

Maine Policy Review

Volume 5

Issue 1 *Health Policy*

1996

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Recommended Citation

Nicoll, Leslie H. , Marianne D. Steinhacker, and Teena H. Ouellette. "A Comparative Evaluation of Distance Learning Versus Traditional Teaching Methods in an Associate Degree Nursing Program." *Maine Policy Review* 5.1 (1996) : 65 -73, <http://digitalcommons.library.umaine.edu/mpr/vol5/iss1/11>.

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A Comparative Evaluation of Distance Learning Versus Traditional Teaching Methods in an Associate Degree Nursing Program

Maine Policy Review (1996). Volume 5, Number 1

The policy question addressed by this article is whether distance education works. Are students taught by distance learning disadvantaged relative to their peers in traditional educational settings? The results of this study strongly indicate that distance learning does work and that significant benefits may result for rural Maine residents if distance learning opportunities are expanded.

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Introduction

The debate over the University of Maine System Education Network's ability to bestow degrees raged through 1995. Although few would argue the importance of providing rural residents with opportunities for higher education, many object to offering degrees to students whose only college experience was derived electronically. Some detractors have indicated that it would be more appropriate to offer certificates for program completion and others would like to do away with the educational network altogether. However, a decrease from degrees to certificates is a step in the wrong direction for students who value and may want to build on their academic credentials in the future. To dismantle the educational network completely without proper assessment would deny many rural residents the chance to avail themselves of a higher education. Proponents of distance learning recognize it as a strategy to reach populous hubs in rural areas, while saving money and resources, and making the opportunity of higher education to people who might otherwise have limited educational access.

What are missing are the hard data needed to accurately assess Maine's distance learning program vis-à-vis traditional learning. Without systematic evaluation, no one can say exactly how the distance experience differs from the traditional experience, if at all. Thus, when the faculty of the Nursing Program at the University of Maine at Augusta decided to offer their associate degree program to students at distant sites, they realized that a systematic, planned evaluation was essential to understand program outcomes and student and faculty teaching/learning needs.

The evaluation reported in this article was designed to compare educational experiences of students enrolled in the associate degree nursing program at the University of Maine at Augusta. The program offers three types of learning experiences at four teaching sites in Maine: (1) a traditional experience, which includes traditional classroom (in the ITV broadcast classroom

with the instructor) and faculty supervised clinical experiences, based in Augusta; (2) a modified distance learning experience, which includes classes via the interactive television system (ITV) and faculty supervised clinical experiences, based in Thomaston and Augusta; and (3) a distance learning experience, which includes ITV classes and clinical experiences supervised by clinical teaching associates (CTAs) who are practicing staff nurses at participating clinical institutions in Calais and Machias. A full time Augusta-based faculty member served as a "distant liaison," responsible for the coordination and evaluation of the Washington County students. (See Table 1)

Table 1: Learning experience type, description, and site

Type	Program description	Site(s)
Traditional	<ul style="list-style-type: none"> • Traditional (on-site) classroom instruction • Faculty supervised clinical experiences 	Augusta
Modified	<ul style="list-style-type: none"> • Interactive Television System (ITV) classroom instruction • Faculty supervised clinical experiences 	Thomaston
Distance	<ul style="list-style-type: none"> • ITV classroom instruction • Clinical experiences supervised by clinical teaching associates (CTAs) 	Calais Machais

Developing the Evaluation

Education of nursing students is a multifaceted process that includes didactic and clinical teaching. As the student progresses through the program a socialization process occurs that moves the student from non-nurse to beginning nurse. Further, faculty strive to teach and role model certain skills, behaviors, and attitudes so that students continue to demonstrate appropriate professional behaviors after graduation. Exactly how this process occurs is not well understood despite years of research on the topic. The distance learning program adds a new variable to the education of nursing students. To develop the evaluation, we examined prior research on the experiences of distant learners, the socialization process that occurs for nursing students, and traditional outcomes, such as grades, to select relevant variables to be measured in the project.

Distance learners generally have different life experiences and face unique challenges to completing their education that students in a traditional setting do not encounter. Studies have concluded that distance students are more apt to be adults with established careers and families. Some studies of distance education in nursing programs found that satellite students spent more time completing their academic program, worked at their jobs more hours per week, had more children, and drove further to class (McClelland & Daly, 1991). The added pressure of holding a job and raising a family may have an impact on the satellite students' abilities to complete their academic programs. Also, students may not receive emotional support from their families as they

try to juggle all of these responsibilities, which may cause some students to fall behind in their assignments, miss classes, and drop out of college.

The support that the students lack from their families, however, may be replaced effectively by faculty and counselors in the academic program. In 1987, Billings found while studying attrition from correspondence baccalaureate nursing programs that distance learners benefited from counseling on such matters as timely completion of assignments. Also, according to Billings, distance students should be targeted for extra moral support if they travel a great distance or express that their families are not supportive of their educational pursuits. This body of research indicated that measurements of stress and coping would be important elements of the evaluation.

Support from faculty members and user-friendly technology can be essential to easing students' frustrations. Satellite students may need personal reassurance and instruction from their professors, or they may want the faculty to facilitate better communication between the learning sites during class time to ensure that they are included in discussions and exercises in critical thinking. Viverais-Dresler and Kutschke (1992) examined satisfaction with clinical faculty among distance students who were registered nurses. They found that students were most satisfied when the clinical teacher was supportive, encouraging, and well-connected with the area healthcare organizations in which students carried out their clinical instruction. This research proved relevant for the measurement of role socialization and professional orientation to the nursing care role during the evaluation.

Several studies have examined delivery of a nursing curriculum to distance learners (Kerr, 1988; Wuest, 1989; De Jonge, 1989). Shomaker (1993) found that some effective methods for including distance students in the classroom were eliciting discussions among the learning sites, alternating eye contact regularly between the camera and the classroom, and providing telephone office hours for the distance students. Inclusionary tactics reinforced the distance students' feelings of being a college student, even if the college is a hundred miles away. To evaluate these outcomes, a measure of self concept was included in the evaluation.

Description of the Program

The rural nature of Maine makes the delivery of higher education to many areas difficult, if not impossible. Washington County lacked any sort of nursing program for preparation as a registered nurse (RN) until the introduction of the associate degree program from the University of Maine at Augusta (UMA) via distance education in 1993. The Thomaston site in Knox County, as previously described, first received ITV classes in 1990 and provided an opportunity to test educational strategies to enhance classroom delivery and student participation at both sites. The University of Maine at Machias with its Calais Center and the Washington County Technical College in Calais collaborated with UMA to provide general education courses either in the live classroom or via ITV.

In 1992, faculty developed and produced, in conjunction with the ITV staff, laboratory skill videotapes that replaced live nursing skill demonstrations. Each student was able to purchase a videotape to use in preparation for laboratory practice. This method provided consistency in student learning in the three types of programs. Student outcomes using the videotape skill

model were tested in the Augusta and Thomaston nursing laboratories prior to beginning the Washington County program.

The delivery of the entire two-year program at a distance to Thomaston, Calais, and Machias started in the fall of 1993. The only difference was the approach used for clinical instruction. The Thomaston students received their clinical education in the traditional fashion; that is, having clinical groups of 8-9 students on site with a clinical instructor one or two days per week. Instead of traditional clinical experiences, Washington County students were supervised by clinical teaching associates (CTAs) with the oversight and evaluation of the distant liaison. The distant liaison traveled to Washington County two to three times each semester to meet with the students. She also communicated with the students and CTAs via telephone, computer, and fax. During the two years of the project, most faculty traveled at least once to Washington County and Thomaston.

During the summer of 1993, final plans were put in place for the implementation of the program at the Machias and Calais sites. In addition to the program implementation, a comprehensive evaluation for all students at all sites was developed to address the following questions:

1. Do students in the traditional program (Augusta), modified distant learning experience (Thomaston), and the distant learning experience (Machias and Calais) differ from each other on selected outcome measures, including stress and coping, self concept, role socialization, and orientation to nursing care role?
2. Do students in the traditional program (Augusta), modified distant learning experience (Thomaston), and the distant learning experience (Machias and Calais) differ from each other on traditional outcome measures, including grades throughout the program, overall grade point average and post-graduation National Council Licensure Examination (NCLEX) results?
3. Do students in the traditional program (Augusta), modified distant learning experience (Thomaston), and the distant learning experience (Machias and Calais) differ from each other in terms of their demographic profiles?

Based on the literature and the evaluation questions, the study variables were operationalized and measured using reliable and tested instruments, listed in Table 2. Data were collected periodically during the two years of the program; the schedule is illustrated in Table 2.

Students at each site were assigned a code number and evaluated between and within their groups to protect confidentiality. Although participation was voluntary, all students were encouraged to join the study. At the beginning of the evaluation there were 38 students enrolled in the traditional nursing program in Augusta, 16 in the modified program in Thomaston, and 14 students at the distance sites (seven each in Machias and Calais). All instruments were coded after each data collection period; all data were entered into a longitudinal file and analyzed using traditional statistics and tests of significance.

Table 2: Evaluation variables

Variable	How measured	When measured
Traditional outcomes	Nursing course grades per semester; overall GPA at graduation; NCLEX pass rate.	Course grades collected at end of each semester; GPA calculated after graduation; NCLEX pass rate collected during the summer of 1995.
Demographic information	Self designed instrument with questions regarding age, marital status, family commitments, hours spent studying, working, in class, and with family; and income.	Four times during the project: January, 1994; May, 1994; January, 1995; May, 1995.
Stress and coping	Student Stress and Coping Inventory (Cohen, 1990).	Four times during the project: January, 1994; May, 1994; January, 1995; May, 1995.
Self concept	Tennessee Self-Concept Scale (Roid & Fitts, 1991).	At beginning and end: January, 1994 and May, 1995.
Role socialization	Corwin Nursing Role Conception Scale (Modified Professional Subscale) and the Stone's Health Care Professional Attitude Inventory (Modified for Nursing) (Lawler, 1988).	At beginning and end: January, 1994 and May, 1995.
Orientation to the nursing care role	Nursing Care Role Orientation Scale (Stemple, 1988).	At beginning and end: January, 1994 and May, 1995.

Results

Demographic profile of the students

Overall, the mean age of respondents was 34.4 years, ranging from 21 to 55 years. The mean age at each site was 33.7 in Augusta, 35.5 in Washington County, and 36.5 in Thomaston. Most of the respondents were female (87.5 percent) and 58.9 percent were married. Only 12 of 56 (21.4 percent) said they had previously earned a higher degree of some type. Most had previously worked in the healthcare field (71.4 percent) and the amount of time spent working in the field averaged 5.4 years. Washington County students had the most healthcare career experience with an average of 7.7 years, followed by Thomaston with 7.3 years and Augusta with 4.4 years.

Traditional outcomes

Grade point averages (GPA) are the average of all class grades and indicate students' overall academic achievements in their program and are measured on a scale in which an A grade equals 4.0, B equals 3.0, and C equals 2.0. GPAs ranged from 2.4 to 4.0 and the overall mean was 3.43. Thomaston students had the highest mean GPA of 3.45, followed by Washington County at 3.44 and Augusta at 3.41. Therefore, the means of each site fell between the letter grades B+ and A-, indicating a similar academic experience across the sites.

As of this writing, 59 of 60 graduates involved in this evaluation have taken the National Council Licensure Exam (NCLEX). The NCLEX is an examination that must be taken and passed in order for the applicant to be licensed as an RN. Fifty-seven of 59 students (96.6 percent) passed the examination. One student from Augusta and one student from Washington County did not pass. The high overall passing rate indicates little difference in the academic or clinical experiences of students and speaks well of the program's ability to produce quality nursing graduates.

Stress and coping

The Student Stress Inventory is a five section instrument that measures anxiety on a scale of one (not stressful) to four (extremely stressful) in the nursing classroom, nursing clinical experience, non-nursing classes and laboratories, college environment, and social/personal environment.

During the evaluation period, overall mean stress levels hovered around one (not at all stressful) and two (slightly stressful). Mean stress levels for each site tended to mirror the overall results. Augusta students reported the highest mean stress, 2.5, on section five--social/ personal life at the end of the evaluation (May 95). Also, at that time, Thomaston students reported the lowest mean stress score, 1.0, on section four--college environment. Although students at each site generally experienced increases in stress as they progressed throughout the program, the changes were incremental and did not reflect unhealthy levels of anxiety.

Students cope with stress in different ways. Some common coping strategies that can be either proactive or counterproductive include discussing the situation, accepting the situation, becoming depressed, praying, and using alcohol and other drugs. The coping instrument completed by students compared how often they used these coping techniques to alleviate the anxiety of the stressful environments discussed in the Student Stress Inventory. Mean coping scores may range from one (do not use coping responses described in instrument) to four (use coping responses a great deal). Overall mean coping scores ranged from 2.4 to 2.5 at each data collection period indicating little to moderate use of the coping responses presented on the instrument.

Self concept

For this analysis, students' total scores on the Tennessee Self Concept Scale, which measure self-esteem level, were of primary interest. The range of the scale is from 150 (5th percentile) to 450 (90th percentile), with 150 being very low self-opinion and 450 being very high. The range of student responses was 304 to 411 in the first round and 259 to 422 in the final round. The average total scores for each site fell between the 40th and 70th percentiles, indicating normal levels of self-esteem.

Role socialization

The Corwin Nursing Role Conception scale uses 14 hypothetical situations in which a nurse may find him/herself. The respondent is asked the extent to which he/she thinks the situation should be the ideal in nursing and the extent to which he/she has observed the situation in the hospital.

The highest score (70) for each section indicates the strongest possible perception of ideal and real nursing situations. Mean total scores ranged from 71.8 (Thomaston students) to 83.5 (Washington County students) which demonstrated an average to moderately strong perception. Results indicated no significant differences between or among the sites.

Stone's Health Care Professional Attitude Inventory asks the respondent 38 questions about healthcare professionals and healthcare delivery systems. It is designed to measure the level of professionalism among nursing students. Total scores may range from 38 (least professional attitude) to 190 (most professional attitude). Student scores ranged from 112 to 167 (January, 1994) and from 95 to 131 (May, 1995). The overall mean decreased from 131.4 to 111, as did the mean within Augusta students (130.4 to 111.3) and within the distance sites (Washington County, 134.4 to 111.3; Thomaston 127.5 to 107.5). The reported decrease in professional attitude should be examined because it appears to be prevalent throughout the nursing student body and there were significant differences in the total scores.

Orientation to the nursing care role

The Nursing Care Role Orientation Scale measures the level of identification the students feel with the role of a nursing professional. Test scores may range from a low of 24 to a high of 120. Student scores ranged from 63 to 110 in January, 1994 and from 72 to 110 in May, 1995.

Interestingly, only the Thomaston students maintained almost the same score from the beginning to the end of the evaluation. One would expect the scores to rise from the beginning to the end of the program; as the students progress through their nursing studies, one would expect that they would become more acclimated to that role. Both the Augusta and Washington County sites experienced a slight decrease in mean scores.

Analysis

Differences in overall nursing classroom stress from the first to last data collection period ($p=0.023$) and differences within each site from beginning to end ($p=0.022$) were found to be statistically significant. However, these differences appear to be between a feeling of no stress to feeling only slightly stressed. There do not appear to be any significant increases in stress either between or within the sites on any of the remaining sections of the stress instruments.

There were also significant decreases in stressful experiences reported in the college environment by Augusta ($p=0.005$) and Thomaston ($p=0.036$) students. The mean for Augusta students decreased from 1.5 to 1.2 and for Thomaston students from 1.3 to 1.0. Again, this difference appears within the range of slightly stressful and not at all stressful levels of the scale. These differences may be explained by understanding that when students began this study they were new to campus life or distance learning and would have anxiety related to change and newness. By the end of the program, the majority of the participants had "learned the ropes" of college life and conquered their fears.

There was a significant difference ($p=0.026$) in the use of coping responses between Augusta and the Washington County and Thomaston sites grouped together in the final round but the difference was, once again, between little use and no use of coping responses. It does seem logical that those who report only minimal stress would also report minimal use of coping responses to deal with stress.

The overall mean of the Stone Health Care Professional Attitude Inventory, a measure of role socialization, decreased significantly ($p=0.001$) from 131.4 to 111, as did the mean within Augusta students ($p=0.001$) and within the distance sites ($p=0.001$). Between each group, however, there were no significant differences in their scores. In other words, each site experienced a decline in scores similar to the other sites. This result is particularly interesting as one would not expect the mean professional attitude of students to decrease as they complete the program. Instead one would expect that the students would feel more assimilated into the profession at the end of their program.

Discussion

Some of the concerns that have been raised by critics related to differences in students in a traditional nursing program versus those participating at a distance learning site include the lack of local support networks for distance learners, the difficulty of role socialization at a distance, and the concern that there are not enough role models present to instill professional nursing attitudes. Although a few statistically significant differences were found on some of the evaluation variables, the overall findings indicate that the students at all sites did not differ in detrimental ways from each other either academically or in professional socialization qualities.

The measures of role socialization indicated an overall decrease in professional attitude and socialization, a surprising finding. This could merely be the product of the trepidation experienced as students face the prospect of applying their education in a healthcare facility or the downward spiral in employment prospects for new graduates due to healthcare delivery changes; these concerns might be remedied through exit counseling. These decreases cannot be attributed to distance learning as similar decreases were reported by students at the Augusta campus.

Several major health education policy implications have been elucidated in this study. First, the average age of distance learners in this study was 35.5 in Washington County and 36.5 in Thomaston. They have homes and families and need access to health education programs near their living/working environment. Distance education can and did meet that need for these students.

Second, the success of the associate degree nursing distance education program can spill over to other practice-based health education programs (such as certified occupational therapy assistant, physical therapy assistant, respiratory therapy assistant) that are offered through Maine's technical colleges. The costs of starting these programs on-site are high and can be mitigated with distance learning. Finally, the distance format opens opportunities for rural communities to develop the health specialists they need to meet their needs.

This study may not end the debate over the level of education provided by the education network. The results do indicate that there is parity among the students in many areas and that there is no justification for either dismantling the program or lowering its academic standing. This systematic evaluation has demonstrated that the University of Maine at Augusta's nursing program has been very successful in achieving educational, attitudinal, and professional parity for students across the learning sites encompassed by this program.

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Acknowledgement

This research was supported by a grant from the Office of the Vice Chancellor of the University of Maine System, Nancy McKnight.

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Full cite: Nicoll, Leslie H., Marianne D. Steinhacker, and Teena H. Ouellette. 1996. *A comparative evaluation of distance learning versus traditional teaching methods in an associate degree nursing program*. Vol. 5(1): 65-73.