
Cost analysis and student survey results of library support for distance education

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This paper describes the costs associated with providing library support for a series of distance-education courses at The Ohio State University (OSU). These courses are designed as a pilot program offered by the OSU Office of Geriatrics and Gerontology. Costs to the library are analyzed for document delivery, electronic reserves, reference services, and librarian activities. Also included are the results of a student evaluation survey. The students are full-time working professionals who cannot attend regularly scheduled classes on campus. Conclusions extrapolate costs for each course, student, and service.

INTRODUCTION

In January 2001, the Ohio State University (OSU) Prior Health Sciences Library (PHSL) began planning to participate in a pilot program of a series of distance-education courses offered by the OSU Office of Geriatrics and Gerontology (OGG). The courses were titled "The Series in Applied Gerontology Education (S.A.G.E.)" and were offered March through November 2001. These classes were designed as a special nine-credit-hour program intended to provide continuing education and training in the field of aging. The students were full-time working professionals who could not attend regularly scheduled classes on campus.

OSU uses WebCT, a course authoring software, to organize class materials on the Web. Students have access twenty-four hours a day, seven days a week, to readings, calendars, syllabi, discussion groups or chat, email, and other Internet resources. Creating a "library" presence in WebCT, so library resources would be readily available when students are logged in to their Web courses, is the service goal of this project.

The research goal of the study is an attempt to assign a per-course cost or a per-student cost for library support of the S.A.G.E. program. Abels, Kantor, and Saracevic state,

Libraries are moving from being print-centered to electronic-centered; from collecting to accessing; and from serving primarily in-house users to serving both in-house and remote users. Information managers face many difficult decisions regarding which electronic sources to make available, which services to offer that support the use of electronic sources, how to differentiate among user groups to be served, and how to charge for access to these sources and services. [1]

As stated above, this study on library costs for dis-

tance education should support fiscal decisions for costing virtual library access for all students, researchers, faculty members, clinicians, or staff members, no matter where they are located.

PROGRAM OVERVIEW

The S.A.G.E. series was developed collaboratively by the OGG, The School of Public Health, and the Office of Continuing Education. The classes offered were "Introduction to Applied Gerontology" (Health Services Management & Policy 693), "Case Studies in Applied Gerontology—The Team Approach" (Allied Medicine 791), and "Issues and Trends in Aging" (Health Services Management & Policy 693). A program manager in the OGG coordinated the efforts of three teaching faculty, a librarian, and the WebCT software support manager. The S.A.G.E. program manager also served as the "problem" contact person for issues concerning library services or the WebCT program.

OSU is located in the central part of the State of Ohio. The OGG received approximately 100 applications and accepted twenty students into the program. Of these students, fifteen lived in the central Ohio area; two near Cincinnati, Ohio; two in Cleveland, Ohio; and one in central Pennsylvania. Tuition was paid directly to the OGG. Because these students were not part of a regular registration process, special arrangements were made for an OSU email account to access the campus network, and a library patron record was created for using library services.

A daylong orientation session was held the weekend before the first day of class. All participants, including the librarian, attended this session, except the student from Pennsylvania who received orientation materials and additional instructions via email. The orientation program was designed to meet the following objec-

tives: (1) introduce the students to each other to facilitate group work, (2) introduce the students to their professors (the only time they would meet), (3) review computer skills needed to use WebCT, and (4) provide library services instruction.

The librarian's role was focused on the following areas: (1) to inform instructors of virtual library resources and services, (2) to create a library services and resources page on the Web to be linked from the WebCT course, and (3) to instruct the students in using online library services and evaluating Websites found through Internet searching. Along with these goals, the librarian also had responsibility for planning, communicating, implementing, and tracking identified resources within the library for cost analysis.

According to Caspers, "When distance education services are initiated, the full range of library services available for on campus students in the same discipline must be identified and used as the baseline for planning" [2]. To that end, reference (using a Web form), document delivery, and course reserves were identified as the core services to be provided. It was decided that interlibrary loan of materials would not be provided as a core service. Instead, students were advised that if they needed to consult a basic reference text they should go to the closest library.

Implementing reference services required a brief demonstration at the regular monthly librarians meeting to discuss the S.A.G.E. program, demonstrate WebCT, and inform the librarians that the students had been instructed to ask questions or seek help via the Ask A Health Sciences Librarian Web form.* There was no way to predict if activity for this library service would increase. Email questions were automatically filed in a completed questions folder. Tracking the number of requests required a review of the completed questions file.

Document delivery to the computer desktop was the second core service included as critical support for distance education. A document delivery request Web page was created. Participating students were instructed to search the library catalog and ascertain whether the required material was available at OSU or would be considered an interlibrary loan. In consultation with the head of circulation and the head of document delivery, it was decided on-campus requests would be processed by circulation services evening and weekend staff. Requests necessitating an interlibrary loan would be processed by document delivery staff. Students then received an email message containing the Web address for the requested article.

The third service to be added was electronic reserves. At the PHSL, faculty may submit course readings for scanning into the reserve system for Web access via the OSU library network. Instructions for use of this system were included in the orientation session.

Time spent by the librarian developing library services was also tracked. The librarian was solely re-

sponsible for developing library support for this program. These activities included participating in meetings with faculty and students, planning and participating in the orientation session, developing the library services Web page, coordinating library staff activities, and finally setting up and removing program materials from the WebCT Website. Staff training was minimal because core service routines were well established at the PHSL. Results of these core services were analyzed to establish costs associated with this project.

A S.A.G.E. evaluation was sent to all participating students at the end of the series of courses. It included questions on instruction, the WebCT experience, and library services. The library was allowed five questions and one space for overall comments. The responses are summarized for this study. Costs are important in establishing fees, but identifying what is most valued by users should also be factored into any decision. Therefore, the student responses are very important for future decisions on direction and participation.

LITERATURE SURVEY

Accurate costs of library services are essential for decision making in resource allocation for library services. In preparation for costing library distance-education services, the author reviewed methods on cost analysis for libraries. The Library Costing Model (LCM), as described by Hayes, was developed to assist libraries in handling some of the problems involved in assessing costs. It is also suggested that this model needs to be brought up-to-date to accommodate electronic resources [3]. Cost-benefit analysis was also reviewed as a possible methodology. According to Svenningsen, cost-benefit analysis attempts to decide whether the result justifies the expense [4]. The author is not attempting to weight the results of the services but only to ascertain the unit of cost for each service. Wynne, Brophy, and Butters report on an extensive costing model of reference services for a project at the University of Central Lancashire that included costs associated with hardware and software, telecommunications, specialist services, postage, fax transmission, file transfer, and staff time [5]. Because operations and services used in the S.A.G.E. program were already established at the PHSL, most of the costs associated with the Lancashire project were not applicable to this study. Rather, functional cost analysis, as described by Abels, Kantor, and Saracevic, was seen as the method to adopt for this research. To determine the average unit cost of library and information services using functional cost analysis, all functions of a service must be determined. The total cost is then divided by the number of times the services were used during a given period of time [6].

Much published literature exists on distance or virtual course offerings in library, education, and social behavior journals. Distance education as a concept has been used for approximately 100 years. As Rockenbach and Almagno state, "Delivering instructional ma-

*The Ask a Health Sciences Librarian Question Form may be viewed at <http://bones.med.ohio-state.edu/ref/refdeskform.html>.

Table 1
Library support for distance education: activity chart totals for March 31 to December 7, 2001

| Activities | Time spent | Wage per hour | Number of requests | Total cost per activity |
|---|-------------|---------------|--------------------|-------------------------|
| Librarian activities | | | | |
| Initial planning meeting | 2 hours | \$20.24 | 1 | \$40.48 |
| Development of services and identification of topical resources | 23 hours | \$20.24 | 1 | \$465.52 |
| Development of library services Web page | 2 hours | \$20.24 | 1 | \$40.48 |
| Development of orientation session materials and lecture | 6 hours | \$20.24 | 1 | \$121.44 |
| Supplemental planning meeting | 2 hours | \$20.24 | 1 | \$40.48 |
| Student orientation day | 8 hours | \$20.24 | 1 | \$161.92 |
| Library staff orientation | 3 hours | \$20.24 | 1 | \$60.72 |
| Patron record set-up | 1 hour | \$20.24 | 1 | \$20.24 |
| Staff training materials and statistics sheets | 5 hours | \$20.24 | 1 | \$101.20 |
| Staff training | 3 hours | \$20.24 | 1 | \$60.72 |
| Problem solving | 1 hour | \$20.24 | 1 | \$20.24 |
| Web page and patron record maintenance | 2 hours | \$20.24 | 1 | \$40.48 |
| Student survey development | 5 hours | \$20.24 | 1 | \$101.20 |
| Course completion activities | 3 hours | \$20.24 | 1 | \$60.72 |
| Total | 66 hours | | | \$1,335.84 |
| Reference activities | | | | |
| Email questions | 45 minutes | \$28.19 | 3 | \$21.14 |
| Total | 45 minutes | | | \$21.14 |
| Document delivery | | | | |
| Mailbox programming | 2 hours | \$14.13 | 2 | \$28.26 |
| Searching and ordering (ILL) | 20 minutes | \$14.13 | 2 | \$4.80 |
| Searching and pulling (on campus) | 6.8 hours | \$14.13 | 35 | \$96.06 |
| Scanning article (on campus) | 5.8 hours | \$14.13 | 266 pages | \$82.65 |
| Email processing (ILL) | 10 minutes | \$14.13 | 2 | \$2.40 |
| Email processing (on campus) | 2.9 hours | \$14.13 | 35 | \$41.46 |
| Problem solving (on campus) | 46 minutes | \$14.13 | 4 | \$11.04 |
| Statistics (ILL) | 5 minutes | \$14.13 | 1 | \$1.18 |
| Statistics (on campus) | 1 hour | \$14.13 | 1 | \$14.13 |
| Total | 18.3 hours | | | \$281.98 |
| Electronic reserves | | | | |
| Receive and process requests | 5.3 hours | \$12.06 | 30 requests | \$64.30 |
| Build reserves record | 30 minutes | \$12.06 | 3 records | \$6.03 |
| Scan article pages | 9.9 hours | \$12.06 | 296 pages | \$120.14 |
| Link articles to reserves record | 2.5 hours | \$12.06 | 30 links | \$30.15 |
| Problem solving | 47 minutes | \$12.06 | 3 problems | \$9.43 |
| Maintenance and removal of course materials | 36 minutes | \$12.06 | 3 records | \$7.23 |
| Total | 19.6 hours | | | \$237.28 |
| Grand total | 104.7 hours | | | \$1,876.24 |

terials over a distance began as early as the turn of the century with the U.S. postal system. This was followed by courses deliverable through radio around 1910, television (1960s), video (1980s) and CD-ROM (1990s)" [7]. The Web is the next viable educational delivery option to be investigated and used. Before the advent of the Web, all students, whether distant or not, had to go to the library for research and information. Now, it can be said that users no longer have to go to the library for their resources. The Web has and is revolutionizing the way users access information.

A number of papers in the library literature describe different information support initiatives for distant students or users. The problem in organizing this literature is that descriptive terminology associated with the various initiatives is not used consistently. Is this new role for libraries defined as remote, outreach, distance, extension, nontraditional, virtual, distributed, or off-campus services [8-14]? Of note is a resource on the Web that provides "an information source for librarians interested in the many issues of library support for distance learners" [15].

METHODOLOGY

Cost analysis for the purposes of this study is defined as the method used to determine dollar amounts for a defined library service. To establish the cost of each unit of service, a list of the component parts of the service along with the processing or development time, hourly wage of responsible staff, and volume of service needs to be tracked. The detailed information for each identified activity is listed in Table 1. The costing of each activity can be represented by abstract mathematical formulas. The cost of each activity can be represented by C_A or cost of activity A, which in this case equals the staff wage. The volume can be represented by the assigned activity letter in parenthesis or (A). Therefore, the following notation $C_A = C_A(A)$ is derived to represent the cost analysis for each activity. If each activity is assigned a letter, the following notation arrives at a total average cost.

$$C_{ABC} = C_A(A) + C_B(B) + C_C(C)$$

Total cost can then be divided by the total number of

Table 2
Library support for distance education: final costs

| | Total cost | Cost per student | Cost per course | Cost per activity |
|----------------------|------------|------------------|-----------------|-------------------|
| Librarian activities | \$1,335.84 | \$66.79 | \$445.28 | \$95.42 |
| Reference services | \$21.14 | \$1.06 | \$7.05 | \$21.14 |
| Document delivery | \$281.98 | \$14.10 | \$93.99 | \$31.33 |
| Electronic reserves | \$237.28 | \$11.86 | \$79.09 | \$39.55 |
| Total costs | \$1,876.24 | \$93.81 | \$625.41 | \$187.44 |

students for an average per-student cost. Also, because there were three courses, an average per-course cost can be established by dividing by three.

The above calculations represent variable costs of the services. To most accurately describe the total cost of services, fixed costs per activity should also be included as part of the overall analysis. This step can be represented by the following:

$$C_A = C_A^{\text{fixed}} + C_A(A)$$

Due to the fact that equipment, software programs, building services, network, overhead charges, and so on were already in place prior to the pilot program implementation, fixed costs are not factored into the final analysis. The results of this study only report the variable costs associated with identified library services. The following discussion outlines the results for each identified core activity for all three courses over nine months. Cost of a single item is also provided. Final cost results are rounded up to the nearest hundred. These results are summarized in Table 2.

LIBRARY SERVICES RESULTS

Librarian activities

Librarian activities include coordinating library services for the S.A.G.E. program within and outside the PHSL. The activities are analyzed as costs per hour, and each activity has a volume of one. The total cost for librarian support to develop all library services is \$1,335.84 or \$66.79 per student or \$445.28 per course.

Reference services

Reference service is an activity that is shared by eight librarians at different billable rates with an accepted "standard or average" time of fifteen minutes per question. In-depth questions are referred to another reference service. Three questions were received from students participating in the S.A.G.E. program. Based on an average hourly rate of eight librarians, the total cost for reference services equaled \$21.14 or \$1.06 per student or \$7.05 per course.

Document delivery

As described in the project overview, this service was divided into interlibrary loan (ILL) requests and on-campus requests. ILL requests require more time to process because of additional steps to identify a library that owns the text and to order the article. An

average salary was used for the billable rate as multiple library staff were assigned to these activities. There were two requests requiring ILL processing and thirty-five requests for on-campus materials. No article costs were associated with any document requests, because staff borrowed from reciprocal partner libraries. Also, no copyright costs were incurred to report, because staff had not borrowed more than five articles from either ILL journal title. The total cost for document delivery was \$281.98 or \$14.10 per student or \$93.99 per course.

Electronic reserves

Articles for electronic reserves were delivered by each instructor prior to the first day of class to allow library staff enough time to scan in the material and build the actual course record in the reserve system. Multiple staff were responsible for these activities, so the billable rate was an average of their combined hourly rates. The total cost for electronic reserves totaled \$237.28 or \$11.86 per student or \$79.09 per course.

Summary

Final calculations resulted in total variable costs for all services of \$1,876.24. Based on twenty participants, this would equal a \$93.81 average library fee for each enrolled student and an average total of \$625.41 for each of the three courses. A final calculation based on a total of thirty different activities yielded an average cost of \$187.44 for library support of this pilot project.

STUDENT EVALUATION RESULTS

As part of the pilot program, the course faculty and librarian compiled an evaluation of the courses and services provided. The survey/evaluation of the program was emailed to the twenty students during the final week of the program. It contained six questions concerning library services that are summarized below.

- Question 1: If you had problems using library services, please describe them in one or two sentences (9 students answered).
 - Five students reported that due to varying computer speeds and set-ups, some students experienced difficulty in downloading articles. It was unclear whether this issue pertained to electronic reserves or document delivery.
 - Three students reported that they were daunted or intimidated by the range and scope of library services or did not understand how to use the provided services.
 - One student noted an ability to gain access to two provided resources: the American Psychological Association Style Guide and Net.Tutor (interactive lessons on using the Internet effectively).
- Question 2: Please list your top three library services (10 students answered, some partial answers, described in Table 3).
- Question 3: Did the Library "button" within the

Table 3
Most valued library services student evaluation results

| Resources | Number of students answering* | | |
|---|-------------------------------|----------------|--------------|
| | First choice | Sec-ond choice | Third choice |
| Electronic reserves | 6 | 1 | 1 |
| S.A.G.E. Web-based resources | 2 | 1 | |
| Ask a Health Sciences Librarian | 1 | | |
| Document delivery | 1 | 1 | |
| Health Sciences Library Web page | | 1 | 1 |
| Research databases | | 2 | |
| Arizona State University Research in Gerontology page | | | 2 |
| OSCAR (library catalog) | | | 1 |

* N = 10, some students gave partial answers.

WebCT course software make a difference in finding information you needed? (Figure 1).

4. Question 4: Did you think the initial hands-on orientation session helped you know about and use library services during the classes? (Figure 2)

5. Question 5: Indicate library services you used during the S.A.G.E. series, check all that apply (ASU represents a Website on geriatrics and gerontology research by Arizona State University) (Figure 3).

6. Question 6: Please list overall comments about library services (10 students responded).

■ Five students responded with comments ranging from "please continue this service" through "excellent/invaluable" and "amazingly helpful."

■ Four students responded that the services made research easier because they did not have to go to the library.

■ One student responded that librarians and staff were very helpful, especially with searching. It was not clear which service was used.

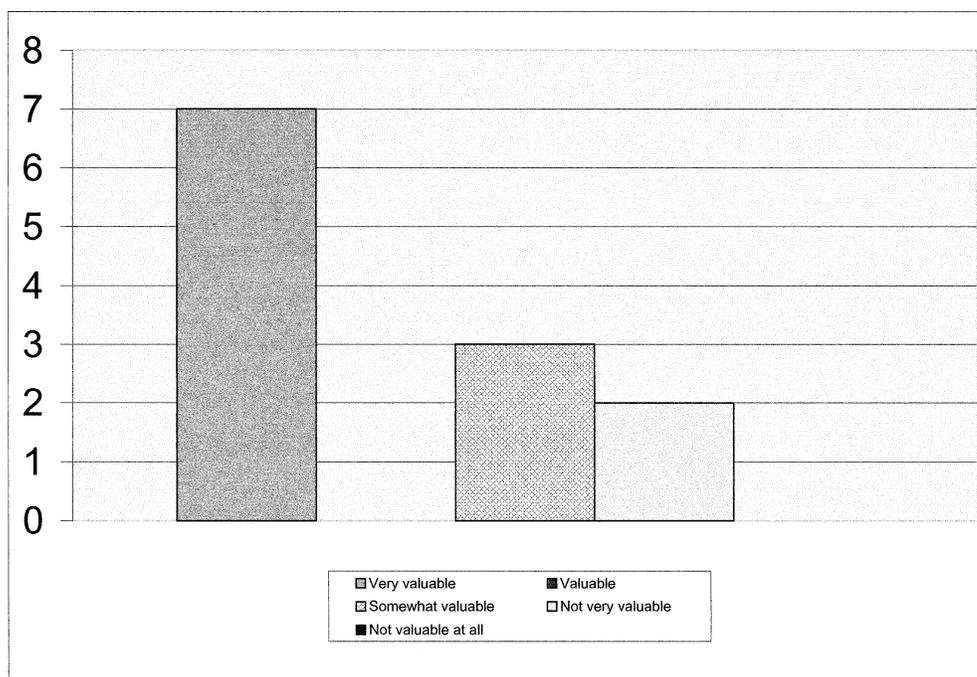
The responses represented 45% to 50% of the students enrolled in the S.A.G.E. courses. Some of the responses were incomplete but in general indicated that library services were well received and appreciated. All students reported various access problems. The most-valued library service was electronic reserves. More than half the students responded that library services in the WebCT course did make a difference. Half the students did find the hands-on orientation session helpful. Question five indicated that all of the resources identified as core services for this project were used by at least one student.

CONCLUSIONS

As an initial pilot program in library support for distance education, the S.A.G.E. project proved to be of value for the participants. The students received an organized approach to library services that enhanced their research and information retrieval skills. The teaching faculty became more aware of library technology and services. The librarian learned about costs associated with library support for remote users.

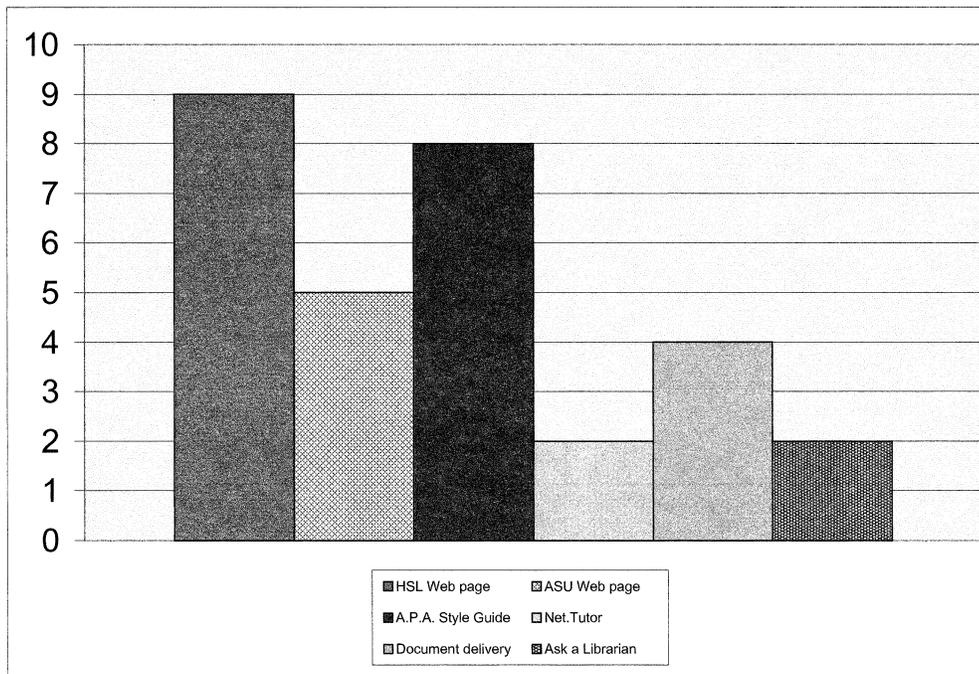
The daylong orientation program, although interesting, proved, in this author's opinion, to be the weakest

Figure 1
Value of library WebCT page responses*



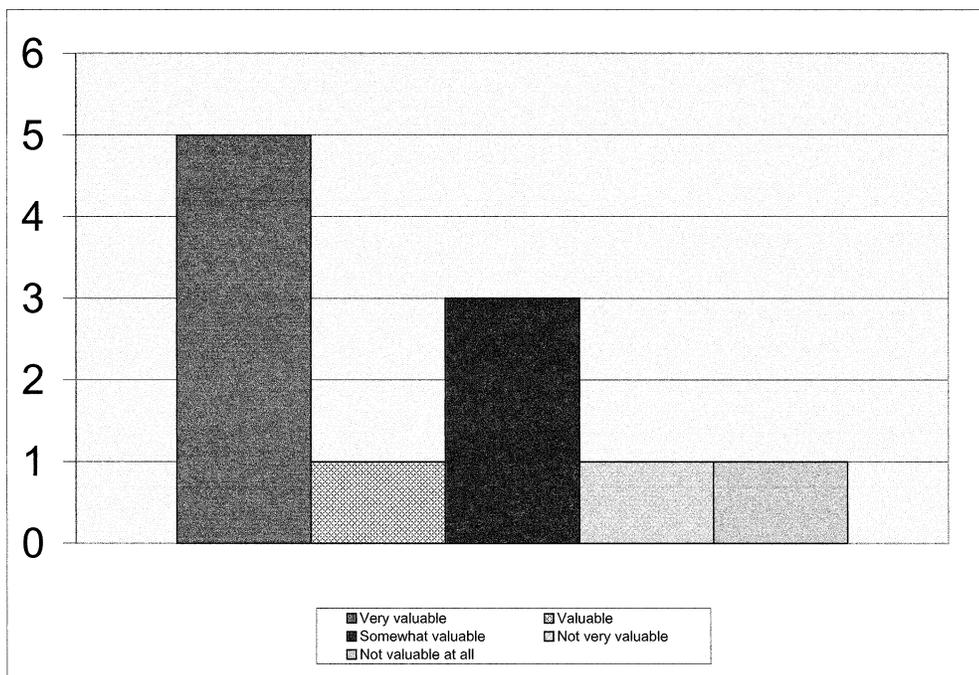
* N = 12.

Figure 2
Value of orientation session responses*



* N = 11.

Figure 3
Responses for value of library services used*



* Response numbers vary for each service.

activity of the project. The students were immersed in so much information and training that retention of skills and knowledge was difficult. Some students reported this problem in the evaluation. For future programs, it is recommended that online orientation materials and instruction be provided. Users can then take the necessary time to learn about library services and, if questions arise, may email the library for assistance.

According to Buehler et al., "The ability to 'push' information out to online library users is essential, as is updating software systems that effectively serve the patron at a distance" [16]. This statement sums up the two main issues that affect library support for distance education: services and technology. As curricula expand and grow for remote users, so will the demands on library services. Libraries will have two primary user groups, local and remote. The demands for both groups are different. Besides constant equipment upgrades, use of technology may also divide into two distinct approaches. Library staff will have increasing continuing-education needs to support and assist different user groups.

This was a small pilot project that could be managed using current staffing and equipment. If the project had been for fifty courses and 2,000 students, the results would not have been as successful. Using document delivery services as an example, one can extrapolate that if twenty students requested thirty-five documents, 2,000 students might request 3,500 documents. The unique course requirements and the varying knowledge levels of each student cannot be predicted. Any significant increase in activity could not be managed using current staffing and equipment resources.

The trend toward virtual library information access will no doubt continue. Finding additional resources or the reallocation of current funds and staff must be planned. Librarians must decide how to manage the demands necessary to support local as well as remote users. Deans, directors, and administrators need to be aware of the costs to libraries as schools and colleges add programs or implement new technologies for students. Fiscal support for libraries should match fiscal support for curricula and technologies.

REFERENCES

1. ABELS EG, KANTOR PB, SARACEVIC T. Studying the cost and value of library and information services: applying functional cost analysis to the library in transition. *J Am Soc Inf Sci* 1996 Mar;47(3):217-27.
2. CASPERS JS. Outreach to distance learners: when the distance education instructor sends students to the library, where do they go? *Ref Libr* 1999;67/68:299-311.
3. HAYES RM. Cost of electronic reference resources and LCM: the library costing model. *J Am Soc Inf Sci* 1996 Mar; 47(3):228-34.
4. SVENNINGSEN K. An evaluation model for electronic resources utilizing cost analysis. *The Bottom Line: Managing Library Resources* 1998;11(1):18-23.
5. WYNN PM, BROPHY P, BUTTERS G. An examination of the costs and benefits of an experimental extension of academic library services to remote users. *New Rev Acad Libr* 1997;3: 25-37.
6. ABELS, op. cit., 220.
7. ROCKENBACH B, ALMAGNO S. Distance education: some of the unasked and unanswered questions. *Int Inf Libr Rev* 2000 Sep/Dec;32(3/4):453-62.
8. CASPERS, op. cit., 299.
9. LOGUE S, PREECE B. Library services to support remote students. *Resource Sharing & Information Networks* 1999; 14(1):41-50.
10. COOPER JL. A model for library support of distance education in the USA. *Interlend Doc Supply* 2000;28(3):123-31.
11. FURNISS KA, KARIEL D. Library catalogs, the World Wide Web, and serving the off-campus user: boon or bust? In: *Eighth Off-Campus Library Services Conference Proceedings*. Mount Pleasant, MI: Central Michigan University, 1998: 155-8.
12. CASADO M. Delivering library services to remote students. *Computer in Libraries* 2001 Apr;21(4):32-8.
13. FRISBY AJ, JONES SS. The initiation of distance learning at Thomas Jefferson University: the library as integral partner. *Med Ref Serv Q* 2000 Fall;19(3):19-37.
14. SEDAM RE, MARSHALL J. Course-specific Web pages evolution of an extended campus library instruction service. In: *Eighth Off-Campus Library Services Conference Proceedings*. Mount Pleasant, MI: Central Michigan University, 1998: 251-8.
15. SLOAN B. Library support for distance learning. [Web document]. [cited 1 Mar 2001]. <<http://alexia.lis.uiuc.edu/~b-sloan/libdist.htm>>.
16. BUEHLER M, DOPP E, HUGHES KA, THOMPSON J. It takes a library to support distance learners. *Inter Ref Serv Q* 2001; 5(3):5-24.

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