Educating LIS Professionals for Singapore and Beyond

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Abstract. This chapter traces the development of LIS professional education in Singapore, particular the development of the MSc in Information Studies programme at Nanyang Technological University. The Information Studies programme has developed from a fledgling programme in 1993 with 40 students to a vibrant, forward-looking and popular programme with five areas of concentration and an annual intake of 100 students. Two of its areas of concentration was developed into separate MSc programmes in their own right—MSc in Knowledge Management and MSc in Information Systems—each taking in 40 students a year. The three programmes together attract 700 to 800 applicants annually. The chapter explains the structure of the Information Studies program, its particular strength in information technology, the student and faculty profile, and future directions for the programme. A manpower survey and a competencies survey are being carried out, and preliminary results are reported.

The Beginnings

An LIS professional programme was established in a university in Singapore only in 1993 with the introduction of the MSc in Information Studies programme at the Nanyang Technological University (NTU), School of Applied Science. A Certificate and Diploma programme for training paraprofessionals was also established at the Temasek Polytechnic at about the same time. This was a culmination of three decades of effort by the library profession to establish a library school (Wee, 1980; Sabaratnam, 1989).

Prior to that, LIS professional training could be obtained through the postgraduate diploma programme in library and information science conducted by the Library Association of Singapore from 1982 to 1992 (Thuraisingham, 1984 & 1989). The instructors in the diploma programme were a combination of lecturers engaged from overseas library schools in United Kingdom and Australia, and local practising librarians. Many librarians also went overseas to obtain their professional library qualification, mainly in Australia, New Zealand, United Kingdom and the U.S. Others obtained their qualifications through the external Library Association (U.K.) and Australian Library Association professional examinations to obtain an A.L.A. (Associateship of the Library Association) or A.A.L.A. (Associateship of the Australian Library Association), until these programmes were phased out around 1980.

According to Wee (1980), the first proposal for a library school was made in 1960 by the librarian of the University of Singapore to establish a library school in the university. Over the years, numerous manpower surveys were carried out to project the number of professionals needed in traditional libraries as well as non-traditional information environments, to persuade various authorities of the demand for professional library and information science training.

Sabaratnam (1993) reported that finally in 1989, at the request of the Permanent Secretary of the Ministry of Community Development, the National Computer Board set up a high-level committee called Programme for Information Management (PRIM) to review the issue. A task force was set up, led by the director of the IT Manpower Department, National Computer Board, to conduct a national manpower survey. The results of the survey confirmed the demand for information professionals in non-traditional settings. The PRIM report was endorsed by the Committee on National Computerisation, and the Nanyang Technological University (NTU) offered to set up a part-time Master's programme in the School of Applied Science. At the same time, two important policy documents were issued by high-level committees led by the National Computer Board:

- the IT 2000 Report (1992), which charted the development of Singapore's national information infrastructure to transform it into an intelligent island
- the Library 2000 Report (1994), which charted the development of library services to support Singapore as a learning nation and as a knowledge hub.

The MSc in Information Studies programme was then seen as part of the "manpower infrastructure" development programme to provide the trained information personnel to help transform Singapore into an Intelligent Island and a learning nation.

Development of the MSc Programme

The Division of Information Studies was set up in NTU School of Applied Science with five faculty members to offer the MSc in Information Studies programme. This was a 2-year part-time programme, in which students had to complete 6 core courses and 2 elective courses, as well as a dissertation. The curriculum underwent two major revisions in addition to the annual minor adjustments to become the forward-looking programme that it is today. A chronology of the milestones in the history of the programme is given in Table 1.

From the beginning, the programme attracted both students who want to be librarians as well as IT professionals who want to learn the softer side of IT, including the user aspects, applications and management. The library science-oriented students felt that there was not enough library science content in the programme, while the IT-oriented students felt there was not enough IT. To meet the needs of these two groups of student, the curriculum was restructured in 2000 to offer two broad areas of concentration, and within each area a number of specializations:

Library and information services concentration
- Public libraries
- Academic libraries
- School libraries and media resources
- Corporate information services

Information management and systems
- Internet and multimedia-based information systems
- Information systems and products development
- Document and records management
- Knowledge management.

As a result, the number of applications to the programme shot up to 400 in 2000 and 700 in 2001! More details of this curriculum revision were reported in Higgins & Chaudhry (2003).

In 2002, the areas of concentration were simplified into the following five areas:
- Archival Informatics
- Information Management
- Information Systems
- Library and Information Science
- School Media Resource Management

The decision to define areas of concentration and specialization has been a controversial one in the Division of Information Studies. The areas of concentration and specialization were defined to serve a number of purposes:
1. as a marketing tool to give the public a clearer idea what the programme was about and what the strengths of the programme were
2. as a guide to students to help them define a coherent programme for themselves
3. as strategic directions for the programme to focus on and develop more advanced courses in
4. as a guide in recruiting faculty.

A three-tier programme structure was designed to gradually prepare students for more advanced courses. The tiers were:
1. *Core courses* (3 courses): foundation courses that define the skills and competencies common to all the information professions
2. *Group A* electives (students select 2 out of 5 courses): foundation courses for the various concentrations/ specializations
3. *Group B* electives (students select 4 courses): more in-depth courses in an area of concentration/specialization.

The popularity of the revised programme and the rising number of applicants exerted pressure on the Division of Information Studies to admit more students to the programme. It was decided that the best way to develop the programme further, provide more advanced courses as well as admit more students was to spin-off the knowledge management and the information systems specializations into separate MSc programmes, since these specializations attract a high proportion of applicants.

The MSc in Knowledge Management programme was launched in 2002, and the MSc in Information Systems programme was introduced in 2005 in collaboration with the School of Computer Engineering. The Knowledge Management programme is more management-oriented and more oriented towards corporate organizations, whereas the Information Systems programme is more technical, with more programming and system development. A proposal for a multi-disciplinary undergraduate programme, BSc in Information, is being developed.

With the establishment of separate information systems and knowledge management MSc programmes, there is a need to chart a new direction for the Information Studies programme. The

programme can now refocus on its core business of library and information services. Possible areas of focus include:

- School media, information literacy, information services for children and young adults
- Records management, information management, archives
- Information and knowledge organization, metadata, classification, information architecture, ontology construction and use
- Digital libraries, digital information, electronic resources and knowledge repositories
- Digital information services, environment scanning, information analysis, information packaging, abstracting
- Information security
- Information entrepreneurship.

Table 1. Milestones in the development of the MSc in Information Studies programme at NTU

1993	MSc in Information Studies programme started as a 2-year part-time programme, requiring students to complete 6 core courses + 2 electives + dissertation. 50 students were admitted to the programme each year.
1997	Part-time "day-release" programme for staff of Natural Library Board was introduced.
1998	New curriculum with 4 core courses + 4 electives + dissertation was introduced.
2000	A full-time programme was introduced with 30 full-time students, in addition to 60 part-time students. A new curriculum was introduced with 3 core courses + 2 Group A electives + 4 Group B electives + dissertation. The number of applicants to the programme rose to 400, and to 700 in 2001.
2002	The Division of Information Studies moved to the School of Communication Studies, and the school was renamed School of Communication & Information. An MSc in Knowledge Management programme was introduced, in collaboration with the Civil Service College. The areas of concentration in the Information Studies programme was revised.
2004	The dissertation requirement was made optional. In place of the dissertation, students can take 2 courses, 1 of which is Critical Inquiry involving a group research project. The core course, Information Users and Society, was changed to a Professional Seminar series with pass/fail grading.
2005	A new MSc in Information Systems programme was introduced, in collaboration with the NTU School of Computer Engineering. A proposal for a multidisciplinary undergraduate programme in Information is being developed.

IT in the MSc Programme

The Information Studies programme at NTU has built up a particular strength in information technology. Khoo & Al-Hawamdeh (2000) identified the following factors that contributed towards strengthening of the IT component in the programme:

1. The university environment and the parent school
2. The background and expertise of its faculty members
3. The local economy and job market
4. Student demands and expectations.

The first two were internal factors. The School of Applied Science, in which the Information Studies Division was situated, was an IT school which was later renamed School of Computer Engineering. This and the fact that NTU was an engineering and technological university influenced the programme to become more IT-oriented rather than social science-oriented. The strength and interest of the faculty members in IT also contributed to the nature of the programme.

In addition, several external factors have influenced the programme. The limited number of library-related jobs made it necessary to train graduates for non-traditional information positions. The emerging knowledge-based economy, growth of the IT sector and government support for IT infrastructure development in the 1990s gave rise to new-age or "new economy" information-intensive jobs which required more IT skills. The perception of librarianship as a low-paying unglamorous job also made it necessary to focus on the new-age information professions to attract more and better-quality students.

There was also a perception among some faculty members that information professionals need to be semi-IT professionals. They have to keep abreast of developments in technology and new information products to assess them for use in their libraries and to exploit them to improve their services. They also need sufficient IT knowledge to supervise IT projects in their library and to draw up specifications for these projects. It is also deemed desirable for information professionals to be able to set up simple database and Web applications for their own use as well as for use by their clients. The IT department and IT support staff are often too busy with major IT projects to develop small applications for the library or information service. Information professionals are increasingly playing the role of teachers and IT trainers, providing workshops and short courses on the use of new technologies and new information products, and on Internet and technology-oriented topics (Ashcroft, 2004; Braun, 2002; Musher 2001).

Annual surveys of applicants to the Information Studies programme found only a small proportion who intended to work as librarians after graduation. Of the applicants for the year 2000 admission, only 12% selected the library science concentration. Of the applicants who were actually offered admission in 2004, fewer than 20% had selected the library and information service concentration. Fig. 1 shows the proportion of applicants admitted to the programme who selected the various areas of concentration.
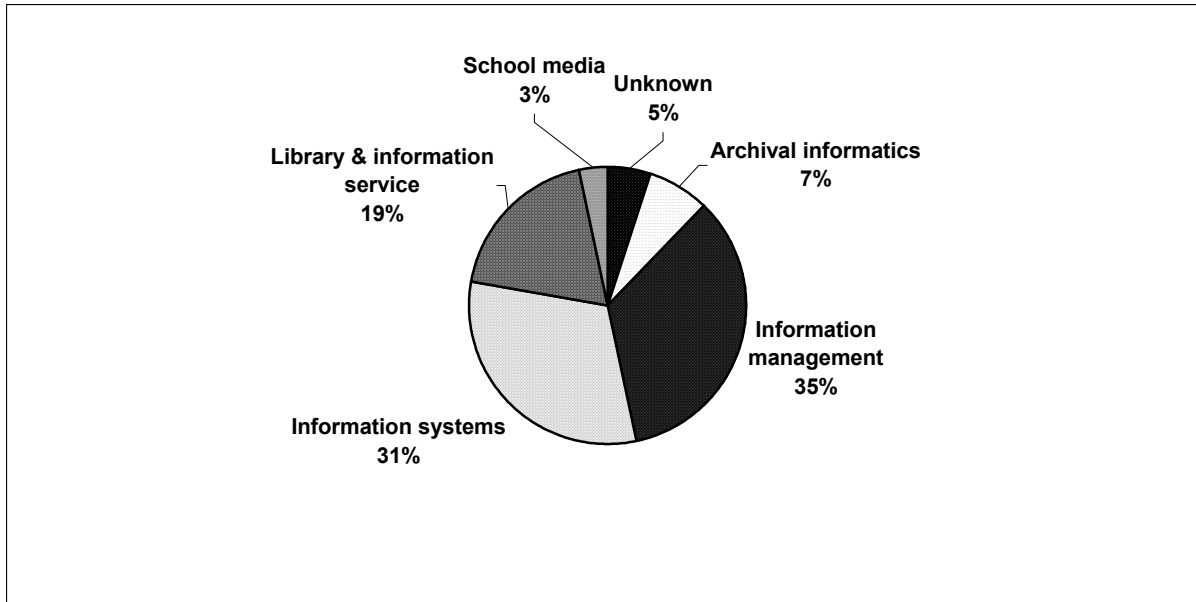
Fig. 1. The proportion of applicants offered admission in 2004 who selected various areas of concentration

Survey of Competencies Needed in Industry

The Division of Information Studies is conducting a manpower survey and survey of competencies needed in libraries as well as corporate organizations to help it chart future directions for the Information Studies programme. Information on needed competencies was obtained from the following sources: a review of the literature, analysis of newspaper position announcements, and feedback from librarians as well as alumni and students of the Information Studies programme.

Library directors in Singapore were asked by email for their opinion regarding important competencies needed by librarians in the next five to ten years. Five library directors responded, and their responses are summarized in Table 2. Competencies needed by library and information professionals can be divided into:

- *traditional librarianship skills*, including cataloguing, acquisitions, reference and information search skills
- *value-adding skills*, including research skills and skills in synthesizing and packaging information to support clients' work and decision-making
- *IT skills*
- *transferable and soft skills* that are generic and cut across disciplines, especially skills in communication, management, leadership, teaching and training, and teamwork, as well as the ability to empathize with users and understand their information needs
- *appropriate attitudes, values and personal traits*, especially those of user orientation and service orientation, flexibility and willingness to handle a wide range of tasks, adaptability and ability to handle change, continual learning, and an entrepreneurial attitude

- *domain knowledge* (subject knowledge) that are specific to the type of information service or organization they are working in.

Traditional skills are still in demand, but they have to be expanded to handle new digital formats and the online (especially Internet) environment. For example, cataloguing now includes use of new metadata schemes and cataloguing of digital and Internet resources. Cataloguers also now use electronic and online tools. They can also branch out into the new area of developing taxonomies for organization enterprise portals and intranets, and eventually into ontology construction and application.

There is also a need for information professionals to do more "value-adding" work. Instead of just identifying the source of information and providing documents, they will increasingly be evaluating, filtering, extracting, analyzing, summarizing, synthesizing and packaging information into a form that is ready for immediate use by their clients for decision-making and other purposes. In this way, information professionals will move from information work to knowledge work, and will have direct impact on their user's work and on the effectiveness and competitiveness of their parent organization. In a Web survey of 75 information professionals, Musher (2001) found that one third of the respondents believed that more value-adding is required in their work, including specialized research and packaging. One respondent in the study noted that clients are looking more for knowledge and less for information.

Table 2. Important competencies for librarians, cited by five library directors in Singapore

* competencies in italics were cited by at least three library directors

Traditional LIS skills extended to the handling of digital and online resources, including acquisition, *cataloguing and organization of resources*, metadata schemes, reference/information services, information packaging, circulation, preservation, online reference service, *information search skills*, copyright and intellectual property laws, user behavior, user needs, information sources, *packaging of information*, management of digital and hybrid libraries, evaluation of information and information sources, knowledge of information flows in society

Information management, including information audit, knowledge management

IT skills, including Internet, Web and XML technologies, RFID, federated search engines, programming and scripting, Windows operating system, productivity tools (e.g. word processing, spreadsheet, database, planning tools, etc)

Transferable/generic skills applied to the library environment, including *communication*, public speaking, writing, public relations, *interpersonal/group* skills, *networking*, research skills, interviewing and listening skills, conducting focus groups, *analytical skills*, *teamwork,* multi-tasking, time management

Teaching, training and coaching, including skills for providing user education and training in an E-learning environment, developing e-learning and computer-based learning materials, facilitating collaborative learning

Management and leadership, including planning, financial management, budgeting, project management, negotiation and persuasion, supervisory skills, performance management/evaluation, administrative skills, human resource, outsourcing, quality management, ability to motivate subordinates, lead groups effectively, strategic planning

Entrepreneurship, including business analysis and market research, *marketing*, fee-based information service, *networking skills* across job functions and levels

Attitudes and professional values, including user-orientation, service-orientation, belief in the pursuit of knowledge, love of learning, ability to read and respond to novel situations, intellectual curiosity, interaction with members of the profession, ability to articulate the roles of libraries and librarians

Other skills/knowledge: operation of call centers, publishing, Internet publishing

It is clear from the literature and from responses from library directors in Singapore that employers are increasingly emphasizing transferable and soft skills, especially communication, management, leadership, training and teamwork skills. Information professionals have to be effective in oral, written and electronic communication with users, colleagues and supervisors/managers. They have to be effective in promoting and marketing their services, as well as promoting the value of their service to the parent organization. They also need good interpersonal and networking skills to interact with their users and collaborate effectively with their colleagues. There is also a growing realization that libraries and information services play important social, cultural and community functions. Thus, social and community building skills are useful for information professionals—both for building a community of colleagues (community of practice or special interest group) and communities of users. Cronin (1983) noted that management of information had become very much a social activity.

Employers are also emphasizing appropriate attitudes and personal traits that are needed by information professionals to be effective in the new era. Information professionals have to be user-oriented, service-oriented, adaptable and flexible, quick to pick up new skills, and have an entrepreneurial or enterprising spirit. Goulding, Bromham, Hannabuss & Cramer (1999) noted that numerous studies in the U.S. and U.K. since the early 1980s had found that library and information employers placed a high premium on personal skills and traits such as enthusiasm, initiative, interpersonal skills, commercial awareness, extroverted personality, independence, entrepreneural flair, teamwork, ability to work under pressure, service orientation and flexibility.

However, different competencies are relatively more important for different types of information jobs and environments. Chaudhry & Lee (2001) carried out a survey of public librarians in Singapore, who were given a list of 50 competencies and asked to rate their importance for excellent performance in their current job. Top-rated competencies were (in decreasing order of importance): knowledge of the library's policies, procedures and services, teamwork, customer service, staff supervision and training, motivating staff, professionalism, knowledge of mission/roles of the public library, information needs of users, leading the team, problem-

solving, working independently, achieving results, and time management. Traditional skills related to information searching, reference work and collection development, and IT skills seem to be less important to public librarians in Singapore.

To find out what information skills are needed in non-library related jobs, we analyzed job announcements in the recruitment pages of the Straits Times newspaper (Singapore) for eight Saturdays in November and December 2004, to identify jobs that included some information handling component in the job scope or responsibilities. Out of approximately 2,300 jobs requiring at least a Bachelor's degree:
- 74 (3%) were IT-related positions
- 340 (15%) were non-IT-related positions that include some information handling responsibilities comprising at least 25% of the job.
- 23 (1%) were non-IT-related positions that include information handling responsibilities comprising at least 75% of the job.

Information skills in high demand are related to: business intelligence, competitive intelligence, environment scanning, information audit, information management, information organization, information searching, information security, information sources evaluation, information systems management, information vendor management, intellectual capital management, knowledge management, system evaluation, and user needs analysis.

In another study, graduates of the Information Studies programme were asked which of the courses in the programme were useful or relevant to their work, and which were not. Table 3 lists the courses most often found relevant or non-relevant. Traditional librarianship skills—knowledge of information sources and searching, collection development, information storage and retrieval, information society and information organization—are clearly still relevant. However, some of these also appear in the list of less useful courses, indicating either that these skills are not useful to some information jobs or that some graduates of the program are not working as information professionals. The results are compatible with those obtained in a survey by Buttlar & Du Mont (1996) of the alumni of an M.L.S. program in the U.S., in which 736 alumni rated a list of 55 competencies. The six competencies most often rated as essential were knowledge of sources, collection management, reference interview, written communication, critical thinking and interpersonal skills.

Table 3. Courses most often found relevant and not relevant by graduates of the Information Studies program at NTU

Results of a 2002 survey of graduates of the MSc Information Studies program at Nanyang Technological University, with 219 respondents

Graduates were asked the questions:
- What IS courses in your opinion were comparatively more relevant/useful in performing your job responsibilities?
- What IS courses, in your opinion, were comparatively less relevant/useful in performing your job responsibilities?

Courses most often considered useful/relevant

Information Sources & Searching
Collection Development
Information Storage & Retrieval
The Information Society
Information Organization
Knowledge Management
Internet & Web Technologies
Business Information Sources & Services
Cataloguing & Classification
Database Management Systems

Courses most often considered less useful or relevant (with at least 10 respondents)
Information Sources & Searching
The Information Society
Cataloguing & Classification

The Division is taking steps to inculcate and strengthen soft skills in its students through new teaching approaches and extra-curricular activities. Some generic skills, e.g. interpersonal skills, entrepreneurial skills and leadership, and professional attitudes and personal traits are difficult to impart to students via traditional lecture-based courses and exam-oriented learning. The Division is employing group learning, student-led seminars, project work, open-ended learning, seminar courses, e-learning, etc., to inculcate soft skills in students.

Profile of Students and Faculty

A major strength of the Information Studies programme is the diverse backgrounds of the students as well as its faculty. Khoo & Chennupati (2004) and Khoo, Higgins, Foo & Lim (2004) carried out in-depth analyses of the profile of applicants and students in 2000 and 2001, as well as their subject interests and selected areas of specialization. Overall, 58% of the applicants were male, the majority of applicants were aged 25 to 34 years (71%), and they came from a cross-section of industry, mainly education, engineering and IT, and from a wide range of educational backgrounds. Only about 13% were from the library and information services sector. There were a substantial number of non-Singaporean applicants from Malaysia, China and India, though many were Singapore permanent residents or working in Singapore.

A statistical analysis was performed to identify the characteristics or applicants selecting the various specializations. Applicants selecting different specializations had different profiles and educational and employment backgrounds. Applicants tended to select the specialization that was related to their educational and employment background. Teachers tended to select the school libraries specialization, people with finance, business and accountancy background tended to select corporate information services and knowledge management, and IT workers tended to select information systems. The library specializations tended to be selected by Arts & Social Science graduates, whereas science and technology graduates preferred information systems and the Internet specializations. However, the Internet specialization appeared to cut across all sectors, with applicants from every industry selecting it.

Gender and age differences were also found. The public library and school library specialisations tended to attract female applicants. The library specializations also attracted older applicants than the information systems and Internet specializations. Men and younger applicants were more interested in IT subjects, and the knowledge management area tended to be selected by slightly older applicants and male business/accountancy graduates.

The faculty of the Division are also from very diverse backgrounds. There are currently 13 faculty members, with two more positions expected to be filled in the next six months. Nearly half the faculty are Singaporeans. The rest are from Malaysia, Pakistan, Taiwan, Korea and Canada, though most have worked in several countries. Almost all the faculty have PhD degrees —in library and information science, computer science and management. All faculty members teach courses in all three Master's programmes—Information Studies, Knowledge Management and Information Systems—and collaborate in research projects, making for a rich learning environment.

The Accreditation Issue

There is no system in Southeast Asia for accrediting LIS education programmes. However, the Library Association of Singapore has set up a Standards and Professional Committee, chaired by the author, for developing accreditation and competency standards and procedures for Singapore. The Library Association is considering procedures for accrediting LIS education programmes in Singapore.

The issue of accreditation of LIS professional programmes has been discussed in regional LIS education conferences and workshops for a number of years. In 2000, Majid et al. (2002) carried out a questionnaire survey of LIS schools in Southeast Asia to explore the perceptions of the LIS schools about a regional accreditation scheme. 12 of the 14 schools surveyed agreed there is a need for developing an accreditation scheme for LIS degrees in Southeast Asia. 13 of 14 schools expressed interest in participating in a regional accreditation scheme. A majority of the respondents agreed that a joint committee of representatives from CONSAL (Congress of Southeast Asian Librarians) and LIS schools should be responsible for developing and coordinating a regional accreditation scheme. Majid et al. (2002) also outlined a model for developing and implementing an accreditation scheme under the auspices and oversight of CONSAL. The issue of accreditation and certification was raised at the CONSAL XII (2003) conference in Brunei, and a proposal for the development of a regional accreditation and certification scheme was included in the conference resolutions.

Conclusion

Within a period of 12 years, NTU Division of Information Studies has developed a vibrant, innovative and popular Information Studies programme that attracts high calibre students from diverse backgrounds from a cross-section of industry. In the 2005 admission exercise, a total of 776 applicants vied for 180 places in the three Master's programmes offered by the Division. Graduates of the programme also work in a wide range of organizations and environments.

The Information Studies programme defines 5 areas of concentration. The two most popular areas of concentration, information systems and knowledge management, have been developed further into separate MSc programmes. With this development, the Information Studies programme can now re-focus on developing its core LIS areas, and provide leadership in the development of innovative library and information services. The Division is developing the records management and archives specialization, in collaboration with the National Archives of Singapore, and the school media specialization. It has initiated two special themes—in Special Information Services and in Infopreneurship—which can later be developed into new specializations. The Division is strengthening its ties with the library profession by opening its courses to the profession to take for continuing education, and carrying out collaborative projects with libraries.

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