LIBRARY AND INFORMATION SCIENCE EDUCATION IN THE UNITED STATES: A Look back at the past twenty-years and plans for the next decade

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Abstract

Library and information science (LIS) education in the United States experienced enormous changes in the past twenty years. This paper offers a brief review of these changes and some thoughts about the development of LIS education in the coming decade. The review includes description of master's, doctoral, and bachelor's degrees, as well as reflections on the changes influenced by the inclusion of information science and current developments of information technology. Statistical data are accompanied by illustrations from published literature and personal experiences with the development of programs at the School of Information and Library Science, University of North Carolina at Chapel Hill, which was ranked first among LIS schools in the US and Canada by *US News and World Report in the Spring of 1999.*

Keywords: Library and information science education, United States of America, review, perspectives

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Abstrakt

Izobraževanje knjižničarjev in informacijskih delavcev je v Združenih državah Amerike doživljalo velike spremembe v zadnjih dvajsetih letih. Prispevek ponuja pregled teh sprememb in razmišljanje o razvoju tega izobraževanja v prihodnjem desetletju. Pregled opisuje dodiplomski, magistrski in doktorski študij. Vključuje tudi poglede na vpliv pridružitve informacijskih ved ter hitrega razvoja informacijske tehnologije na stroko. Statistični podatki so dopolnjeni s primeri programov predstavljenih v strokovni literaturi ter z osebnimi izkušnjami z razvojem programov na Šoli za informacijske in bibliotekarske vede na Univerzi Severne Karoline v Chapel Hillu, ki jo je revija *US News and World Report* spomladi 1999 razglasila za najboljšo tovrstno šolo v ZDA in Kanadi.

Ključne besede: izobraževanje knjižničarjev, Združene države Amerike, pregled, razvoj

1 Introduction

The field of library and information science (LIS) education has undergone dramatic changes in United States* in the past two decades. In this paper we intend to provide an overview of these changes in the education for this profession as well as a brief forecast as to where that professional education will be going in the next decade.

Before looking at the changes, however, let us first briefly review the nature of LIS education in the United States (US). LIS education is primarily concentrated in schools offering a master's degree accredited by the Committee on Accreditation (COA) of the American Library Association (ALA). The ALA accredits programs in both US and Canada. Currently, there are 56 accredited programs, 49 in the US and 7 in Canada. Although there are a number of undergraduate and graduate programs in LIS that do not reside at schools that also offer accredited ALA programs, our presentation will concentrate on the schools with ALA-accredited programs in that they are generally considered to be at the forefront of the field. We should note at the outset that ALA only accredits at the master's level. Other degree programs offered by schools with

* *The term, "United States" has been used throughout this paper for ease of use. In doing so we intend that the name includes more than just the 50 sates but also Canada in that 6 of the 56 schools with accredited programs in library and information science at the master's level are in Canada.*

accredited ALA master's level programs only have the general accreditation of the body that accredits the university.

Most professional library positions in the US require graduation from an ALA accredited master's program. LIS graduates can also find rewarding job opportunities outside of libraries, in institutions and companies that organise and manage records for internal or external purposes, e.g., hospitals, banking and investment institutions, providers of Internet search engines, etc. They also work as computer network managers, web-masters, software developers and in other related positions. This variety of job opportunities for our graduates, uncommon twenty years ago, results not just from changes in the information environment, but also from the willingness of LIS educational programs to adjust their offerings to these changing needs (Van House and Sutton, 1996).

2 Background

Education for librarianship in the US initially resided in different kinds of institutions – from libraries to colleges and universities at differing degree levels. Since the early 1920s with the publication of the Williamson report (1923) accredited professional education has gradually become situated primarily in colleges and universities at the master's degree level. This paper will look at these master's programs as well as other programs offered by these schools at both the baccalaureate and doctoral level.

2.1 Schools and programs

As one looks at the state of LIS education in the US over the past twenty years one thing becomes quite noticeable – the reduction in the number of accredited master's programs. Following a rapid growth in accredited programs in the 1960s and early 1970s, the field began to experience a closing of one program after another beginning in the late 1970s. Even quite recently, a number of programs have been under review by their parent institutions for either closing or restructuring. Let us look at some of the numbers. In 1979 there were 64 universities offering an ALA accredited master's degree (Association of American Library Schools, 1979). By 1998, the number of accredited master's programs had declined to 56 (Association for Library and Information Science Education, 1998). All told during this period 14 schools discontinued their programs while 6 universities had either gained or regained accredited status.

One might expect that in any period of retrenchment it would be the smaller or what might be perceived by some a the weaker, pr grams that would be closed. In fact, however, the closings occurred across the full gamut of accredited programs. Several of the most prestigious universities closed their LIS programs including the University of Chicago and Columbia University — programs which had always been ranked in the top five LIS programs in the US Recently, the University of California at Berkeley, another university with a very highly ranked LIS program, elected not to seek accreditation after having voluntarily moved to a non-accredited status during a period of program review. The reasons for the schools closing are generally tied to local universities issues and priorities. Certainly, economic considerations, particularly for private institutions, is a critical factor. Also important though are issues such as the perceived quality of the program and the centrality of the program to the university's mission. Regardless of the reasons for closings the effect of the closing has, and continues to play, an important role in school decision making and planning. In a recent presentation to the Congress on Professional Education, Barbara Moran (1999), the former dean of the program at the University of North Carolina (UNC) at Chapel Hill commented that the school closings our profession experienced over the past two decades had an effect similar to that the Great Depression of the 1930s had on our parents or grandparents. Forever after, their lives were very focused on making every effort to ensure job security and financial stability. Similarly, Moran observed that LIS educators who experienced this period of school closings today are keenly aware of the need to plan and respond to perceived threats in order to avoid being in a situation where their programs are susceptible to closure. We believe the trends in LIS education today, expanding from an almost pure library orientation to a wider area of information management and transfer, are both a response to perceived need as well as a form of pre-emptive action to avoid being in a weakened position.

2.2 Student enrollment

The attrition in the number of schools offering an accredited LIS master's degree might be expected to have resulted in a corresponding reduction in the numbers of students the remaining programs serve. In fact the reverse is true. In 1979 the total enrollment at the 64 schools was 9.200 students (Learmont 1980, p. S 3 - S 16). The mean size was 144 students per school. Today, with only 56 accredited programs a total of 12.802 students are served with an average enrollment of 237 students per school (Saye with Lan 1999 p.72-74) As one might expect the distribution of students in terms of total numbers and full time vs. part time status varies considerably from school to school. These same statistical sources indicate that in 1979 the smallest master's pro-

gram had 43 students (Atlanta, now named Clark Atlanta) while the largest program had 427 students (Simmons). The master's program enrollment figures for 1998 reveal that the smallest program enrolled 56 students (Southern Mississippi) while largest had 562 students (San Jose). Overall, the schools are generally larger than they had been twenty years earlier.

There is a great deal of variation in terms of how students participate in their master's program – whether as full-time or part-time students. Generally, most schools with large part-time enrollments tend to reside in or near large metropolitan areas. There is a wide variation among schools in terms of this level of student participation. In 1979, 40 percent of master's students were full time students. This ranged from a high of 98 percent full-time at British Columbia and University of California at Los Angeles (UCLA) to a low of 7 percent full-time at Brigham Young (Learmont, 1980, p. S-3 - S-16). By 1998, the mean number of full time students had declined to 30 percent, ranging from a high of 90 percent at Montréal to a low of 5 percent at Queens (Saye with Lan, 1999, p. 79-84). These differing levels of student participation evidence quite different types of students in a program – part-time students usually holding full-time jobs – as well as creating a noticeably different student environment.

As we shall address later, many of these schools do not confine their educational offerings to the accredited master's degree. Rather a number also offer baccalaurate, other master's and doctoral degrees. The enrollments in these degree programs, when combined with the accreditation master's enrollments result in some very sizeable schools. Student enrollments of matriculating students across all degrees offered by LIS schools are quite revealing about the sizes of our schools. Among 56 programs, 7 have fewer than 100 students. The school with the smallest overall enrollment is Dalhousie with 59 students. By far the largest schools are Florida State with 1,030 students, followed by Drexel with 983, Syracuse with 969, and Pittsburgh with 733. The total enrollments at these schools are heavily influenced by their large undergraduate programs. The other largest programs cluster in the 500 range (Saye with Lan, 1999, p. 72-74).

3 Library and information science

Besides closing of programs and enrollment of more students at fewer schools, a change in the scope of the educational offering is most noticeable during this twenty year period. If one looks at most LIS programs of the 1970s one sees that these programs were in fact essentially library science (LS) programs.

In the US the appearance of information science (IS) in the academic programs of our professional schools can be seen as the result of two conferences held in 1962 at the Georgia Institute of Technology entitled Training of Science Information Specialists (Shera, 1972, p. 288-289). These early IS programs were often associated with engineering, mathematics, or computer science programs. These programs, however, were quite different from the type of IS we see in our schools today. Beginning in the latter part of 1960s IS began to appear in what were then called "library schools." One should caution that even in our schools the term "information science" can mean quite different things from one speaker, and listener, to another. Similarly, other terms including "information systems," "information studies," etc. also are often used quite interchangeably.

Some schools developed separate IS programs, including a separate curriculum, set apart from their LS program, an example being the University of Pittsburgh. Others, UNC Chapel Hill being among them, developed separate IS degree programs that share a common curriculum with the LS program. Most schools have combined their IS and their LS offering into a single curriculum with one combined degree. In that degree students generally may identify a specific degree track or speciality. While a few schools early on, Pittsburgh and Syracuse University come immediately to mind, developed an extensive array of IS courses. The entry of other schools into the IS arena often was confined to the introduction of some computer technology into their curriculum. This spread of more expanded and extensive IS course offerings is a more recent, but continuing and rapidly expanding part of the curriculum of our schools.

If titles are any indicator of reality, a quick examination of the names of the units that house these programs can be informative on the pace of assimilation of IS into school programs. Of the 64 schools with accredited master's programs in 1979 19 had the word "information" in their title. By 1989 50 of the 61 schools had "information" in their title. This broadening of purpose as expressed by the title of the school becomes very apparent by 1998. By then all but one of the 56 schools (Clarion) had included the word "information" in their school's name. In fact, by this time 9 schools had removed "library" from their titles whereas in 1979 only one school (Syracuse) had done so. The removal of "library" generally reflects a noticeable change in the emphasis of the school and results in a title something along the lines of School of Information Science, or as in one case it's the simplest form, School of Information (Michigan).

Two factors seem to have been very influential in shift from a concentration on LS towards other related fields: the demands of the profession and the development of new professions (Van House & Sutton, 1996; Sherron & Landry,

1999). Technological developments have influenced changes in our societies that have prompted changing skill requirements for librarians. At the same time, schools have tried to prepare graduates for jobs in the broader sphere of information work. The abundance and complexity of information combined with its global accessibility allows for the ready absorption of graduates from computer, communication, business, and LIS programs into the workplace. The efforts to adapt LIS programs to meet future needs are perceived by faculty as crucial for program survival. Thus, curriculum development and redesign continues as an important ongoing task. Changes in school names, however, do not tell much about changes in the curricula of these programs other than serving as a broad indicator that change has occurred. The level to which schools have incorporated IS into their curriculum is unclear. Some schools adding an IS component has likely resulted in primarily emphasising the use of computers while remaining primarily a LS program. For others, it has been a wholesale embracing of IS into their educational offerings. For most, it is been healthy combination of library and information science.

In the past two decades as IS has expanded rapidly within our schools notable changes have occurred in terms of the interests of students entering these programs as well as in the breath of professional opportunities available to them outside of libraries. For schools this may have created some tension, sometimes healthy sometimes not, as they discovered the emergence of divisions in their student bodies – a LS group and an IS group. Groups which may have quite differing sets of values and expectations. In today's schools it is not unheard of to find students who want absolutely nothing to do with anything involving eventual work in a library setting or exposure to any course that discusses such opportunities. There also exists the challenge to convince students that we are no longer only a "library school." In fact, perhaps an even harder struggle, at least this was, and still is, true at UNC Chapel Hill, has been to get university faculty and administrators to truly recognize this and stop referring to our academic unit as the "library school." While trying to broaden the content of the school's offering and the way in which the school is viewed, there remains the opportunity/challenge during this period of enormous transition to maintain a healthy and supportive relationship with the school's alumni who are primarily still librarians. These alumni value and treasure the relationship they have with their "library school."

Perhaps it would be useful to look at one school as an example of how change from being a "library school" to becoming what we call the "School of Information and Library Science" was met. No formal history has been written of this process of change so the history we're going to relate is purely from a personal perspective, but we believe accurate nonetheless. At UNC at Chapel Hill the first LS courses were offered as far back as 1904, however, the School of Library Science began in 1931. In the early 1980's it became apparent to the

faculty and leadership of the school that, although the number of IS like courses had been introduced into the curriculum, a more assertive approach needed to be taken to keep the school at the forefront of our field. The time seemed most appropriate with an upcoming change in the leadership of the school. In its search for a dean the school was fortunate to obtain the services of the dean of one of the most forward-looking of the schools of LIS, Evelyn Daniel of Syracuse University. Dean Daniel, having a form of mandate from the faculty to be a facilitator for change, in a few short years was able to work with them to develop a separate IS degree program within a common LS/IS curriculum. Although the larger community was relatively slow to recognize that this change had taken place, an aggressive public relations effort combined with further enrichment of IS offerings, eventually produced positive results. As part of the school's five-year strategic plan, the faculty adopted a target of a 60/40 percent distribution of LS to IS student enrollment. That objective has been achieved.

This school like most others, faced, and continues to face, the challenge of developing its IS offerings without, at least at first, any significant increase in number of new faculty lines to support the enlarged number of course offerings. As a result, the school followed the approach used by many other schools of redefining what were LS faculty lines as they became vacant in order to hire IS faculty. This was done while trying its high-quality LS program with reduced staffing. This challenge was met in several different ways. One was to increase the use of adjunct faculty to teach some of the LS and IS courses. Another was to reduce the number of LS courses offered in the curriculum without diminishing the LS preparation of students – a difficult balancing act. Additionally, a conscious effort was made to broaden the content of a number of courses so that they would no longer appeal exclusively to LS students. A similar approach was taken with some IS courses. An example how this was accomplished lies in the reference area. Courses which concentrated primarily upon reference materials were restructured to view information as a commodity. Thus, one no longer concentrated on, say science reference materials, but rather studied scientific information. That study expanded beyond science information tools to also include an examination of how scientists and others use and transmit their specialized scientific information. This approach extended the treatment of information beyond the confines of the library to the information marketplace.

Schools have also broadened their perspective in other ways. Some schools no longer offer a course in cataloging and classification. Rather, the content is offered in a more generalized way in an organization of information course in which library organization plays only one, and sometimes even a minor, role. Similar approaches have been taken in areas such as management, collection development, etc.

The transition of IS into all aspects of the curriculum was facilitated by the rapid improvements in computer technology, it's reduced cost, and the availability of library-related tools in machine-readable form. By the mid-1970s we began to see services such as OCLC and online searching making their first appearances in the curriculum of LIS programs. This was often facilitated by the vendors offering free or reduced rates for their services if used by the LIS program for educational uses. Although at first sometimes faced with some reluctance of students, particularly older students, to work with this new technology, it was generally very popular and well received. This acceptance has been enhanced by the advent of first the personal computer and later the Internet making the transition to the information profession beyond the bounds of the library easier.

Today, although UNC Chapel Hill's School of Information and Library Science still has a large number of students who would define themselves as preparing for career in librarianship it has many others who are preparing for careers in the information profession outside of libraries. There are courses taken primarily by either just LS students or just IS students. In their work for their master's degrees students frequently share courses, which bridge both LS and IS continuum. Such courses include Systems Analysis, Internet Applications, Database Systems, Communication, etc. At UNC Chapel Hill some traditional library oriented courses still remain in the curriculum. The Organization of Materials (i.e., Cataloging) and Information Resources and Services (i.e., Reference) continue to be offered. Other specialized courses exist though that have little with librarianship. These would include Applications of Natural Language Processing, Introduction to Local Networks, Protocols and Network Management, TCP/IP Networking and Network Programming, and Knowledge-Based Systems.

Zimmerman and Jörgensen (1998) reported how curriculum change occurred at the School of Information and Library Studies at the University at Buffalo, State University of New York. They stressed the importance of basing curriculum revision on the needs of future graduates. Such needs were perceived in terms of skills essential to modern librarians as presented in lists of competencies assembled by professional organizations, like those presented by the Medical Library Association (1991). Zimmerman and Jörgensen compiled a list of competencies from published lists. Some of the 31 skills they identified were close familiarity with computer systems and software, presentation and communication skills, and ability to locate, evaluate, select, and use information sources. Their list reveals how heavily the library profession is influenced by the technologies used in libraries. The development of these technologies appears to influence curricular revisions in the direction of IS. Overall we find that the knowledge and skills of what was once termed "library education" is now more broad while the degree to which that is true varies considerably from school to school.

3. Master's programs

Master's programs, which prepare students for most professional LIS positions, have been discussed extensively in the above section on changes in the relationship of LIS. However we feel it is necessary to mention changes in the duration and requirements of the programs.

The average master's program in LIS in the US tends to be a 36 credit program. This allows a full-time student to complete the degree in a twelve month period if that student is enrolled full-time including the summer. In 1979, the number of credit hours required to attain the master's degree ranged from 27 to 60 with most schools having a 36 credit hour requirement (Pope, 1980, p. C-3 - C-4). The schools with the higher number of credits for the degree tended to be Canadian schools. Gradually, over the past twenty years, with the advent of the new technologies and the great knowledge requirement information workers must have, the number of hours required for the master's degree have slowly risen at a number of schools. Some schools, like UNC Chapel Hill made the transition directly from a 36 to a 48 credit hours program while others have increased their degree requirement less precipitously. The 48 credit requirement while frequently referred to as a two year, is more accurately a four semester program. Today, while most schools still require only 36 credits for the master's degree and increasing number of schools require 42 or more credits for the degree (Barron and Blessinger, p. 232). These additional credit hours provide time for the introduction of the new technologies and internships (i.e., work experience). Currently, UNC Chapel Hill, UCLA, and Washington along with the Canadian schools are among those with two year programs.

4. Doctoral programs

Two very noticeable changes have occurred in LIS education beyond those associated with the master's degrees. These changes are the expansion in the number of doctoral programs and the introduction of IS education at the baccalaureate level.

Doctoral education for librarianship in the US dates back to 1926 with the founding of the Graduate Library School at the University of Chicago. The growth and acceptance of education at this level with its emphasis on research and inquiry was slow. Indeed, by 1953 only four schools had awarded doctoral degrees in LS, Chicago, Columbia, Illinois, and Michigan. Chicago was by far the most productive of these schools with its graduates the source of 80 of the 129 dissertations produced between 1930 and 1959 (Shera 1972, p

401). The state of doctoral education has changed greatly since the early 1950s. Looking back at the focus of our review, the past twenty years, we see that there have been tremendous changes in these programs in term of their availability and enrollment. In 1979, 25 schools had students enrolled in a doctoral program. That enrollment of 312 students was distributed quite unevenly from one school with a single student to a high of 32 students at another (Learmont, 1980, p. S-3 - S-6). Today 27 schools offer a doctoral degree with total enrollment of 693 students (Saye with Lan, 1999, p. 72-74). Now the largest program has 90 students. From an international perspective LIS doctoral programs have had a healthy international enrollment. Throughout the 20 year period we have reviewed doctoral programs have had a steady quarter of their enrollment by students from countries other than the US and Canada.

As was true with master's degree programs, the content of doctoral programs have changed over the years. Although anything we say in general about doctoral program content can always be refuted by an instance where it isn't true we believe the following is quite accurate. While an unknown percentage of doctoral students remain interested in obtaining the degree primarily for professional reasons there has been an steady increase in those pursuing the degree because of a serious and profound interest in research. This has resulted in a greater emphasis on research in these doctoral programs and particularly in research from the broader perspective of IS and less work being conducted addressing library questions. This change has resulted in some structural differences. Gone is the requirement common in the 1970s that an applicant must have some meaningful period of post-master's professional practice before entering a doctoral program. Rather, a noticeable percentage of students are entering LIS doctoral programs directly form their master's program. Also more common is the student who enters without a LIS master's but holds instead a master's degree from another discipline or profession.

5. IS baccalaureate programs

Although professional library education is primarily at the master's level there has remained an undergraduate component within a small number of schools with accredited master's degree programs. This undergraduate enrollment frequently involves the preparation of school librarians at the undergraduate level or offerings to a small number of undergraduates taking courses at the graduate level. This involvement with undergraduate education changed dramatically in 1979 when the University of Pittsburgh introduced an undergraduate major in IS. This was followed by a similar program at Drexel University in 1984 and another in 1987 at Syracuse University. Other schools have followed

this lead with their own majors and minors. By 1998, eleven schools with ALA accredited master's programs also had undergraduate level programs. Although the majority have relatively small enrollments a few have very significant enrollments that have greatly increased the overall size of the schools. At the undergraduate level Syracuse has 528 students, Drexel 455, Florida State 204, and Pittsburgh 181 (Saye with Lan, 1999, p. 72-74).

Why would a school, comfortable with its graduate program, undertake to educate a quite different student population? The reasons may be as varied as there are schools that have done this. Certainly, a very strong source of motivation is perceived need or demand. The information industry in the US provides a wealth of employment opportunities at very attractive salaries for individuals with information systems expertise and only a baccalaureate preparation. In fact, these employers not infrequently concentrate on the knowledge of an applicant rather than on degree level attained. Moreover, it is not unusual for these positions to offer salaries quite a bit in excess of those offered to entry level librarians with a graduate degree. Very likely however, another strong motivation for schools to create these IS baccalaureate programs is the force we mentioned earlier – survival and the memory of those schools that closed. Schools of library and information science are most often the smallest, or among the smallest, graduate level units on a campus. As such, they frequently view themselves as susceptible targets in times of a university's financial distress. This feeling is frequently more than just an issue of size, however. It also has to do with the perception, we believe to be an accurate one, that LIS schools are removed in many ways from the central mission of a university. An undergraduate program provides these schools with an opportunity to become more of an integral part of that central mission by becoming more allied with other units within the arts and sciences.

Sherron and Landry (1999) described in their paper how the School of Information Studies at the Florida State University developed its new undergraduate program in information studies. The school perceived that the market (i.e., students and employers) required more knowledge about information technology than other bachelor's degrees offered and that the school was ready to fill that gap. Their program prepares graduates "within the context of liberal arts education with knowledge, skills, and values ... to develop, organize, retrieve, administer, and facilitate the use of recordable information and knowledge ... for service within an information-dependent global society" (Sherron & Landry, 1999, p.50). Besides courses like Information Sources and Services; Theory of Information Retrieval, and Network Administration, providing theoretical framework for the students' career, the school also offers hand-on experience through internships.

While some schools have made the transition going directly to an undergraduate major, others, including our own, have taken a more indirect approach. Four years ago our school at UNC Chapel Hill made the decision to develop an undergraduate minor in information systems. This approach, however, was not designed to prepare persons for the information industry, but to provide students majoring in other disciplines and professions with a healthy information systems background to enable them to use these systems and expertise to further their work in their profession. One can probably get as many opinions as to why this approach was taken as there were persons involved in the decision making itself. We believe that was done because the time was perceived as not right for the development of a major. However, four years later, the school's faculty has approved plans to develop and IS major within the next two years given the required approvals at the university level. What has changed? We believe it to be the result of a clearer mandate by the university and the market, i.e., students and employers, that there is a need for such a program at the undergraduate level, and the faculty feels that it is now ready to assume this responsibility if adequate resources are provided.

The inclusion of an undergraduate element has the potential to alter the very character of a school and its culture. Unlike master's programs where students enter following the attainment of a degree and, as frequently happens, after some experience in another profession or obtaining another graduate degree, most undergraduate students in the US are coming directly from secondary education. While presenting a number of educational challenges, given the usual different maturity level of these students, these undergraduate programs also provide wonderful opportunities for the development of very knowledgeable informational professionals. Unlike graduate programs where schools must work with the raw material that they have, i.e., the knowledge base the student brings to the graduate program from their undergraduate degree with little ability to undo any shortcomings in the student's preparation, these undergraduate students can be provided with a richer foundation of courses upon which to build. For example, a school might require calculus, logic, computer programming, etc. in addition to their IS degree coursework. If these undergraduate programs become more commonplace, and we believe they will, they may provide the opportunity for graduate level IS programs to change from their being a form of retooling to becoming programs that build upon that solid foundation developed at the undergraduate level. Of course there are risks. Many students, having achieved the undergraduate IS degree, may never return after finding lucrative careers without the need to pursue graduate education. Thus, we have a somewhat uncertain future here, but clearly the development of these programs will continue and have a role in determining what our schools will be in the next decade.

6. The impact of technology on teaching

LIS schools have changed names, curricula, and the type of work for which they are preparing students – all these changes influenced by technology and its impact on the information industry and society. Technological developments have and are major influence on teaching approaches.

We believe there is little doubt that the most important factor for change in LIS education in the past decade, and certainly in the past five years, has been the Internet. It has not only changed the educational experience by causing new courses to be added to the curriculum, is has also changed the content of existing courses as well as how those courses are delivered. Look at any LIS program catalog from five years ago and we are certain that you will find little or no mention of the Internet in it. Today, the Internet plays a role throughout a school's catalog. It is used as a means of providing information about a school's program to prospective students and a means for them to obtain application material. Once in the program the Internet serves as a vehicle for students to communicate with each other, with faculty, and, we hope most importantly, as a source of research material. The Internet allows faculty to increase the power and impact of their presentations in classes. As a case in point, at UNC Chapel Hill some aspect of the Internet is used in virtually every course offered from children's programs, to cataloging and in even as prosaic a topic as a history of libraries. In fact, it's hard to imagine teaching without this tool today.

Many schools now deliver their LIS programs beyond the boundaries of their geographical area. Distance education previously delivered by telephone or satellite now has become very dependent on the Internet. The Internet provides enhanced means to deliver content directly to a student's home rather than to a central gathering point off campus as had been done using previous distance delivery modes.

In addition to its use as a communication vehicle the Internet serves as the focus of study in ILS by both students at the master's level, doctoral students, and the faculty. It is also awakened an interest in areas of study long present in library education now suddenly of great interest to many outside the field of LIS. A great challenge now exists for LIS faculty and graduates to seize the opportunity share and apply their knowledge in this new "information world."

Another vital tool in LIS education that has re-shaped LIS education as well as the world in the last twenty years is the microcomputer. From its introduction in the early 1980s as a tool with limited use, primarily confined to word processing and online searching, it is now an integral part of the educational program. Rare is the program that lacks a computer laboratory. Also, increas-

ingly common, are classrooms designed to be used by students with a computer in front of each of them. No longer confined to word processing these tools are now used for graphic design, the creation of Web pages, cataloging, statistical analysis, etc. In fact, the demand for these resources are so great that both LIS programs and universities in general are being challenged to meet an ever increasing demand. One solution being adopted by several universities, and a few LIS programs, is the requirement that students have their own computers in addition to computer laboratories that the institution provides. Again, at UNC Chapel Hill this mandated requirement will be implemented by the School of Information and Library Science in the Fall of 2000 when all students in its degree programs will be required to possess a laptop computer. The school and faculty are now challenged to provide the infrastructure for the effective use of these computers by students and to fully enhance the educational program with their use. Do the challenges never end?

7. Future directions

Clearly change will continue and, like with the technology we use, likely will increase in pace. Van House and Sutton (1996) using ecological theory argued that any organism, including LIS programs, has to adapt to the environment to ensure the survival. Schools have demonstrated their vitality with revisions and creation of new programs. We believe that programs will continue to develop in three basic directions: (1) changes within requirements for LIS profession; (2) changes by expanding programs into new or other professional fields; and, (3) interdisciplinary cooperation.

Professional organizations with their lists of desired competencies and employers with their requirements for hiring employees express the needs for the development of the profession. Towsey (1997) compared job position announcements in professional journals across ten years and found that besides traditional library skills (e.g., cataloging rules for catalogers) computer literacy, communication, and management skills are often required. LIS schools will likely continue to give, and possibly develop even further, courses in interpersonal communication, collaboration, interface design, information resources management, etc. However, the speed of change will likely require a form of continuing education (CE). Although the need for CE for professionals in all fields has been a constant over the years, the rapid development of new technologies requires constant learning far greater than the need that existed in the past. Employees, employers, and LIS schools will need to enhance the availability of CE offering. These may be through formal courses, seminars, or

workshops similar to UNC Chapel Hill's "Info to Go" program where faculty present sele ted topics in a one-day workshop to professionals from North Carolina. This is an approach being taken by a number of LIS schools across the US Fortunately, the power of the Internet provides a means to deliver CE opportunities to LIS professionals unhindered by geographical obstacles.

The other venue of development seems to be in the expansion of opportunities into other professional fields. IS graduates from our school, for example, can compete for job positions with graduates of computer science programs. They are educated to design computer systems tailored to user needs, while computer science graduates are more likely to be prepared to design computer systems to optimize the system and attend less to the human component. Such a slight difference may prove to be important in certain situations. Again the Internet has a potential of offering numerous job possibilities to professionals with knowledge of organization and retrieval of information.

One new group of these professionals are the graduates of the baccalaureate degree programs in IS. Whether a major, like at Pittsburgh, Drexel or Florida State University, or a minor like in Chapel Hill, these graduates are competent users of modern information technology. They are capable of following future development as well as of helping co-workers and their employers to effectively use such technology. Our increasing dependence on technology and the frustration with our inability to follow its development may give a clue to the value of such professionals.

Interdisciplinarity, which is now mostly centered on cooperating with the competing fields like computer science, telecommunication, business, and engineering (they all assert to be part of knowledge or record management) (Grover et al., 1997), will likely expand to create information technology experts in specific fields, like agricultural, financial, legal, medical, and scientific information. Such hybrid professional will probably help other professionals in specific fields with facilitating their information transfer. Numerous other professions and jobs, from architects to sales persons to travel agents also have specific information needs that may be met best by persons knowledgeable with information management – whether those persons work within an information agency or as information brokers.

We believe that LIS education has all the reasons continuing its planning development and expansion of programs. The increasing numbers of students and employers' demands, accompanied by planned development should persuade universities in the wisdom of supporting our schools. Although there may be fewer similarities among the programs, that diversity can also be a positive agent for survival.

8 References

Association of American Library Schools. *Directory of the Association of American Library Schools, 1979.* State College, Pa.: Association of American Library Schools, 1979

Association for Library and Information Science Education. *Directory of the Association for Library and Information Science Education, 1998-99* (29th ed). Arlington, VA: Association for Library and Information Science Education, 1998

Barron, D. D. & Blessinger, K. "Curriculum" In : E. H. Daniel & J. D. Saye (Eds.) *Library and information science education statistical report,* Washington, DC: Association for Library and Information Science Education, 1999 : 231-254.

Grover, R., et al. "The wind beneath our wings: Chaos theory and the butterfly effect in curriculum design". *Journal of Education for Library and Information Science,* 38(1997) : 268-281.

Learmont, Carol L. "Students" In : *Association of American Library Schools library education statistical report,* State College, Pa.: Association of American Library Schools, 1980 : S-1 - S-83.

Medical Library Association. *Platform for change: The educational policy statement of the Medical Library Association.* Washington, DC: MLA, 1991

Moran, B. B. "What is the world today? LIS education." Paper delivered at the *Congress on Professional Education,* Washington, DC, 1999, April

Pope, E. "Curriculum" In : *Association of American Library Schools library education statistical report,* State College, Pa.: Association of American Library Schools, 1980 : C-1 - C-40

Saye, J. D. with Lan, W.-C. "Students" In : E. H. Daniel & J. D. Saye (Eds.) *Library and information science education statistical report,* Washington, DC: Association for Library and Information Science Education, 1999 : 53-229

Shera, J. H. *The foundations of education for librarianship.* New York: Becker and Hayes, 1972

Sherron, G. T. & Landry; M. B. "Reinventing the bachelor's degree: Call it "information studies!" *Journal of Education for Library and Information Science,* 40(1999) : 48-56.

Towsey, M. "Nice work if you can get it? A study of patterns and trends in cataloguing employment in the USA and the UK in the mid-1990s". *Cataloging & Classification Quarterly,* 24(1997)1/2 : 61-79.

University of North Carolina at Chapel Hill. School of Information and Library Science. *School of Information and Library Science 1998: 1998 record.* Chapel Hill, NC: University of North Carolina, 1998

Van House, N. & Sutton, S. A. "The panda syndrome: An ecology of LIS education". *J urnal of Educati n f r Library and Inf rmation Science*, 37 1996) : 131-147.

Williamson, Charles C. *Training for Library Service: A Report Prepared for the Carnegie Corporation of New York.* New York, 1923

Zimmerman, N. & Jörgensen, Corinne. "Seizing the day: A case study of one school's core curriculum revision process". *Journal of Education for Library and Information Science*, 39(1998) : 134-148.