Assessing Outcomes with Nursing Research Assignments and Citation Analysis of
Student Bibliographies

Holly Heller-Ross BA, MLS

Holly Heller-Ross is Associate Librarian, Feinberg Library. Plattsburgh State University
of New York. 2 Draper Ave. Plattsburgh, NY 12901.

Abstract

What are the library and information research requirements in a typical undergraduate nursing program? Do distance-learning library services provide undergraduate nursing students with the research materials they require for their academic work? In order to determine how the broad range of reference, instruction, and access services offered by Feinberg Library at Plattsburgh State University of New York, are used by students, the author reviewed selected nursing course syllabi for research requirements and the resulting student research bibliographies as an outcome assessment. The review included 441 bibliographic citations from 78 student research papers from 1998-1999. Results indicated no significant difference between on and off-campus student bibliography citations with regards to currency, format or number of citations. Results also indicated that the reviewed undergraduate nursing research assignments were indeed designed to promote research integration into nursing practice, and that student access to information was sufficient to allow them to complete their academic assignments.

Introduction and Statement of Research Problem

The American Nurses' Association (1989) identified the investigative functions of a nurse at various educational levels. The ANA described the functions of nurses at the baccalaureate level as follows: "Reads, interprets, and evaluates research for applicability to nursing practice... shares research findings with colleagues." Nursing faculty must design curriculum and assignments that prepare students to effectively carry out these investigative functions. Nursing students must use these learning opportunities to develop and practice the required skills. While access to library and information services cannot guarantee incorporation of literature into student work and clinical practice, it is a critical prerequisite. Changes in library and educational technologies have resulted in an increasing use of electronic databases and Internet sites for health research. Distance-learning programs have further increased this use by bringing academic courses and electronic library collections to students who may never step onto the physical campus. Access to information and information services remains critical for all students, and the institution offering distance-learning programs remains responsible for providing these

resources and services.

Plattsburgh State University of New York offers several distance-learning courses, including an RN-BSN degree program for nurses called the Telenursing Program. Library and information services are provided to distance-learning students in the program through flexible and carefully designed combinations of electronically accessible resources, bibliographic instruction sessions, and distance site-library agreements. Web-based courses are additionally supported through library and computing support web pages and web-based interactive reference chat. Initial student opinion survey results collected from1994 through 1997 gave evidence that students used these library services and appreciated their value.

While student opinion surveys provide valuable insights for service assessment, other measurable outcomes are usually required for continued institutional funding, grant proposals and reports, and educational accreditation. In the fall of 1998, the Outreach Information Services Librarian and the Instruction Librarian at Plattsburgh State posted a survey on several electronic lists (including the Bibliographic Instruction List and Off-Campus Library Services List), to collect information from librarians on trends and issues a variety of libraries face in attempting to deliver instruction and services to a growing audience of distance learners. A lack of clearly identified goals and measurable outcomes for distance-learning instruction was noted as a particular concern by several of the survey respondents (Heller-Ross & Kiple, 2000). This information reinforced the thought that further research was needed to assess whether the library services that Plattsburgh State provided were in fact contributing to the desired educational outcomes of the distance-learning program.

The 1998 ACRL Task Force on Academic Library Outcomes Assessment report stated that "Outcomes, as viewed by the Task Force are the ways in which library users are changed as a result of their contact with the library's resources and programs." The report carefully distinguished between input data (measuring library collections and instructional and reference activities), and outcome data (providing evidence of student academic achievement). The report further pointed to the work of Bonnie Gratch Lindauer (1997), which recommended "Syllabi analysis; library use/instruction statistics analysis" and "Rating of references or bibliographies; portfolio analysis" as good data collection methods for outcomes assessment.

If nursing faculty were requiring students to utilize the research literature in order to prepare them for a nurse's "investigative functions", and if students were using library services and resources to "read, interpret, and evaluate research", then student use of library materials would be evident in their coursework. This evidence could be part of an institutional outcome assessment for distance-learning library services support. In 1998, the Outreach Information Services Librarian selected citation analysis as the research methodology that would provide the best objective and specific assessment of student use of literature to complete their course assignments. Nursing faculty research assignments were analyzed as well, to determine the extent to which the assignments in selected courses required use of published literature, and how they may have guided students to appropriate use of resources. Other assessment tools (student surveys, course grading analysis, conversations with students, librarians, nursing faculty) were also occasionally employed to measure student satisfaction and use of library and information services.

Research Context for Citation Analysis

Citation studies have long been used to trace the flow of information and establish reputations of individual authors, journals, research institutes, and universities. The underlying premise is that valuable information will be recognized as such by other researchers and included in subsequent published literature. The more frequently an article or book is cited, the more valuable its information must be. Of course, not all citations are positive, but even a negative reference to a work is interpreted as affirming the significance of the work to the field of study. Faculty tenure decision processes invariably include a review of faculty scholarship, and citation analysis is often used to determine the quality of the faculty member's scholarly contributions. Researchers interested in citation analysis as a tool will easily find extensive literature to consult. A subject search for citation analysis on H.W.Wilson Co.'s Library Literature on OCLC's FirstSearch (1980-November 2001) yielded 644 documents. Research in discipline specific areas is readily available as well, with a search of the nursing literature in CINAHL on SilverPlatter (1999-2001) for citation analysis in the descriptor field yielding 69 records. Only selected examples focused on nursing, distance-learning, or student research are cited here.

Librarians have often used citation analysis to help inform collection development and journal acquisition decisions and to determine core resources in an academic discipline. Most of this research has used published papers, books, and articles for primary research material. Some examples specific to student research and/or distance-learning include Hardesty & Oltmanns' (1989) article on the undergraduate student use of psychology journals, which presents the history of journal title ranking in psychology. The authors report on their study of journal citations from 105 senior psychology theses at two different institutions, concluding that an identifiable core journals list could not be identified from the student papers. Ruddy's (1998) conference paper on the use of citation analysis to investigate journal usage by off-campus graduate students reports an analysis using citations from 100 master's theses, also concluded that a wide variety of journal titles (565) were cited and no core list of journals was identified in the study.

Most research has concentrated on published literature analysis, using the ISI Citation Indexes, or other bibliographic study techniques to determine what experienced subject experts find to be the most important research information. The results have then been used by librarians to aid in the selection of resources and research indexes, and in the development of research instructional guides. Some researchers in this area have used student work for their focus, including Burton & Chadwick (2000). Their research focused on student preferences for resource material and found that students writing research reports (63% of students surveyed) "preferred sources that were easy to use and easy to find, whether these sources were library-based or Internet-based".

Citation studies have also been used as a tool for comparing library instruction pedagogies, and more recently to identify student information seeking behaviors. One example of a citation study using student research for this purpose is Fescemyer (2000), writing on the research strategies and citations used by students. This article provides a thorough review of the library literature on citation analysis along with citation research

findings from undergraduate geography research exam questions. Hovde (2000), in an article focused on student research paper bibliographies and library instruction, analyzed references from 109 freshman English papers to determine whether students used resources suggested by the library instruction sessions. The results showed that students were indeed using the library online catalog and recommended research databases for their coursework. Cornell University librarians have now published two studies of undergraduate student research bibliographies, focused on tracking the proportion of traditional scholarly resources used by students. The studies (Davis & Cohen, 2001 and Davis, 2002), report a decline in scholarly resources cited, and attribute this primarily to the effect of easy access to popular and technical web resources.

This limited literature review provides ample evidence that citation analysis has a solid history in library research methodologies. Clearly this single method has been used for a broad range of purpose, with several different subject groups, and has been conducted using both published and unpublished and both faculty and student bibliographies as the research study materials. While most statistical analysis requires either large numbers or strikingly different results between data sets in order for the researcher to draw significant conclusions, even small scale uses of statistical research methods can provide benefits for a single institution. (ACRL , 1998) The citation study conducted at Plattsburgh State University will be used as only one component of a multi-faceted outcome assessment program currently under development.

Research Context for Distance-Learning

Distance-learning or distance-education is generally accepted to mean a teaching/learning experience between instructors and students who are separated by some combination of time and place. Another term for distance-learning students has been off-campus students, as opposed to on-campus learning and on-campus students. Distributed-learning is often defined as a separate mode of instruction more connected to distributed-computing, whereby instructional materials are delivered through computer-based course packages or tutorials, often to on-campus students. Many American universities have defined distance-learning as distinct from a more traditional independent study or correspondence course, in part due to increased reliance on communications technology (compressed video/audio, satellite, or the Internet for example) that provides fast delivery and additional interactivity. Educational and library associations have established standards and guidelines for both library services for distance-learning and the provision of information literacy instruction.

According to the 2000 Association of College & Research Libraries (ACRL) Guidelines for Distance-learning Library Services, "The originating institution is responsible, through its chief administrative officers and governance organizations, for funding and appropriately meeting the information needs of its distance-learning programs in support of their teaching, learning, and research. This support should provide ready and equivalent library service and learning resources to all its students, regardless of location." The ACRL Guidelines also define the association's philosophy and definitions for distance-learning. According to the document, "Distance-learning library services refers to those library services in support of college, university, or other post-secondary courses and programs offered away from a main campus, or in the absence of a

traditional campus, and regardless of where credit is given. These courses may be taught in traditional or non-traditional formats or media, may or may not require physical facilities, and may or may not involve live interaction of teachers and students. The phrase is inclusive of courses in all post-secondary programs designated as: extension, extended, off-campus, extended campus, distance, distributed, open, flexible, franchising, virtual, synchronous, or asynchronous." In addition to library association standards; institutional accrediting bodies (such as the Commission on Higher Education Middle States Association and the National League for Nursing), state boards of education, and academic faculty governing bodies also set standards and criteria for library services and quality of instruction. Outcome assessment is therefore part of each institutions responsibility, allowing a determination of whether the educational standards are being met.

Distance-learning students are particularly affected by the transformation of information storage and research access from traditional print to new electronic formats. Information literacy and technology fluency have become key requirements for the successful completion of a university program or continuing education certificate. Specific competencies include fluency in electronic library and information research, electronic mail and file transfers for communication with faculty and classmates, electronic access to academic records and registration, and proficiency in Internet use for course content as well as information research.

Distance learners have been predominantly part-time, adult or returning students; students in professions where continuing education leads to career opportunities or additional licensure (nursing and allied health, education, engineering, business), and students looking for degrees not offered by their local institutions. Web-based distance-learning networks and programs, such as the State University of New York's SUNY Learning Network (SLN), the University of Phoenix Online, and Jones International University, offer significant advantages to working adults, disabled or otherwise home-bound students, students in rural and remote areas, students in the military or other jobs where assignments require frequent relocations, and incarcerated students. These students are not often well prepared for academic information research, and need a good deal of faculty and librarian guidance as they progress through their classes. A new and very fast-growing group of distance learners are those technologically proficient students who prefer the time-shifting, no-travel-or-dorm-room independence of interactive video, interactive television, or web courses. Technology proficiency however, does not mean that these students have information research and critical information evaluation skill levels beyond their adult and returning student classmates.

The current convergence of technological advances, financial constraints, and changing demographics in higher education has continued to nudge many institutions towards piloting or seriously considering distance and distributed learning formats. By all accounts, distance-learning programs, courses, and student enrollments will continue to grow rapidly through the next decade. (AFT 2001)

Research Context for Distance-learning Library Services at Plattsburgh State

Plattsburgh State University is located in northern New York State, about 20 miles from the U.S.-Canadian border. Plattsburgh is a state-supported, comprehensive,

co-educational institution, accredited by the Middle States Association of Colleges and Schools. Part of the State University of New York (S.U.N.Y.) system, Plattsburgh offers nearly 60 major fields of study, and has a student population of about 5,800. Plattsburgh first offered distance courses in 1989, and expanded its distance-learning program in 1994 with a five-year, one million-dollar grant from the U.S. Department of Health and Human Services for the establishment of the Telenursing Program, a distance-learning baccalaureate completion program for Associate Degree and Diploma RN's. In 1999, Plattsburgh joined the S.U.N.Y. Learning Network (SLN), a system-wide asynchronous learning network for Internet-based courses and degrees. The SLN provides S.U.N.Y. campuses with faculty professional development, course-management software and Internet servers, technical support and help-desk service, and coordinated publicity for distance and distributed learning. Plattsburgh Telenursing distance-learning classes are now offered using a real-time, two-way interactive, compressed video/audio system (PictureTel), through e-mail distribution/discussion lists, and through the SLN on the World Wide Web. In the fall 2001 semester, Plattsburgh State had 157 students in the Telenursing Program. Plattsburgh also had an additional 206 students enrolled in 19 different SLN classes, and 360 matriculated students (primarily education and management graduate students) at it's extension site at the Adirondack Community College in Glens Falls, NY.

Library services were identified as critical from the start of the Telenursing Program, and funding for a part-time outreach librarian was included in the 1994 grant. The Outreach Librarian established the library services program using a distributed approach to facilitate collaborations with librarians at Feinberg Library and at each distance site. Essentially, all traditional library and computing departments added responsibility for working with the Outreach Librarian to provide services for distance learners. Faculty and staff revised or created procedures and services to provide equitable support. Examples include offsite nursing book collections, a new electronic interlibrary loan form, electronic reserves, online reference chat, home delivery of article photocopies and books, and off-campus database access through a proxy server. Library faculty teach a required one-credit course, "LIB101 Introduction to Library Research" previously described by Carla List (1995), that was revised for delivery through compressed video and then later revised for online delivery. Telenursing students generally use their distance site libraries and reference librarians first and then electronically connect to Feinberg Library for further research or additional reference assistance

As the distance-learning program changed to include web courses, the scope of the library services program changes as well. Less emphasis was placed on providing site-based technology, document delivery, and instructional services. More emphasis was placed on optimizing access to online resources through proxy services and full-text databases, electronic reserves, web-based instructional guides, and e-mail and chat reference support. Again, while access is a critical prerequisite to information resource use, it cannot guarantee appropriate information resource use.

Methodology

A correlational research study, funded in 1998 by the Eastern New York Chapter of the Association of College & Research Libraries (ENY/ACRL) Janice Graham

Newkirk Research Award, was designed to investigate nursing student use of the comprehensive library services provided to Plattsburgh State's distance-learners. The research study proposed to collect data on the incorporation of published research literature into student work submitted to fulfill academic course requirements. The Plattsburgh State Committee for the Protection of Human Subjects reviewed the proposal, the primary researchers credentials, the funding and consent form (Appendix A), and granted an expedited review approval. Human Subjects Research reviews are intended to protect both individuals and the institution from harm and liability. Plattsburgh States' Sponsored Research Office handles these reviews, manages grant funds, and also offers support and guidance for research projects.

Citation study methodology often includes the use of footnotes and references lists as well as bibliographies. The difference between references, which may be cited several times throughout a work, and a bibliography, which lists resources only once, is a critical difference. Since this study was intended to investigate student use of the literature by number, currency, and type, student research papers with bibliography and works cited sections were used. The purpose was not to establish the importance of the individual referenced materials, nor to identify frequently cited materials, but to determine broad patterns of student use of the published literature. Accordingly, bibliographic citations were counted once, even if cited several times in a research paper.

Student Research Citation Analysis Methodology

Student research participants were recruited from two (NUR 350 and NUR 425) of the Plattsburgh State nursing courses reviewed in the nursing research assignment analysis. Potential participants were given information about the study and were asked to sign a written consent form. Student bibliographies and works cited sections (from research papers, case studies, and group presentations) were collected by photocopying those pages when they were handed in to the course instructors. The bibliographic citations, without any information identifying the student, were then entered into a database of literature consulted by students in the program. This database was constructed to organize the citations according to the following resource characteristics: the number of different research sources consulted, currency of resources consulted, and the format of resources consulted (books, journals, media, web resources). For purposes of this study, citations from full-text article databases were counted as journals, not as web resources. The research findings were reviewed and analyzed for statistically significant differences between on and off-campus student use of the research literature, as well as for patterns of resource characteristics.

Findings were further reviewed for possible relevance to various questions of interest to the library and nursing faculty. Are students able to locate resources as required by their course assignments? What is the impact of library instruction on student use of resources? Do students without access to Plattsburgh State's physical library use online resources more than on-campus students do? Are books still utilized by students in their research? Of course, some of these questions can only be answered through consideration of multiple issues, but it was hoped that the research findings would contribute to the ability of librarians to formulate the answers.

Nursing Research Assignment Analysis Methodology

Nursing research assignments were analyzed in order to determine student research requirements and faculty expectations for student research. It is commonly accepted that faculty requirements, and not inherent student love of learning, most strongly influences the amount of research undergraduates pursue for course assignments. Nursing research assignments in four classes offered through distance-learning were reviewed for their specific library and information research requirements.

Analysis included review for specifics of length of assignment, guidelines for references or bibliographies, resource currency or format requirements or restrictions, and for the importance of the research assignment in the course grading structure (percentage of the total grade). This analysis was intended to inform the student citation analysis in several ways. If the nursing research assignments primarily required the use of journal articles, then significant student use of journal articles could not necessarily be interpreted as a student preference for journal articles. If the nursing research requirements restricted use of older resources or web resources, then limited student use of these resources could not necessarily be interpreted as an instructional concern or a resource access issue. On the other hand, since both on and off-campus students were participating in the same classes, differences between these two populations could be interpreted as real differences in student knowledge, access or preference. Review of the importance of the assignment in the course grading structure was included in the study as a very preliminary and informal measure of the importance of information literacy skills in the nursing curriculum.

Results for Student Research Citation Analysis

78 student research papers providing 441 bibliographic citations were collected and reviewed from 1998-1999. Early comparisons showed differences between on-and off-campus student research citations, although the small sample sizes precluded definitive conclusions.
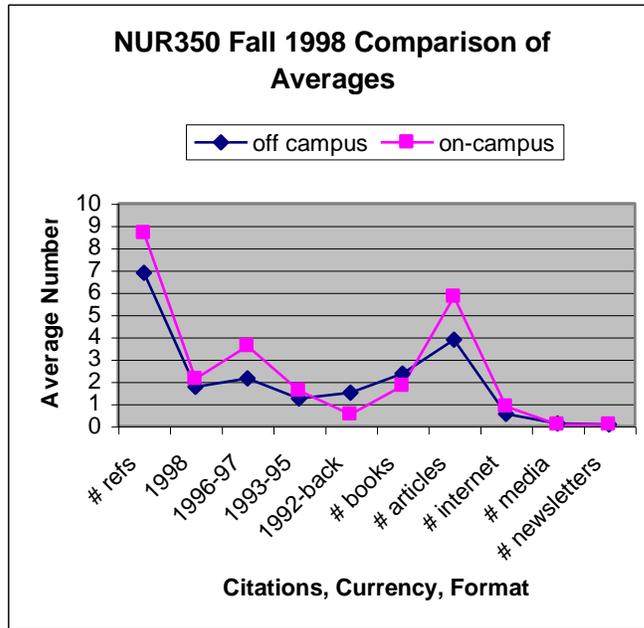
NUR 350 Fall 1998 Off-Campus Students

Number of Papers Reviewed	Average Number of References	Currency Average 1998	Currency Average 1996-1997	Currency Average 1993-1995	Currency Average 1992 and earlier	Format Average Book	Format Average Journal Article	Format Average Internet	Format Average Media
26	6.88	1.77	2.15	1.23	1.5	2.35	3.88	0.54	0.12

NUR 350 Fall 1998 On-Campus Students

Number of Papers Reviewed	Average Number of References	Currency Average 1998	Currency Average 1996-1997	Currency Average 1993-1995	Currency Average 1992 and earlier	Format Average Book	Format Average Journal Article	Format Average Internet	Format Average Media
15	8.67	2.13	3.6	1.6	0.53	1.8	5.8	0.87	0.07

NUR 350 Fall 1998 Comparison of Averages

category	# refs	1998	1996-97	1993-95	1992-back	# books	# articles	# internet	# media
off campus	6.88	1.77	2.15	1.23	1.5	2.35	3.88	0.54	0.12
on-campus	8.67	2.13	3.6	1.6	0.53	1.8	5.8	0.87	0.07

NUR350 Fall 1998 Comparison of Averages

off campus — on-campus

Average Number / Citations, Currency, Format

(x-axis labels: # refs, 1998, 1996-97, 1993-95, 1992-back, # books, # articles, # internet, # media, # newsletters)
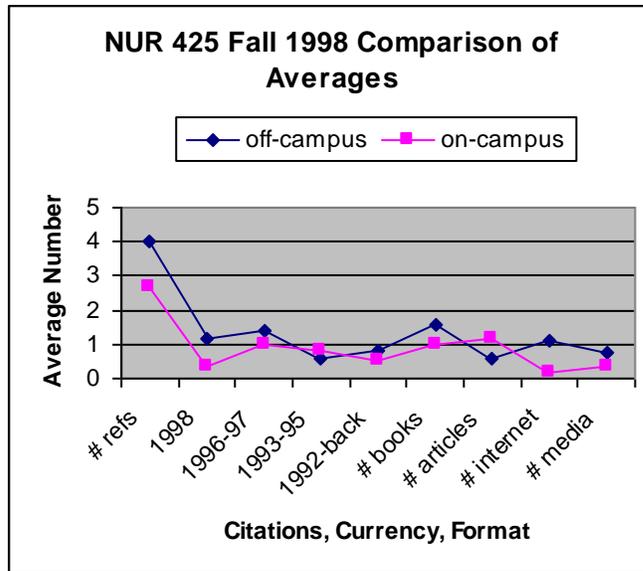
NUR425 Fall 1998 Off-Campus Students

Number of Papers Reviewed	Average Number of References	Currency Average 1998	Currency Average 1996-1997	Currency Average 1993-1995	Currency Average 1992 and earlier	Format Average Book	Format Average Journal Article	Format Average Internet	Format Average Media
12	4.0	1.16	1.42	0.58	0.83	1.56	0.58	1.08	0.75

NUR 425 Fall 1998 On-Campus Students

Number of Papers Reviewed	Average Number of References	Currency Average 1998	Currency Average 1996-1997	Currency Average 1993-1995	Currency Average 1992 and earlier	Format Average Book	Format Average Journal Article	Format Average Internet	Format Average Media
6	2.66	0.33	1.0	0.83	0.5	1.0	1.16	0.17	0.33

NUR 425 Fall 1998 Comparison of Averages

category	# refs	1998	1996-97	1993-95	1992-back	# books	# articles	# internet	# media
off-campus	4	1.16	1.42	0.58	0.83	1.56	0.58	1.08	0.75
on-campus	2.66	0.33	1	0.83	0.5	1	1.16	0.17	0.33

NUR 425 Fall 1998 Comparison of Averages

NUR 350 Fall 1999 Combined On-off-Campus Students

Number of Papers Reviewed	Average Number of References	Currency Average 1999	Currency Average 1998	Currency Average 1996-1997	Currency Average 1993-1995	Currency Average 1992 and earlier	Format Average Book	Format Average Journal Article	Format Average Internet	Format Average Media
19	7.37	2.21	1.68	1.84	0.74	0.74	2.11	4.63	0.58	0.0

NUR 350 Fall 1998 Combined On-off-Campus Students

Number of Papers Reviewed	Average Number of References	Currency Average 1998	Currency Average 1996-1997	Currency Average 1993-1995	Currency Average 1992 and earlier	Format Average Book	Format Average Journal Article	Format Average Internet	Format Average Media
41	7.54	1.9	2.68	1.37	1.15	2.15	4.59	0.66	0.1

NUR 350 Fall 1998 and Fall 1999 Comparison of Averages

category	# refs	1999	1998	1996-97	1993-95	1992-back	# books	# articles	# internet	# me
NUR350 1998	7.54	0	1.9	2.68	1.37	1.15	2.15	4.59	0.66	
NUR350 1999	7.37	2.21	1.68	1.84	0.74	0.74	2.11	4.63	0.58	

NUR 350 1998-1999 Comparison of Averages
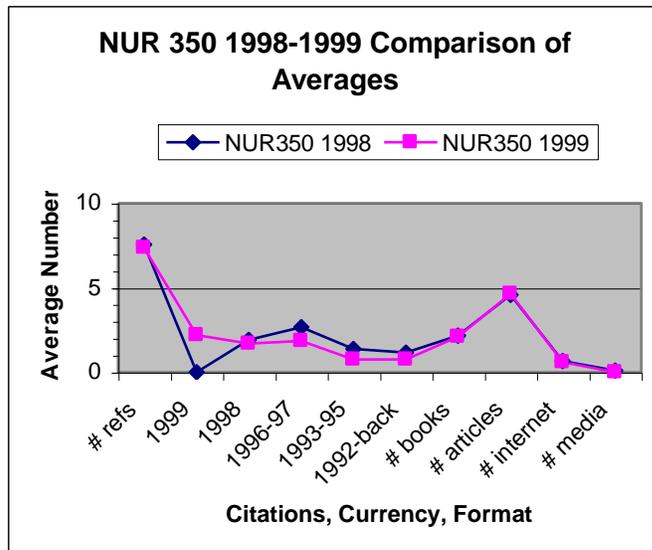
Results for Nursing Research Assignment Analysis

Four nursing courses were selected for review in the research study. Two courses (NUR 350 and NUR 425) were reviewed as direct participants in the citation analysis, and two courses (NUR 351 and NUR 437) were selected as part of the core Telenursing Program curriculum. Selected courses were offered to both on and off-campus students simultaneously, minimizing any potential differences resulting from faculty teaching style or changes in assignment requirements. Course syllabi from 1998/99 were used for the analysis.

Nursing 350 (Theoretical Foundations of Nursing) is a three-credit course covering the essentials of baccalaureate nursing theory and practice. The reviewed research assignment was a traditional term paper covering the presentation of a clinical nursing situation compared to and analyzed against recommendations and practices gathered from a theoretical literature review. The instructor suggested an average length of 10 pages for the paper, and provided fairly detailed guidelines for references. References were to provide a theoretical literature review, include professional journal articles, be sufficiently comprehensive for the nursing topic, and include a minimum number of 5 different sources. This paper was worth 25% of the course grade.

Nursing 351 (Care of Families and the Elderly) is a three-credit course covering trends and factors affecting family health, including health care of the elderly. The reviewed research assignment was similar to the assignment for Nursing 350, a traditional term paper requiring a theoretical literature review. This instructor also recommended a minimum of 5 references, primarily from professional nursing journals, and expected the paper to be approximately 10 pages in length. This paper was worth 25% of the total course grade.
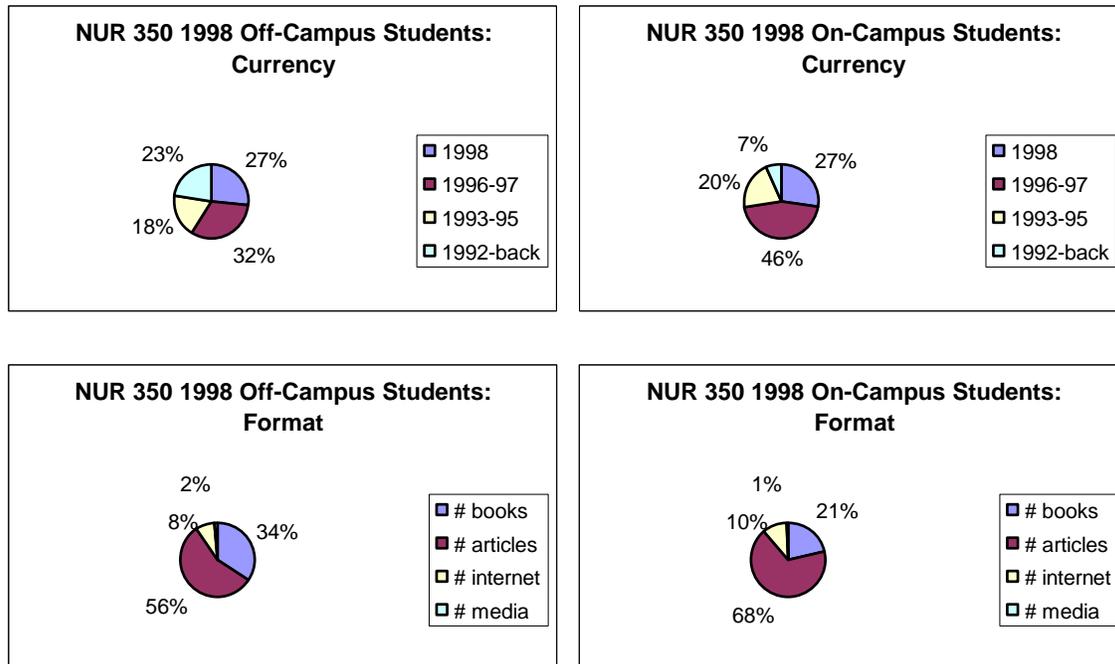
Nursing 425 (Community Health Nursing) is a four-credit course for students in their academic senior year, focused on health care delivery systems and community resources and nursing practices for community wellness. This course includes a clinical nursing component. The reviewed research assignments were a community health assessment paper and a nursing teaching activity presentation. The instructor provided

few specific guidelines for the required research materials but very detailed guidelines for the assignment objectives and components. Both assignments required a references list and/or bibliography. Each assignment was worth 15% of the course grade, totaling 30% together.

Nursing 437 (Professional Issues) is a three-credit course also for students in their academic senior year, concentrating on the educational, legal, ethical, political and social issues affecting nursing practice. The reviewed research assignment was a seminar presentation, with research, theory, seminar objectives, outlines of policy and legal issues, and seminar discussion questions as required components. The seminar presentation and class discussion were to be lengthy, generally the entire class session. The instructor provided specific guidelines for the research materials; a minimum of 5 current references and professional journal articles were required. The seminar outline and presentation assignment was worth 35% of the course grade.

Discussion and Recommendations

Comparative analysis of the citation study results shows some difference between the on and off-campus student groups in their use of the published literature for their course assignments, but not a statistically significant difference. The fall 1998 NUR 350 on-campus students on average cited more references per paper (8.6) than did off-campus students (6.9), and cited more current resources as well. The off-campus students cited an average of 3.88 journal articles, while the on-campus students cited an average of 5.8 journal articles.

NUR 350 1998 Off-Campus Students: Currency

23%   27%   18%   32%

1998 / 1996-97 / 1993-95 / 1992-back

NUR 350 1998 On-Campus Students: Currency

7%   27%   20%   46%

1998 / 1996-97 / 1993-95 / 1992-back

NUR 350 1998 Off-Campus Students: Format

2%   8%   34%   56%

books / # articles / # internet / # media

NUR 350 1998 On-Campus Students: Format

1%   21%   10%   68%

books / # articles / # internet / # media

These results suggest differences in research strategies and research decisions between the two groups of students that may serve as indicators for library service and information literacy instructional needs. Follow-up interviews with students may help librarians determine more precisely how students are making their research decisions. Morse & Clintworth (2000) published a research study focused on the effect of format on

access to information and student use of biomedical journals. Their results showed that students selected the electronic versions over the print versions 10 times more often. Perhaps differences between on and off-campus student access to fast Internet connections and laser printers for downloading and printing full-text articles contributed to the difference in average number of citations.

The fall 1998 NUR 425 on-campus students on average cited fewer references per paper (2.66) than did off-campus students (4.0), and cited fewer very current resources as well. Off-campus students in this class used more web resources than did on-campus students, with an average of 1.08 web citations compared to an average of 0.17 for the on-campus students. These two result sets were opposite patterns from the on-off-campus averages for NUR 350. The NUR 425 off-campus students cited an average of 0.58 journal articles, while the on-campus students cited an average of 1.16 journal articles. This was a similar pattern to NUR 350.
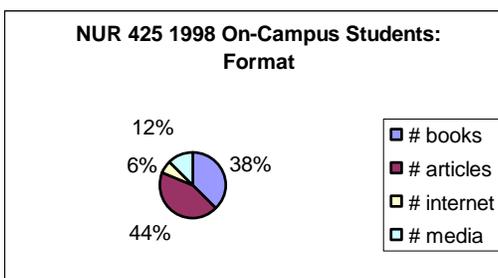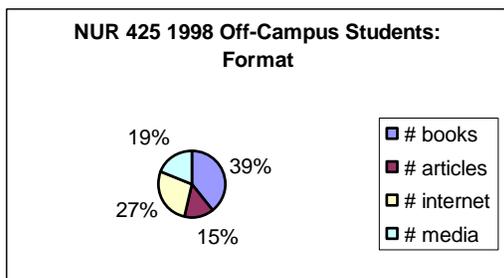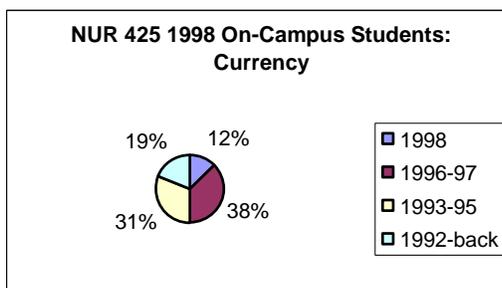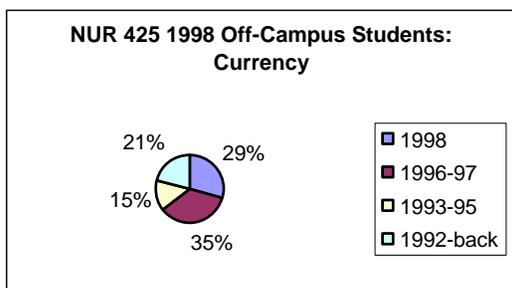
The fall 1999 NUR 350 student data was collected without indication of on or off-campus status. This data was then compared to a combined on-off campus student data set from NUR 350 fall 1998. There was very little difference in the average number of citations per paper between the two years, 7.54 in 1998 compared to 7.37 in 1999. There was a similarly small difference in the average currency of the citations, with an average of 1.9 citations from the current year cited by students in the fall 1998 class compared to an average of 2.21 citations from the current year cited by students in the fall 1999 class.

One of the study's early research questions was concerned with whether students without access to the university's physical library use more web resources. Neither groups of students used many web resources, although access to web search engines and web resource guides was provided by Plattsburgh State University. On-campus and off-campus students cited web resources in similar average numbers for the NUR 350 course (0.87 and 0.54). On-campus NUR 425 students on average cited fewer web resources (0.17) than did their off-campus classmates (1.08), but the differences were not found to be statistically significant, given the small sample sizes. No restrictions on web resource

use were noted in the written course assignments guidelines, although instructors could have provided oral guidelines for web use. One possible reason for the minimal use of web resources is a student concern for reliability, so critical in the medical, nursing and allied health professions.

The second component of the research study was an analysis of course research requirements as an indicator of information literacy importance in the curriculum. Research-based assignments counted as significant portions of each course reviewed in the study. The range of 25-35% certainly points to a strong emphasis on research, analytical and writing skills. This informal measure indicates that the nursing curriculum places a high value on information literacy skills. In keeping with the emphasis placed on research by the American Nurses Association, Plattsburgh nursing faculty require incorporation of research into nursing coursework. This fosters a sense of familiarity with the literature of the nursing profession, and an appreciation for the new information to be gained from consulting published literature.

Instructors sometimes gave specific minimum guidelines for literature resource materials (five references, use of professional journal articles), but also documented expectations of individual student judgment with statements such as "sufficiently comprehensive…", guiding students but still requiring critical thinking and professional decision making. Instructors used a variety of assignments, including but not limited to the traditional term paper. This discipline-specific use of the literature could more effectively lead students into regular incorporation of information literacy into nursing practice. Radjenovic & Chally, (1998) reporting on their work with undergraduate nursing students on research utilization wrote "High-quality poster presentations suitable for display at a professional meeting resulted from student efforts…" They also noted that research utilization requires specific evaluation skills and is best if "…the research and clinical expertise of faculty members and nursing staff is combined with the developing skills of the undergraduate student." An investigation of the effectiveness of different types of research assignments in preparing nursing students to use published research in their practice would be of great benefit to nursing educators. Few nurses will write formal papers after graduation, although the term paper remains an excellent strategy for developing knowledge in a subject. Many more nurses will prepare teaching activities for patients and their families, prepare and conduct in-service seminars for their colleagues, and assess community health needs and available services. Faculty inclusion of independent literature research in a variety of course assignments contributes to student recognition of the role information literacy skills can play in their future professional nursing practice.

Comparison of the citation study results to the research requirement review indicate that faculty written assignment requirements and assignment type (research paper or teaching activity or seminar presentation) have much more impact on student use of the literature than do any potential differences in access to resources on or off-campus. The average number of citations for the NUR 350 research paper was 7.54 in 1998 and 7.37 in 1999. The assignment required a minimum of 5 different sources and most students exceeded this requirement. The average number of citations for the NUR 425 teaching activity was 4.0 for off-campus students and 2.66 for on-campus students, many fewer than the average numbers cited for the NUR 350 research paper.

The NUR 350 instructor recommended use of professional journal articles, and students cited more than twice as many journals than books in both 1998 and 1999. There were no specific written guidelines for resource format in the NUR 425 assignment and the citation analysis results showed that students used a more evenly spread selection of books, journals, internet and media resources than did students in NUR 350. Instructor guidelines clearly bear great weight in student selection and use of resources.

In addition to selecting, organizing and providing access to information resources, in addition to preparing and delivering research instruction and information literacy sessions, this small study indicates that librarians at Plattsburgh State University need to continue to work with departmental faculty as they develop research assignments and research resource guidelines. Closing the loop between providing services and assessing outcomes with small studies such as this one can help point us in the right direction.

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Appendix A

Informed Consent
Research Study Participation

Research Project: Incorporation of Published Literature into Student Research: Impact of Library Services for Distance Learners in the Plattsburgh State Telenursing RN-BSN Program.
Principal Investigator: Holly Heller-Ross, MLS, Plattsburgh State University

I understand that I am being asked to participate in a bibliography research study to document student use of published literature (books, journal articles, WWW pages, pamphlets) in their academic coursework.

I understand that I am not required to participate in the research study.

I understand that the purpose of this research study is to improve understanding of student research and use of published literature to complete academic assignments in the Telenursing program. A further purpose is to analyze the research results and improve library resources and library instructional activities for Telenursing students. A final purpose is to investigate any differences between resources cited by on and off-campus students.

I understand that my instructor will not be informed of my decision about participating, and that my decision will not affect my course grade in any way.

I understand that a student research assistant for this research study will photocopy the references cited or bibliography section of my academic paper/project. The references cited will then be compiled into a statistical database for analysis and possible publication, and my references will be identified only as an on or off-campus student, and not by name, sex or age.

YES _____   _____
I agree to participate in the bibliography research study (signature)   date

NO _____   _____
I do NOT agree to participate in the bibliography research study (signature)   date