Innovation and education: unlimited potential for the teaching library

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The information age demands that health sciences librarians take active roles in the educational process. Librarians have traditionally taught users how to access information. Now, with the proliferation of information, librarians must accept new roles and teach the user efficient techniques for evaluating and processing information as well. Innovative roles for librarians at Texas Tech University Health Sciences Center include teaching users to use technology for information management, to appraise literature critically for quality, and to develop skills for lifelong learning. This paper reviews the history of educational activities in health sciences libraries and describes the teaching programs at Texas Tech.

Two studies issued by the Association of American Medical Colleges in this decade have contributed to the growth and development of the teaching role of health sciences libraries. "Academic Health Sciences Center: Roles for the Library in Information Management," commonly known as the IAIMS report or the Matheson report, painted an inspiring portrait of the teaching library of the future. Innovative librarians would be involved substantially in the teaching process, teaching information gathering and information processing skills [1]. This new role would represent, as Matheson expressed it, a quantum leap from the traditional bibliographic training techniques [2]. The report "Physicians for the Twenty-first Century," developed by the Project Panel on the General Professional Education of the Physician and College Preparation for Medicine and known as the GPEP report [3], called for development of skills in independent learning, problem solving, and information management in medical students. Both studies implicitly support the creation of teaching libraries.

The teaching library defined

The concept of the teaching library has been defined by Guskin et al:

> A teaching library is a library that is more than a support unit for academic programs and research. It is a library that is actively and directly involved in advancing all aspects of the mission and instructions of higher education: teaching, research and community service [4].

The teaching library provides user instruction in identifying and using information resources, and encourages lifelong learning and continuing education [5].

Background of teaching activities in health sciences libraries

The teaching role of the librarian has been discussed [6] and debated [7–10], but the fact remains that more and more health sciences librarians are teaching in formal settings. A study done by Titley in 1969 found that only one of fifty-nine medical libraries offered a formal instructional program [11]. Martin found that 18% of the one hundred medical libraries he studied in 1975 had formal programs [12]. By 1982 the percentage had grown to 19.8, according to Renford's study [13]. Hospital librarians have also begun to present information management education [14].

Traditionally, health sciences library instructional programs have focused on bibliographic tools and library use [15]. With a few exceptions [16–18] they have emphasized training in how to use bibliographic tools over education about concepts and strategies for obtaining information [19]. Examination of the literature shows that formal educational offerings have begun to expand beyond traditional bibliographic instruction. Recent articles describe courses in microcomputer instruction [20–22] and end-user searching [23–29].

Library futurists call for the teaching trend to expand even further. Although literature searches have

revealed no previously published reports of health sciences librarians teaching courses on lifelong learning or literature evaluation, the possibilities have been discussed. Schwartz writes of expanded roles for librarians beyond the year 2000 A.D.:

> These professionals will teach active informed learning techniques that stress 'learning how to learn' in a qualitative sense, while providing the foundation for helping physicians to identify their own learning needs [30].

In "Reminiscing About the Future," Taylor challenges us to provide professional librarians who can educate our users to be ". . . critical consumers of research results and effective participants in the research process . . ." [31]. Carr discusses differences in the role of the librarian and the role of the library. He believes that the librarian bridges the gap between the learner and the information collection.

> What we are talking about is going beyond the giving of information—to evaluate and sort it, to help in its integration with existing information, to communicate about it and so to create better conditions for individual knowing. Such a difference means that the librarian moves from witness to participant . . . [32].

CONVERTING PLANS INTO ACTION

Although the Texas Tech University Health Sciences Center (TTUHSC) Library faculty has offered courses in information management to graduate students since 1975, the library faculty agreed during a long-range planning meeting in 1983 that the library should expand its educational offerings in preparation for IAIMS. An Educational Task Force was created, chaired by the assistant director for media services and composed of the assistant directors for information services and for technical services, the systems librarian, and a reference librarian. Guskin et al. have reviewed the process of planning and implementing an academic teaching library, which involves examining the environment, conducting needs assessments, and evaluating available resources [33]. These steps correspond to the steps taken by the library faculty at TTUHSC. The group's charge was to investigate the feasibility of expanding the library's teaching role (by examining the environment and conducting a needs assessment), identify teaching resources, and implement a pilot project, if appropriate.

Determining feasibility

A supplemental session was added to the annual long range planning meeting. Four hours were devoted to examining the environment and potential changes in the micro- and macro-environment that might affect TTUHSC, the library, and the profession in general.

The committee conducted an informal needs assessment by inviting deans, vice-presidents, faculty members, and students to discuss the institution's needs for information management education. The deans and vice-presidents identified what they perceived the needs to be, the plans for changes in the general curriculum, and the available opportunities for teaching in the elective program. This was perceived to be more feasible than introducing information management topics into an already overloaded curriculum. Faculty and students helped to set priorities needs and identified computer literacy as being the most pressing need.

Evaluating available resources

The task force considered the resources of skills, time, materials, and money. In identifying available human resources, the task force used creative, problem-solving techniques. One brainstorming session resulted in the generation of over eighty topics that librarians could either teach or coordinate. Three broad categories of topics emerged: skills for using technology to manage information, skills for evaluating information for quality, and skills for lifelong learning. The most limited resource appeared to be time. It was decided that librarians should take on teaching duties only on a volunteer basis, since some librarians would be unable to participate due to other priorities. Most of the materials needed for teaching were already available in the library collection. Although a formal budget was not prepared, it was determined that the only costs involved in a pilot project would be for promotional flyers, handouts (not to exceed ten pages), and overhead transparencies. The cost for the pilot project would not exceed $300. A formal course in the elective curriculum would involve larger expenses, but promotion would not be necessary, and many of the expenses, such as the purchase of computer software, would be buried within the current library budget.

The pilot project

The ultimate goal, however, was not creating a plan, but taking action on it. In the summer of 1984, twenty different short seminars on topics in microcomputer literacy and information management were presented to 206 participants, including faculty, staff, and students. Each session was evaluated by the participants on relevance, content, and teaching methods. While over 80% of the evaluations ranked the seminars as good or excellent, the task force determined that the variety of topics was too broad to provide for efficient instruction. Nonetheless, the pilot project was determined to be successful, and ten key seminars were identified to be repeated throughout the year.

Resulting actions

In the fall of 1984, the library began offering first-year medical students an elective course on computer

literacy based on the pilot. In 1985 an associate director for education was appointed to implement the recommendations of the task force and to coordinate the formal teaching activities of the library. The TTUHSC Library has continued to expand its teaching program. It now offers three elective courses for medical students. The courses, reflecting the topics identified by the Education Task Force, are: "Coping with the Biomedical Information Explosion: An Introduction to Computer Literacy," "Critical Appraisal of Biomedical Literature," and "Skills for Lifelong Learning." These courses are briefly described in the following sections.

EDUCATIONAL ACTIVITIES

Coping with the Biomedical Information Explosion: An Introduction to Computer Literacy and Information Management

The report issued by the Association of American Medical Colleges on the General Professional Education of the Physician (GPEP) recommended that:

> Medical schools should designate an academic unit for institutional leadership in the application of information sciences and computer technology to the general professional education of physicians and promote their effective use [34].

At TTUHSC the library has taken a steering role in this area.

Although the TTUHSC course was originally called "Introduction to Computer Literacy," the title of the course was promptly revised to reflect the philosophy that the computer is a tool for managing information. It focuses on how the student can use the computer to cope with the information explosion. This elective course consists of ten to thirteen sessions per semester, depending on the academic calendar. Each session is two hours long. The following topics are presented:

1. Introduction to computer hardware and software
2. Introduction to word processing using PFS Professional Write
3. Introduction to spreadsheet applications using Lotus 1-2-3
4. Concepts of online database searching
5. Comparisons of end-user searching systems
6. Reprint file management using PC File
7. Resources for lifelong learning
8. Patient and practice management software
9. Introduction to medical informatics (lectures on developments in artificial intelligence, robotics, etc.)

In the past, each of the eleven librarians at TTUHSC has taught parts of the course. The system librarian and media librarian have taught the introductory session on hardware and software; the reference librarians have taught database searching; technical services librarians have taught reprint file management and word processing; administrative faculty have taught spreadsheets. A team of three librarians has taught the session on resources for lifelong learning. Guest lecturers have been invited to team-teach the sessions on patient and practice management and on medical informatics.

When the course began in 1984, it was offered to a maximum of ten students, who shared five IBM PC Juniors. The course has now been offered four times to a total of thirty-seven students. In 1987 the administration of TTUHSC demonstrated its support of the teaching library by funding eleven IBM PS/2 Model 50 personal computers for the learning laboratory in the library. These computers will ultimately be linked with a local area network and controlled with an IBM PS/2 Model 60 personal computer.

Students are graded on attendance (90% attendance required) and completion of class exercises and assignments. Outside assignments are rare, but students must schedule individual time to practice bibliographic searching.

There are three stages in the evaluation of this course. There is a precourse assessment, in which students identify their previous experiences and their own learning objectives for the course. The course can be altered according to the interests and level of competence of the students. There is a continuing evaluation process during the course as the students evaluate each session and the instructor(s) for that session. These evaluations have resulted in changes in the sessions on bibliographic searching and on spreadsheets. At the last class session, students must complete an evaluation form for the course as a whole. Most of the scores for the individual sessions and for the class as a whole are extremely high. On a scale of 1 ("low") to 10 ("high"), the course as a whole averages 9.4, with thirty-four students responding.

Critical appraisal of biomedical literature

The TTUHSC Library's strategy was to help the student deal with the problems of the information explosion by teaching how to evaluate the scientific literature for quality. The Critical Appraisal Skills Subgroup of the GPEP recommends that:

> Medical students should develop the ability to apply the rules of evidence and the laws of logic to clinical, investigative and published data in order to estimate their validity, reliability and utility [35].

It has yet to be resolved in whose realm education for evaluating the literature falls. Several courses on the topic are being taught in medical schools by medical faculty without the help of librarians [36–42]. Allegri has found that critical evaluation of the literature is becoming a more frequent component

of instructional programs. She states that this is an excellent area in which to introduce a team-teaching approach with library and nonlibrary faculty [43]. But the current literature does not reveal any examples. It is undeniable that medical librarians possess skills and knowledge that could be of benefit. Teaching others how to evaluate the literature is not so different from teaching them skills the clinical medical librarian draws on when selecting classic or critical articles in clinical medical librarianship or LATCH (Literature Attached to the Patient's Charts) programs.

At TTUHSC the elective course, "Critical Appraisal of the Literature," has been developed and taught by the library's associate director for education. Designed in 1983 and tested in 1983/84, it was originally slated for introduction into the curriculum in the fall of 1985. When the students learned of the plan, they asked that it be introduced immediately, beginning January 1985. The course has been given four times to a total of forty-three students.

The elective draws from the seminal works of Drs. Sackett, Haynes, and Tugwell at McMaster [44] and Dr. Riegelman of George Washington University [45]. In twenty contact hours of instruction and exercises, it presents

1. A philosophical introduction on the merits of developing evaluative and critical thinking skills in the information age (one hour);
2. An introduction to the perils of researching and publication—fraud and self-deception (two hours);
3. A review of biostatistics from the perspective of a reader of the literature (three hours);
4. A review of research methodology (two hours); and
5. A step-by-step method for evaluating clinical literature. (There are four three-hour sessions which are devoted to reading articles on each of the four following topics: diagnostic tests, prognosis of a disease, etiology of a disease, and new therapies for a disease or condition.)

Students are given grades of pass or fail based on attendance (100% attendance at six required sessions) and on completion of the class assignments. Students are required to evaluate the same ten articles before and after the course. While there are no ultimately right or wrong answers, students are scored on their ability to spot "red flags" in the articles, such as a sample group of less than thirty, weak study design, or unfounded conclusions.

All students are also required to evaluate the effectiveness of the course and whether it has met its objectives by responding in writing to open-ended questionnaires. When asked if the course had met the goal of helping them evaluate literature more quickly, 93% of the students answered that it had. When asked if they would recommend the course to a fellow student, 97% answered that they would.

The library is in the early stages of developing condensed versions of the course for medical residents. These courses will consist of five hours of classroom lectures on evaluation techniques and a computer-assisted instructional program, Liteval [46]. This program, developed by Dr. Shelley Roaten, provides a step-by-step approach to learning the appraisal of clinical literature and is based on the work of Sackett, Haynes, and Tugwell. Although this program does not currently allow the user to save evaluations of articles or create databases of citations and their evaluations, it does allow the user to print completed evaluations of articles, which would then be attached to the reprint and filed manually with the item. A new version of Liteval is planned, which will allow the user to save data that he has entered.

Skills for lifelong learning

The GPEP report summarizes:

> Perhaps the most important concept emanating from this study is that medical students must be prepared to learn throughout their professional lives. This learning must be self-directed, active, and independent. The formal educational process should emphasize assisting the student to develop the ability and desire to continue acquiring and applying knowledge in solving problems [47].

And Matheson writes:

> The goal of educating self-directed lifelong learners is espoused by all, but instructional methods or philosophies that support these goals are uncommon. Academic programs that instruct students on how to develop a useful memory support system and a personal lifelong learning plan are rare [48].

However, the elective course that the TTUHSC Library offers on lifelong learning skills was not developed because of the GPEP recommendation or even because of the IAIMS report. Instead it resulted directly from medical students' requests. One of the sessions in the course, "Coping with the Biomedical Information Explosion," is devoted to the concept of lifelong learning by helping the student obtain information after his formal education is over. The session presents methods for handling anxiety created by information overload. It was during this session that students discussed their urgent needs in coping with the information explosion and asked for a new elective course that would address the development of lifelong learning skills.

The course was originally developed by the library's associate director for education with the input of the students. The proposal was presented to the Office of Medical Curriculum. The assistant dean for medical curriculum and the library's associate director for education coteach the course, "Skills for Life-

long Learning," which is structured as a series of workshops, rather than lectures. The course consists of ten two-hour sessions. The following topics are included:

1. Identification of personal learning objectives for the course
2. Identification of individual learning styles and preferences using the Myers Briggs Personality Inventory
3. Development of personal learning contracts
4. Relaxation and learning
5. New research and learning theory
6. Test taking skills
7. Memory retention
8. Creative thinking
9. Decision making and problem solving
10. Self-evaluation of learning contracts and of the course

The student is given a grade of "pass" or "fail" based on attendance and on the completion of class assignments. The most important of these assignments is the creation of the learning contract. The course was designed to challenge students to take responsibility for educating themselves by developing educational goals and objectives. It has emphasized immediately useful, practical applications. Students write their own learning contracts on topics of personal interest. The contract includes goals, objectives, actions, time frames, and methods for evaluation. Because the library is a mecca of lifelong learning, students are strongly encouraged to include structured information gathering and resources evaluation in their action plans. Learning contracts have been written for rather predictable goals such as "controlling test anxiety" but also for less predictable goals such as "becoming knowledgeable about world affairs." A student was concerned that he would lose touch with current events due to the demands of medical school.

Because students write their own objectives for the course, they evaluate whether their goals and objectives have been accomplished as well. In addition the students fill out a thirty-two-item form that uses a Likert scale to evaluate the effectiveness of the course. On a scale of 1 to 5, with 1 being "poor" and 5 being "excellent," students ranked general teaching effectiveness of the instructors at 4.15 and the value of the course as a whole at 4.0. This evaluation is not conclusive, however, since the course has been taught only once and the evaluations have been completed by only thirteen students.

OBSTACLES AND SOLUTIONS

There has been a multitude of potential obstacles to the development of the TTUHSC teaching library. These have included scarcity of needed resources (expertise, time, personnel, equipment, and materials) and competition for a place within the curriculum. The obstacles listed below could not have been overcome without a committed library faculty and a strong director. The director has been a convincing advocate for additional resources with the administration. He has, at times, reallocated library resources to support the concept of the teaching library and has encouraged librarians to be innovative.

Resources

Expertise. While all of the librarians could identify subject areas of expertise, few of them felt comfortable with their teaching skills. Two librarians took the Medical Library Association's continuing education course, "Teaching Skills for Library Educators." Two had previous teaching experience. By 1985 three had joined Toastmasters International to improve their speaking and communication skills. In 1987 a new Toastmasters' chapter, the Bibliophiles, was formed for librarians only. A total of seven library faculty members have joined in the past three years. All librarians enrolled in a short course (three three-hour sessions), "Improving Lecture Skills," that was presented by the associate director for education and the assistant dean for medical curriculum. Informal instruction has been presented on writing and using behavioral objectives, and several journal club sessions have covered topics related to the teaching programs.

Time and personnel. When the program began, planning and implementation was extremely time consuming. Particularly in the Teaching and Learning Centers (computer and audiovisual-learning laboratories), paraprofessionals and student workers have taken on additional responsibilities. Paraprofessionals conduct orientation tours, and some student workers help with the courses, tutoring users on word processing, spreadsheets, and database programs. Success of the teaching programs has contributed to the addition of two positions: a librarian, approved by TTUHSC administration in 1986, and a paraprofessional, approved in 1988.

Equipment and materials. While it was expected that the teaching programs would be an expense to the library, the net result has actually been an increase in resources. The School of Nursing has requested that the library administer a new twenty-two-computer teaching laboratory for the Health Sciences Center, stating that the recommendation is based on the library's previous success in this area. The acquisition of the eleven IBM computers has already been noted. Added resources have totaled more than $160,000. Costs to the library have included additional computer software and teaching resources, an expenditure of approximately $4,500 per year.

Competition in the curriculum

It was anticipated that the medical faculty would view the library's courses as competition for space in an

overloaded curriculum. This has not been the case, although there continues to be some uncertainty as to whether all freshman electives will be discontinued in the future to allow time for additional required classes. Even if this were to occur, the fact that the library's electives are supported by the assistant dean for medical curriculum, the associate dean for student affairs, and the associate dean for medical education and special programs will, we hope, assure their place in some form in the future curriculum.

CONCLUSIONS

Creating a teaching library is an uncertain endeavor for a health sciences library. It requires enormous outlays of time and effort. While a teaching library program should not be instigated simply for the purpose of gaining more resources or recognition for the library, a successful teaching program can have these effects. However, these alone are not adequate reasons to establish a teaching library.

There is only one valid reason. That is an expanding accountability to the needs of users—an accountability that requires librarians to help their users make maximum use of information resources. The American Library Association has recognized this by taking a bold step, calling for libraries to become leaders in literacy education programs.

What is the rationale for the public library's involvement in literacy programs: Basically, the public library has a responsibility to maintain the climate for use of the library's resources; a literate society is essential to its continued use. As Ranganathan has made clear, libraries have a responsibility to their resources to see that they are used by people who need them [49].

Health sciences libraries, too, have a responsibility to see that their resources are used by people who need them. Because of this fact, teaching libraries are no longer optional; they are imperative.

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