tr>
<td>Refused</td>
<td>1</td>
<td>3.3</td>
<td>3.3</td>
<td>100.0</td>
</tr>
<tr>
<td>Total</td>
<td>30</td>
<td>100.0</td>
<td>100.0</td>
<td></td>
</tr>
</tbody>
</table>
Fifty-three percent of the subjects lived more than twenty-one miles from their course delivery site. The data also indicated that with telehealth connections in place, less than 13.3% (n=4) lived more than 50 miles from a telehealth course site (Table 4). This indicates that access to more telehealth sites will continue to decrease distance traveled by students.

Table # 4: How far do you live from this course delivery site?

<table>
<thead>
<tr>
<th>Distance</th>
<th>Frequency</th>
<th>Percent</th>
<th>Valid Percent</th>
<th>Cumulative Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>0-5 miles</td>
<td>4</td>
<td>13.3</td>
<td>13.3</td>
<td>13.3</td>
</tr>
<tr>
<td>6-10 miles</td>
<td>8</td>
<td>26.7</td>
<td>26.7</td>
<td>40.0</td>
</tr>
<tr>
<td>11-20 miles</td>
<td>2</td>
<td>6.7</td>
<td>6.7</td>
<td>46.7</td>
</tr>
<tr>
<td>21-50 miles</td>
<td>12</td>
<td>40.0</td>
<td>40.0</td>
<td>86.7</td>
</tr>
<tr>
<td>more than 50 miles</td>
<td>4</td>
<td>13.3</td>
<td>13.3</td>
<td>100.0</td>
</tr>
<tr>
<td>Total</td>
<td>30</td>
<td>100.0</td>
<td>100.0</td>
<td></td>
</tr>
</tbody>
</table>

Only 26.7% of respondents attend the main campus site for their course work. Sixty-percent of respondents attended class at a remote campus. Ten-percent of the students taking the course travel to a community distance learning site (Figure # 1). A community distance learning site in this study is defined as an IP connection at a Community College or rural area. A remote campus is defined as a branch campus using WHETS.

In contrast to the location of telehealth sites for course delivery, eighty-percent of the respondents reported that they lived more than 51 miles from the main campus.
The respondents indicated that 70% lived more than 100 miles from the site where the course originated (Figure #2).

The respondents indicated that 86.7% of the sample spent less than ten dollars a week for food costs because of their convenient site location. (Table #5).
Table # 5: Costs of food per week while at class or due to traveling to class site?

<table>
<thead>
<tr>
<th>Frequency</th>
<th>Percent</th>
<th>Valid Percent</th>
<th>Cumulative Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>9</td>
<td>30.0</td>
<td>30.0</td>
</tr>
<tr>
<td>$1-5</td>
<td>9</td>
<td>30.0</td>
<td>60.0</td>
</tr>
<tr>
<td>$6-10</td>
<td>8</td>
<td>26.7</td>
<td>86.7</td>
</tr>
<tr>
<td>$11-15</td>
<td>1</td>
<td>3.3</td>
<td>90.0</td>
</tr>
<tr>
<td>$16-25</td>
<td>3</td>
<td>10.0</td>
<td>100.0</td>
</tr>
<tr>
<td>Total</td>
<td>30</td>
<td>100.0</td>
<td>100.0</td>
</tr>
</tbody>
</table>

The respondents also indicated that the availability of convenient course locations minimized the costs of childcare while attending school. The proximity of rural based course sites allowed many of the respondents to use spouses, parents, grandparents and other relatives to provide childcare. This resulted in a very low cost of childcare while attending school (Table # 6). The data indicates that 93% of the respondents had no childcare costs associated with taking classes.

Table # 6: Approximate costs of childcare while at school?

<table>
<thead>
<tr>
<th>Frequency</th>
<th>Percent</th>
<th>Valid Percent</th>
<th>Cumulative Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>28</td>
<td>93.3</td>
<td>93.3</td>
</tr>
<tr>
<td>$1-50</td>
<td>1</td>
<td>3.3</td>
<td>96.7</td>
</tr>
<tr>
<td>$51-100</td>
<td>1</td>
<td>3.3</td>
<td>100.0</td>
</tr>
<tr>
<td>Total</td>
<td>30</td>
<td>100.0</td>
<td>100.0</td>
</tr>
</tbody>
</table>

The students reported that the costs of gas for traveling to and from class were minimized by the availability of telehealth courses. The respondents reported that over 76% spent less than ten dollars a week to travel to and from the course. A total of 93% spent less than twenty-five dollars a week for gas (Table # 7).
Table # 7: Approximate costs of gas per week traveling to and from school-class site?

<table>
<thead>
<tr>
<th>Frequency</th>
<th>Percent</th>
<th>Valid Percent</th>
<th>Cumulative Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>3</td>
<td>10.0</td>
<td>10.0</td>
</tr>
<tr>
<td>$1-5</td>
<td>11</td>
<td>36.7</td>
<td>36.7</td>
</tr>
<tr>
<td>$6-10</td>
<td>9</td>
<td>30.0</td>
<td>30.0</td>
</tr>
<tr>
<td>$11-16</td>
<td>1</td>
<td>3.3</td>
<td>3.3</td>
</tr>
<tr>
<td>$17-25</td>
<td>4</td>
<td>13.3</td>
<td>13.3</td>
</tr>
<tr>
<td>$26-32</td>
<td>1</td>
<td>3.3</td>
<td>3.3</td>
</tr>
<tr>
<td>$33-40</td>
<td>1</td>
<td>3.3</td>
<td>3.3</td>
</tr>
<tr>
<td>Total</td>
<td>30</td>
<td>100.0</td>
<td>100.0</td>
</tr>
</tbody>
</table>

This low cost for gas was associated with the minimal time spent commuting to and from the course sites. Commuting and course activities included hours per week spent commuting to and from campus to attend a lecture, discussion or study session, to study in the library, computer lab, etc. (Figure #3).

Figure #3: Commuting and Course Activities: Hours per week

- 3.5 hours-5 hours: 13.3%
- 30 minutes-1 hour: 33.3%
- 1.5 hours-3 hours: 50.0%
- No answer: 3.3%

Overall, 90% of respondents were satisfied with the Medical Mimics course offered via televideo (Figure # 4).
Sixty-six percent of students reported that due to the way Medical Mimics (N544) was offered via televideo they were able to take the course (Figure # 5).
Discussion

The data indicates that education via telehealth modalities benefit rural students who are place bound by jobs, geographical barriers and family obligations. Linkage to regional educational settings provides an invaluable service in small remote communities with limited communications infrastructure. The data indicates that recruitment and retention of qualified health professionals can be overcome in rural and remote communities using telehealth connections. The ICN MIRA Network enabled direct teaching in a synchronous real time mode to isolated communities. The data provides a clear picture on the cost of telehealth education from the student’s perspective. Data was not collected to actually allow comparisons of costs between synchronous and asynchronous classes.

The data indicated that the student’s indirect costs associated with obtaining advanced education were limited by the use of telehealth connections. The data indicates that costs associated with travel, food, and childcare had a direct impact on the student’s ability to access advanced education. The data from this study show that these costs are minimized and facilitate the student’s enrollment in graduate education.

Sixty-percent of the respondents attended class at a remote campus reflecting that access has improved by developing remote sites and offering courses via televideo. Over 70% of the students lived more than 100 miles from the main campus where the course originated. While the televideo course delivery sites were remotely located in respect to the main campus, the students were able to spend little on car maintenance and fuel. Sixty-seven percent of respondents spent less than $10 on gas costs commuting to their
course site. This is remarkable given the recent increases in the costs associated with fossil fuels and the distance to the primary campus.

Typical of most graduate education, 60% of the students were between the ages of 20-49 years of age. Most had major childcare responsibilities or were within the age range during which childrearing occurred. The data from this study indicated that the ability to access local televideo connections for graduate education resulted in minimal childcare costs. In many instances, the students were able to utilize spouses, grandparents and other relatives who also lived in the area.

Forty-percent of students live less than 11 miles from their particular course delivery site. The convenience of having a course site located close to home decreased the student’s financial burden by allowing students to continue to work and attend school. The majority of students work an average of 32 hours a week. In order to afford graduate school and household expenses students need to work and attend school at the same time. Developing televideo courses at work settings or at home would increase the availability and access to education to individuals that are in remote areas who have family and/or work obligations.

The televideo connections did not affect the students’ level of satisfaction. The data indicates that there was a high level of satisfaction with the course. The respondents noted that there was satisfaction with the course regardless of whether they took the course at the main campus or a remotely connected site. The majority of respondents agreed that they were able to take this course due to the way the course was offered via televideo connections. This supports providing sites closer to students, which may help decrease commuting costs and retains students in the program.
Nursing Implications

Due to Washington State having many rural and frontier areas, telehealth is the solution to decrease both indirect and direct costs associated with advanced rural health education. The televideo connection also allows the rural communities access to education that will provide advanced health care. The use of telehealth provides an avenue for solving the problem of lack of access by providing care and clinical sites for rural individuals.

The nursing shortage in the United States is increasing and indicates the need for increased enrollment in nursing schools. Identifying cost-effective approaches will help bridge the educational barriers to populations that need viable routes of access to nursing education.
References


Appendix I

MIRA COST OUTCOMES SURVEY

<table>
<thead>
<tr>
<th>Subject Name</th>
<th>Subject ID</th>
<th>Date</th>
<th>Interviewer</th>
</tr>
</thead>
</table>

1. Because of the way this course uses video conferencing, I was able to take this course.
   - Strongly Agree
   - Agree
   - Disagree
   - Strongly Disagree
   - N.A.

2. Indicate how strongly you agree or disagree with the following statement. Because of the way this course uses video conferencing, I am more confident that I can reach my academic goals.
   - Strongly Agree
   - Agree
   - Disagree
   - Strongly Disagree
   - NA

3. Approximate costs of food per week while at class or due to traveling to class site?

4. Approximate costs of child care while at school?

5. Any other costs incurred due to attending school (excluding tuition).
Indicate how strongly you agree or disagree with each of the following statements:

<table>
<thead>
<tr>
<th>Strongly Agree</th>
<th>Agree</th>
<th>Disagree</th>
<th>Strongly Disagree</th>
<th>Not Applicable</th>
</tr>
</thead>
<tbody>
<tr>
<td>6. This course did not conflict with my work and/or family responsibilities</td>
<td>☐</td>
<td>☑</td>
<td>☐</td>
<td>☐</td>
</tr>
</tbody>
</table>

7. Approximate costs of gas per week traveling to and from school-class site?

<table>
<thead>
<tr>
<th>8. Since the beginning of this semester, on average how many hours per week have you spent commuting to and from campus or another course delivery site (Include time spent commuting to attend a lecture, discussion or study session or to study in the library, computer lab, etc.). Write your response in the space provided.</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. for this course alone?</td>
</tr>
<tr>
<td>b. for all of your courses combined?</td>
</tr>
</tbody>
</table>

9. Why did you decide to take this course (select all that apply)?

- [ ] to fulfill a general education requirement
- [ ] fulfill a requirement for my major
- [ ] the subject matter looked interesting
- [ ] the instructor has a good reputation
- [ ] it was offered at a convenient time
- [ ] it was offered at a convenient location
- [ ] it was offered via [ ] technology
11. Do you live: (select all that apply)
- with your parents as a dependent?
- with your spouse or partner?
- in off-campus housing alone?
- in off-campus housing with unrelated roommates?
- in a dormitory (single or with roommates)?
- in a sorority or fraternity?
- other (please specify) [ ]

12. Number of dependent, school-age children living with you? (write your response in the space provided)

13. Do you take this course primarily: (select only one)
- at home?
- at your place of employment?
- at the main campus?
- at a community distance learning site (such as, a library, a high school)?
- at a remote campus?
- other (please specify) [ ]

14. How far do you live from this course delivery site? (select only one)
- 0-5 miles
- 6-10 miles
- 11-20 miles
- 21-50 miles
- more than 50 miles
- not applicable

15. How far do you live from our institution or campus? (select only one response)
- 0-5 miles
- 6-10 miles
- 11-20 miles
- 21-50 miles
- 51-100 miles
- more than 100 miles
To what extent do you agree or disagree with each of the following statements:

<table>
<thead>
<tr>
<th>(select only one response per question)</th>
<th>Strongly Agree</th>
<th>Agree</th>
<th>Disagree</th>
<th>Strongly Disagree</th>
<th>Not Applicable</th>
</tr>
</thead>
<tbody>
<tr>
<td>16. I feel comfortable taking this course at home, at my place of work, or at a site away from the originating campus.</td>
<td>c</td>
<td>c</td>
<td>c</td>
<td>c</td>
<td>c</td>
</tr>
</tbody>
</table>

17. Please enter your age in the space provided

Age:

18. Race/Ethnicity: (select all that apply)
   - American Indian/Alaskan Native
   - African-American/Black
   - Asian/Pacific Islander
   - White
   - Hispanic/Latino
   - Other (please specify) __________

19. Sex: (select only one)
   - Male
   - Female

20.

Overall, I have been ___ very dissatisfied ___ dissatisfied ___ satisfied ___ very satisfied with this course

In a typical week during this semester, approximately how much time did you spend in each of the following activities:

| For this course (Include all the time you spent for your course(s) during class, laboratory sessions, unpaid internships, and study time. Do not include time spent for a job you were paid to perform or for personal reasons) | (select only one response per question) |
21. Interacting with an instructor or other students at your institution by way of E-mail or other "time-delayed" electronic communication (such as bulletin boards or discussion lists)?

<table>
<thead>
<tr>
<th>Time</th>
<th>Ten Hours or More</th>
<th>Six to Nine Hours</th>
<th>Three to Five Hours</th>
<th>One or Two Hours</th>
<th>Less Than One Hour</th>
<th>None/Not Applicable</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>c</td>
<td>c</td>
<td>c</td>
<td>c</td>
<td>c</td>
<td>c</td>
</tr>
</tbody>
</table>

22. Searching the Internet/World Wide Web to access reference materials and/or conduct research?

<table>
<thead>
<tr>
<th></th>
<th>Ten Hours or More</th>
<th>Six to Nine Hours</th>
<th>Three to Five Hours</th>
<th>One or Two Hours</th>
<th>Less Than One Hour</th>
<th>None/Not Applicable</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>c</td>
<td>c</td>
<td>c</td>
<td>c</td>
<td>c</td>
<td>c</td>
</tr>
</tbody>
</table>

23. Think about a similar course you have taken that [1] relied primarily on face-to-face discussions][2] were offered via correspondence or distance learning without Video conferencing. Compared to that course, because of the way this course uses Video Conferencing: how likely [are] you to: (select only one response per question) Much More Likely Somewhat More Likely About the Same Somewhat Less Likely Much Less Likely No basis for Judgement/Not Applicable 0397S4670 0...to be able to take this course.

- c Much More Likely
- c Somewhat More Likely
- c About the Same
- c Somewhat Less Likely
- c Much Less Likely
- c No Basis for judgment/N.A.

In your opinion, to what extent were each of the following given priority in this course:

<table>
<thead>
<tr>
<th>Please rate each of the following from 1 to 5 where: 1 is the lowest priority, and 5 is the highest priority</th>
<th>(select only one response per question)</th>
</tr>
</thead>
<tbody>
<tr>
<td>24. Structuring the course so that students don't waste time in non-course activities (such as standing in line, commuting, etc.)</td>
<td>c 1 2 3 4 5</td>
</tr>
<tr>
<td>25. Enabling students to complete tasks at times that are convenient for them</td>
<td>c 1 2 3 4 5</td>
</tr>
</tbody>
</table>
26. Please elaborate if there is anything else you would like us to know about your experience taking this course?

27. Estimated Net (after taxes and expenses) Annual Household income:

- $10-14,999
- $15-30,000
- $31-50,000
- $51,000 and above