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Comment les programmes scolaires bibliothéconomie et sciences de l'information ont-ils évolué au cours des 20 dernières années ?

EunKyung Chung, Janet Schalk and JungWon Yoon

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Article abstract

This study analyzed the Association for Library and Information Science Education (ALISE) statistical reports from 1997 to 2020. This study demonstrated that over the past twenty years, the LIS trends of diversity and interdisciplinary work have all been well reflected in the LIS curricula both in iSchools and non-iSchools, and LIS schools are preparing their graduates for evolving information environments.

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EunKyung Chung
Ewha Womans University

Janet Schalk
Pasco-Hernando State College

JungWon Yoon
Jeonbuk National University

Abstract: This study analyzed the Association for Library and Information Science Education (ALISE) statistical reports from 1997 to 2020. This study demonstrated that over the past twenty years, the LIS trends of diversity and interdisciplinary work have all been well reflected in the LIS curricula both in iSchools and non-iSchools, and LIS schools are preparing their graduates for evolving information environments.

Keywords: LIS curriculum, LIS education, ALISE statistical reports

Résumé : Cette étude a analysé les rapports statistiques de l'Association for Library and Information Science Education (ALISE) de 1997 à 2020. Les résultats montrent qu'au cours des vingt dernières années, les tendances concernant la diversité et le travail interdisciplinaire en BSI se sont toutes bien reflétées dans les programmes d'études en BSI, à la fois dans les *iSchools* et les non-*iSchools*, et que les écoles de BSI préparent leurs diplômés à l'évolution des environnements d'information.

Mots clés : programme d'études en BSI, formation en BSI, rapports statistiques ALISE

Introduction

Library and Information Science (LIS) curricula reflect the knowledge, skills, and abilities that are necessary to prepare librarians and information professionals in

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constantly evolving, dynamic information environments (Saunders 2019). Therefore, analyses of LIS curricula can demonstrate which knowledge and skills are currently being offered in order to train qualified librarians and information professionals in the field (Chu 2006) and show how LIS curricula should evolve to meet the challenges that an emerging digital society requires.

There have been past studies which have examined the LIS programs and their respective curricula in North America. An LIS curriculum study of the 21st century, the KALIPER project, extensively examined LIS curricula and identified six trends shaping LIS curriculum changes (KALIPER 2000). Chu (2006; 2010) conducted a series of studies examining LIS curricula through an analysis of 45 American Library Association (ALA)-accredited LIS schools' required and elective courses by focusing on newly added courses, concentrations, and related issues. Chu (2012) also compared two groups of ALA-accredited schools, iSchools and non-iSchools, in terms of their program requirements, core courses, and concentrations/specializations. Markey (2004) examined the new courses, concentrations, and programs of 56 institutional members of the Association for Library and Information Science Education (ALISE), and Hall (2009) examined the required courses of all ALA-accredited LIS programs. Most studies analyzing North American LIS programs and curricula were conducted in the early 2000s, although there are also studies which have more recently analyzed the LIS curricula of non-North American LIS schools. With the rapid evolution of information technologies and their resulting direct influence on librarians and information professionals, it is essential to conduct a more timely study which critically examines North American LIS curricula.

Using the ALISE statistical reports, this study aims to understand how curricula of LIS schools in U.S. and Canada have evolved over the past 20 years. The following research questions were addressed in this study:

- RQ1: How have LIS courses and programs evolved over the past 20 years?
- RQ2: How does the iSchool movement influence LIS curricula?
- RQ3: How has LIS education been emphasizing more interdisciplinary collaborations?

A more thorough understanding of current LIS curricula will provide evidence which LIS schools and educators can use to determine the future directions of librarians and information professionals' training.

Related studies

As previously mentioned, there are studies which investigated LIS curricula across North America in the late 1990s and early 2000s, and they observed the following trends in North American LIS educational programs. (1) While the number of core requirements was reduced, more elective courses were simultaneously offered (Chu 2006). (2) While the subjects within LIS curricula were becoming broader, this diversity stemmed from not only technological developments but also social trends. Particularly, a user-centered approach was identified as a key concept to be emphasized in LIS education (KALIPER 2020; Chu 2006; Markey 2004). (3) Theory and research-

based education was given an additional emphasis (Chu 2006). (4) These trends were subsequently reflected in core courses, and research and information technology courses were also included as core courses. Additionally, LIS programs tended to adopt secondary core courses, in which students can choose additional core classes from sets of courses usually grouped by subject areas, in addition to those in the primary core curriculum (Hall 2009). (5) LIS schools were continuing to experiment with the structure of specializations by providing dual degree options and/or more flexible options for students to customize their curriculum. (6) There was a growth in more interdisciplinary LIS courses, reflecting a more interconnected curriculum (KALIPER 2020; Chu 2006). (7) Lifelong learning became a key focal point within the curriculum (Stoker 2000).

In addition, there have been studies which examined changes in LIS curricula through shifts in job descriptions, basic career requirements for librarians and information professionals, and the iSchool movement. Callison and Tilley (2001) analyzed job announcements, ALISE descriptors, and new course titles between 1988 and 1998, and reported that a more inclusive approach within the broader field of information science was the most notable change. They posited that this trend stemmed from the changes in job market demands and faculty members' research interests. McKinney (2006) compared LIS curricula with the ALA draft of core competencies for librarians and found that 95% of ALA-accredited programs provided courses addressing all of the ALA core competencies. Chu (2012) compared two groups of ALA-accredited programs, five iSchools and five non-iSchools, and discussed that there were clear differences in course offerings that were observed between two groups. Saunders (2019) identified core and specialized knowledge sets, skills, and aptitudes which were rated by 2,000 information professionals and LIS faculty members. The eleven core skills included interpersonal communication, knowledge of professional ethics, writing skills, evaluating and selecting information resources, teamwork, research skills, customer service skills, cultural competence, ability to interact with diverse communities, reflective practice grounded in diversity and inclusion, and the ability to reference interviews and/or negotiations.

Beyond North America, there are also studies which have examined their own respective LIS curricula. In Africa, several studies were conducted, including an analysis of core components of LIS curricula in South Africa (Raju 2003), a discussion of the status, trends and challenges of LIS education in Eastern and Southern Africa (Ocholla and Bothma 2007), and the examination of curriculum development in Nigerian universities (Edegbo 2011). Further, Aina (2005) discussed the development of an ideal African LIS curriculum, which identified eight modules: library concepts, information and communication technology, archives and records management, rural information service, research, management, publishing and public relations. From the studies conducted in Asian countries, the emphasis on Information Communication and Technology (ICT) was particularly noticeable. Marouf and Rehman (2007) identified four competency areas (ICT, business management, LIS skills, and social and personal attributes), which were based on inputs from employers, professionals, academics, and students in Kuwait. Singh and Shahid (2010) examined LIS education in India and found there was a lack of information technology in LIS education, and Tyagi and Yanthan's

(2017) study analyzed the ICT contents of postgraduate degree courses in India, subsequently suggesting a more standardized curriculum which would meet international standards. Wijetunge (2009) identified six subject areas which were taught in most of the LIS programs in Sri Lanka, and Mo, Seon, Park and Kim (2020) analyzed the current status of LIS courses in South Korea. In Europe, Juznic and Badovinac (2005) analyzed changes in LIS curricula in the European Union and reported that LIS schools had changed their curricula to embrace the new generation of professionals.

There are studies which have compared LIS educations between two countries. Siddiqui and Walia (2013) examined the differences between the LIS post graduate courses in India and in the UK, Kacunguzi (2016) compared the LIS curricula of the U.S. and Uganda. Also, Xue, Wu, Zhu and Chu (2019) compared the LIS educations of China and the United States. Additionally, there have also been studies which have examined broader, more global trends in LIS education. Abdullahi, Kajberg, and Virkus (2007) gave an overview of the multifaceted internationalization of activities in LIS education and made suggestions on how to develop more internationalized LIS programs to respond to the challenges of globalized world. Wyman and Imamyerdiyev (2018) conducted a literature review on how international LIS educational systems have changed over the twenty-year period of 1997 to 2017 and discussed common trends in LIS educational programs and curricula. They noted that the differences were mainly due to country regulations and course change flexibility.

Methods

Using the ALISE statistical reports, this study analyzed how LIS curricula have evolved over the past 20 years. The ALISE statistical reports include data about LIS programs among ALISE Institutional members. The ALISE statistical report is composed of five sections: Faculty, Students, Curriculum, Income and Expenditure, and Continuing Professional Education. Among these five sections, this study focused on the Curriculum section[1].

The ALISE statistical reports, which are accessible from the ALISE website, have been published annually since 1997, with a few missing years, including 2007, 2008, 2011, 2013, and 2014. Each report includes data based on the previous academic year. For example, the 2020 ALISE statistical report includes the data from the 2018/2019 academic year. In order to examine curriculum trends over a period of 20 years, this study analyzed three ALISE reports: the first available ALISE report (1997), the latest ALISE report (2020), and the middle year (2009). However, in order to analyze new course changes, we gathered information from the entire set of reports in order to

[1] From the Curriculum section, the following tables were used: Table III-1 (Type of Academic Year Division), Table III-8 (Summary of Academic Credit Requirements for Degrees), Table III-9 (Certificate program), Table III-10 (Academic Credit Requirements for Joint Degree Programs), Table III-16 (Required Courses Work Hours), Table III-24 (Thesis Options by Number of Degrees), Table III-26 (Number of Programs Offering Field Work for Credit), Table III-28 (Special Requirements for Graduation), Table III-39 or 40 (Curriculum Changes Under Consideration), Table III-41 (Name and Number of Required Courses in Different Master's Programs), and Table III-41-a (Name and Number of Required Courses in Different Concentrations).

obtain the full list of courses which were added over the years. According to the Tables III-1, the total numbers of schools submitting their information through ALISE statistical reports were 58 (1997), 56 (2009), and 70 (2020), but non-ALA accredited schools were removed from our analysis. The status of schools' ALA accreditation was cross-checked with the ALA website[2] in order to ensure accuracy. As a result, the following numbers of ALA accredited and ALISE affiliated LIS schools in U.S. and Canada are selected: 57 LIS schools from the 1997 report, 55 LIS schools from the 2009 report, and 54 LIS schools from the 2020 report.

This study analyzed the evolution of LIS curricula by comparing iSchools and non-iSchools. The iSchool movement, which was initiated in 1988 by three LIS schools (Pittsburgh, Syracuse, and Drexel) with the purpose of promoting interactions between schools, led to 119 iSchool memberships as of January 2021. According to the iSchools website[3], iSchool "members are expected to have substantial sponsored research activity, engagement in the training of future researchers (usually through an active, research-oriented doctoral program), and a commitment to progress in the information field." In this study, iSchools are the LIS schools which hold iSchool memberships; the other LIS schools are categorized as non-iSchools. Since the 2009 ALISE report includes information from the 2007/08 academic year and the 2020 reports includes information from the 2018/19 academic year, iSchool memberships from LIS schools were counted in 2008 and 2019, respectively. The number of LIS schools holding iSchool memberships measured at 13 among 55 LIS schools (23.64%) from the 2009 ALISE statistical report, and 33 among 54 LIS schools (61.11%) from the 2020 report. Since there were only three iSchools during the 1995/1996 academic year, we only performed a comparison between the iSchools and non-iSchools from the 2009 and 2020 ALISE statistical reports.

Data analysis

Among the Curriculum section of ALISE statistical reports, Tables III-8, III-41, III-39 (or 40), III-41a, III-9, and III-10 were manually coded in terms of the type of Degree names, Required courses, New courses, Concentrations, Post-master/certificate programs, and Joint degree programs, respectively.

Regarding the Required courses, a previous study (Hall 2009) that conducted a content analysis of core courses provided the basis of the coding scheme. Two authors of this study coded 50% of the dataset and discussed slightly revising the scheme reflecting the characteristics of the current dataset. The finalized coding scheme was applied to the entire dataset of Required courses by two authors.

For Degree names, Concentrations, New courses, Post-master/certificate programs, and Joint degree programs, open coding was conducted. First, two authors of this study started with the Concentrations. The two authors individually coded 50% of the datasets and discussed the development of initial coding schemes. The authors individually coded the other 50% of the dataset with the initial coding scheme, and then

[2] Accredited Library and Information Studies Master's Programs from 1925 through Present http://www.ala.org/educationcareers/accreditedprograms/directory/historicallist

[3] https://ischools.org/Apply-to-join

revised the initial coding scheme. Finally, the coding scheme were finalized with minor revisions and the two authors applied the revised coding schemes to the entire dataset of Concentrations.

Second, for New courses and Post-master/Certificate programs, the coding scheme which was developed for the Concentrations provided the basis of initial coding scheme. For instance, 50% of Post-master/Certificate program dataset was coded by two authors with the coding scheme developed for Concentrations. Then, the two authors revised the initial coding scheme for reflecting the unique features of Post-master/Certificate programs. Using the revised coding scheme, two authors coded the other 50% of Post-master/Certificate programs and finalized the coding schemes with minor revisions. The finalized coding scheme was applied to the entire dataset of Post-master/Certificate program. The same process was conducted for New courses.

Third, since the Degree names and Joint degree programs have different contents from Concentrations, the same process for the development of Concentrations coding scheme was used for each of Data names and Joint degree programs. The two authors individually coded 50% of the datasets and developed initial coding schemes for each of Degree names and Joint degree programs. The authors individually coded the other 50% of the dataset with the initial coding schemes, and then revised the initial coding schemes. The coding schemes were finalized with minor revisions, and the finalized coding schemes were applied to the entire datasets of Degree names as well as Joint degree programs.

One of three authors who did not code the datasets coded 10% of datasets to check intercoder reliabilities. Percentage agreements were calculated to check intercoder reliabilities using Holsti's (1969) reliability formula. The percentage of intercoder agreement was 86.88% on average (Degree names: 87.50%; Required courses: 90.88%; New courses: 78.14%; Post-master/certificate programs 87.50%; Concentrations: 81.25%; Joint degree programs: 100%).

Results

The trends of LIS education have been examined through the names of the LIS degrees, LIS required courses, thesis/fieldwork/special requirements, new courses, concentrations, certification programs, and joint degree programs.

Degree name

The 1997 ALISE statistical report did not specify the degree names of LIS schools, and we assume that this is due to the fact that degree names offered by LIS schools were not as diverse at that time. However, we were able to compare degree names from between the 2009 and 2020 reports.

In the 2009 report, 79 degrees were offered from 55 LIS schools (avg. 1.44/school), 25 degrees from 13 iSchools (avg. 1.92/school) and 54 degrees from 42 non-iSchools (avg. 1.29/school). According to the 2020 report, 97 degrees were offered from 54 LIS schools (avg. 1.80/school), 67 degrees from 33 iSchools (avg. 2.03/school) and 30 degrees from 21 non-iSchools (avg. 1.43/school). These results demonstrate

that LIS schools have begun offering more diverse degrees over the past ten years, and iSchools offer more degrees than non-iSchools. The degrees offered by non-iSchools and iSchools are shown in Appendix 1. Among the proportions of degrees offered, Figure 1 displays the proportions of degrees such as LIS (Library and Information Science), IS (Information Science), LS (Library Science), and other degrees, between non-iSchools and iSchools. As shown in Figure 1, in 2009, the proportions reveal differences between LIS and IS degrees, while the proportions of LS and other degrees remain similar between non-iSchools and iSchools. However, there are considerable changes in the proportions of degrees of LIS, IS, LS, and others in 2020. The iSchools offer a substantial proportion of degrees (45%) in the others category, whereas the non-iSchools offer only 23% of degrees in this same category. In addition, the proportion of degrees of LS exhibits a drastic change from 23% to 4% in 2020.

Regarding the "Other" category (see Appendix 1) in iSchools, the Information (or Knowledge) Management degree was found to be most popular, making up approximately 12% of the degrees offered. In non-iSchools, however, various degrees which were categorized as "Not specified" (15%), and which were simply labeled as MS or MA, were offered the most in 2009. A decade later in 2020, there has been an increase in the diverse degrees offered by iSchools, such as Information (or Knowledge) Management, Information Technology (including Intelligence Studies, Security, Telecommunication), School Media, Archive, Health Informatics, Computer Science, Data Science, HCI, Museum Studies, and Media Studies. New degrees in several areas have appeared mainly in iSchools, such as Archive, Health Informatics, Computer Science, Data Science, HCI, Special Librarianship (Law Librarianship and Children's Literature), and Museum Studies. On the other hand, the number of degrees offered by non-iSchools has decreased, particularly in subjects such as Information (or Knowledge) Management, School Media, and Media Studies.

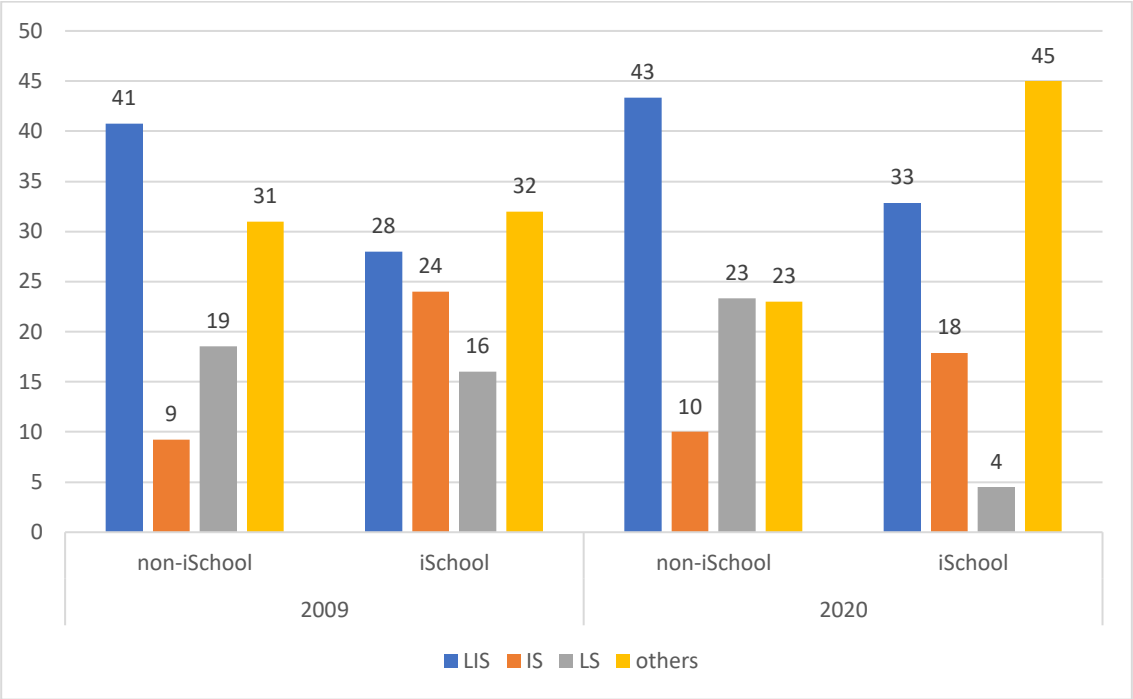

Figure 1. A comparison of LIS, IS, LS, and other degrees between non-iSchools and iSchools (in percentage points). (Source: Table III-8)

Required courses

Figure 2Figure 2 presents the required amount of coursework per degree by credit hours, as offered by LIS schools in 1997, 2009, and 2020 respectively. For this analysis, quarter system schools were excluded based on Tables III-1, and if multiple degrees by one school are offered, each degree was calculated. Credit hours between 11 and 15 hours were the most commonly observed required hours per degree over the two decades. Since a course can be offered in various credit_hours, it is difficult to transfer the credit hours into the course numbers. However, according to Table III-41 (2009 and 2020) which provided the list of required courses, 4-6 courses were most frequently designated as required courses. From the ALISE reports it is observed that the trend is towards fewer required courses, as more schools have shifted toward fewer required credit hours as a percentage of the total degree. For instance, the 2020 ALISE report indicated growth in the "10 or under" and "11-15" categories (the number being the percentage of credit hours composing required courses), and a decline in all others.

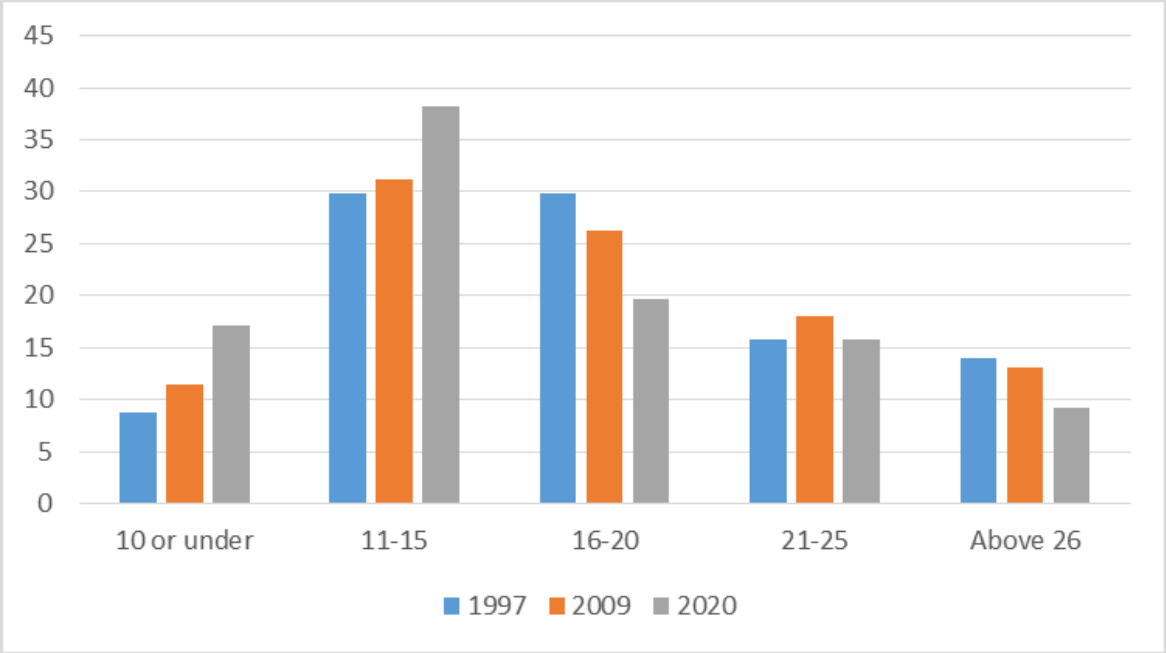

Figure 2. Required course credit hours (in percentage points). (Source: Table III-16)

Table 1 presents the required courses of LIS programs and their equivalent degrees. As LIS schools offer multiple degrees, an analysis of the required courses was conducted for one degree from each school, focusing on the degree which best represents LIS programs or is the most equivalent to most LIS programs. As the 1997 ALISE statistical report does not include the list of core courses, this analysis was performed only with the 2009 and 2020 reports. Although the names of required courses were diverse, the categorizations of required courses were adopted from Hall (2009)'s study, which also analyzed LIS core courses.

In both years, Organization of Information Sources, Library Management, Foundations, Research Methods, and Reference Services were the required courses for more than 50% of LIS programs, except for Reference Services in 2020 (46.30%). Compared to the 2009 report, the percentages of required courses have decreased in most degree programs. According to the comparison between iSchools and non-iSchools, in 2020, User Needs and Behavior and Ethics had higher percentages in iSchools. However, in 2009, Library Management, Information Technology, Information Access/Retrieval, User Needs and Behavior and Instruction are the courses which have higher percentages in iSchools.

	2009						2020					
	iSchool		Non-iSchool		Total		iSchool		Non-iSchool		Total	
	#	%	#	%	#	%	#	%	#	%	#	%
Organization of information sources	8	72.73	38	92.68	46	88.46	24	72.73	16	76.19	40	74.07
Foundations of the field	5	45.45	28	68.29	33	63.46	19	57.58	15	71.43	34	62.96
Library management	9	81.82	30	73.17	39	75.00	16	48.48	13	61.90	29	53.70

Research methods and evaluation	6	54.55	25	60.98	31	59.62	15	45.45	14	66.67	29	53.70
Reference services and sources	4	36.36	26	63.41	30	57.69	10	30.30	15	71.43	25	46.30
Information technology	6	54.55	17	41.46	23	44.23	14	42.42	9	42.86	23	42.59
Information access/retrieval	5	45.45	15	36.59	20	38.46	8	24.24	8	38.10	16	29.63
Information and society	6	54.55	15	36.59	21	40.38	7	21.21	4	19.05	11	20.37
Capstone/thesis	1	9.09	7	17.07	8	15.38	7	21.21	6	28.57	13	24.07
User needs and behaviour	4	36.36	5	12.2	9	17.31	6	18.18	2	9.52	8	14.81
Collection development	2	18.18	8	19.51	10	19.23	3	9.09	6	28.57	9	16.67
Internship/practicum	0	0	5	12.2	5	9.62	2	6.06	3	14.29	5	9.26
Instruction	1	9.09	0	0	1	1.92	1	3.03	2	9.52	3	5.56
Ethics	0	0	3	7.32	3	5.77	2	6.06	0	0.00	2	3.70

Table 1. Required courses of LIS and other equivalent degrees. (Source: Table III-41)

Thesis, fieldwork, and special requirements

Table 2 and Table 3 present thesis, fieldwork, and special requirements. Since there is inconsistency among the three ALISE statistical reports, a precise comparison among the three years is not available. However, the reports clearly demonstrate the trends over the past 20 years. First, the request for fieldwork experience has increased and is labeled as either optional or required. Second, there has been a decrease in a comprehensive exam and language requirement. Finally, the requirements for portfolios, culminated experience, exit interviews, and computer competency has increased.

	Thesis			**Fieldwork**		
	Required	Optional	None	Required	Optional	None
1997	9	33	16	17	46	1
2009	8	27	26	25	44	1
2020	11	38	NA	23	62	NA

Table 2. Thesis options and fieldwork by number of programs.
(Source: Tables III-24 & III-26)

	1997	2009	2020
Comprehensive exam	22	17	11
Portfolio	NA	17	36
Culminated experience	NA	11	32
Exit interview	NA	5	12
Computer competency	NA	NA	29
Language	5	6	NA
Others	10	7	NA

Table 3. Special requirements for graduation by the number of programs.
(Source: Table III-28)

New courses

In order to analyze the new courses which were reported in the ALISE statistical reports, we had to gather the reports of new courses (which are available on either Table 39 or Table 40) from 1997 to 2020, rather than examining the three individual years. Since there was no report for 2007 and 2008, we grouped the new course reports into two categories: 1997-2006 and 2009-2020. Table 4 shows the new course categories which accounted for over 4% of new courses in either the 1997-2006 or 2009-2020 categories (see Appendix 2).

First, there are categories which constantly have new courses throughout the two time windows: Archival & Record Management, Information Organization, Leadership and Administration, and Information Technology (general). These categories have new courses both in iSchools and non-iSchools. Second, there are categories which have more new courses in 2009-2020: Cultural Heritage, Data Science/Data Analysis, Digital Curation, Social Media, IT-Security and IT-Programming. In addition, Digital Humanities was a course that was newly observed for the period of 2009-2020. Comparing iSchools and non-iSchools, Cultural Heritage and Youth Services showed an increase among non-iSchools, whereas Data Science/Data Analysis, Digital Curation, HCI, Research Methods, IT-Security and IT-Programming are the categories which showed an increase, mainly in iSchools. Third, on the other hand, there were categories which showed a decrease in new courses from 1997-2006 to 2009-2020: Digital Libraries/Digital Librarianship, Instructional Technology, Knowledge Management, User Services, IT-Information System and Design.

	1997-2006						2009-2020					
	iSchool		Non - iSchool		Total		iSchool		Non - iSchool		Total	
	#	%	#	%	#	%	#	%	#	%	#	%
Archival & records management	54	7.11	47	7.86	101	7.44	23	4.03	30	7.13	53	5.34
Data science/data analysis	7	0.92	5	0.84	12	0.88	54	9.46	27	6.41	81	8.17
Digital curation	4	0.53	2	0.33	6	0.44	26	4.55	5	1.19	31	3.13
HCI	19	2.50	13	2.17	32	2.36	33	5.78	7	1.66	40	4.03
Health science	18	2.37	17	2.84	35	2.58	19	3.33	17	4.04	36	3.63
IT-Information systems and design	56	7.38	42	7.02	98	7.22	9	1.58	5	1.19	14	1.41
IT-General	38	5.01	26	4.35	64	4.72	24	4.20	22	5.23	46	4.64
IT-Programming	6	0.79	3	0.50	9	0.66	33	5.78	2	0.48	35	3.53
Information organization	49	6.46	38	6.35	87	6.41	27	4.73	18	4.28	45	4.54
Knowledge management	46	6.06	36	6.02	82	6.04	11	1.93	18	4.28	29	2.92
Leadership and administration	43	5.67	28	4.68	71	5.23	19	3.33	23	5.46	42	4.23
Public library	15	1.98	13	2.17	28	2.06	22	3.85	17	4.04	39	3.93
Research methods	20	2.64	17	2.84	37	2.73	28	4.90	9	2.14	37	3.73
User services	64	8.43	42	7.02	106	7.81	12	2.10	8	1.90	20	2.02
Youth services	29	3.82	32	5.35	61	4.50	9	1.58	31	7.36	40	4.03

Table 4. New Courses for both iSchools and Non-iSchools. (Source: Table III-39 or 40)

Concentration

Concentration data is available from the 2020 report, but not from the 1997 and 2009 reports. Chu (2006) addressed that "electives from each LIS curriculum, although sometimes named differently, can be easily placed into clusters by subject content. Traditionally, most of those course clusters are often variously treated as course tracks, area concentrations, and the like" (332). Students can obtain deeper knowledge in a selected area through concentrations, specializations, and tracks (Sanders 2019). Figure 3 presents the top 13 concentrations, and the full list of concentrations is in Appendix 3. According to the 2020 report, Archival (13.13%), School Media (11.88%), Public Library (10.63%), and Data Science/Data Analysis (8.13%) are the most popular concentrations among LIS schools. On average, 2.96 concentrations were offered in LIS programs, and non-iSchools tend to provide a greater number of concentrations (3.53 concentrations are from non-iSchools and 2.6 from iSchools). Data science, Information Technologies, and HCI are more popular within iSchools.

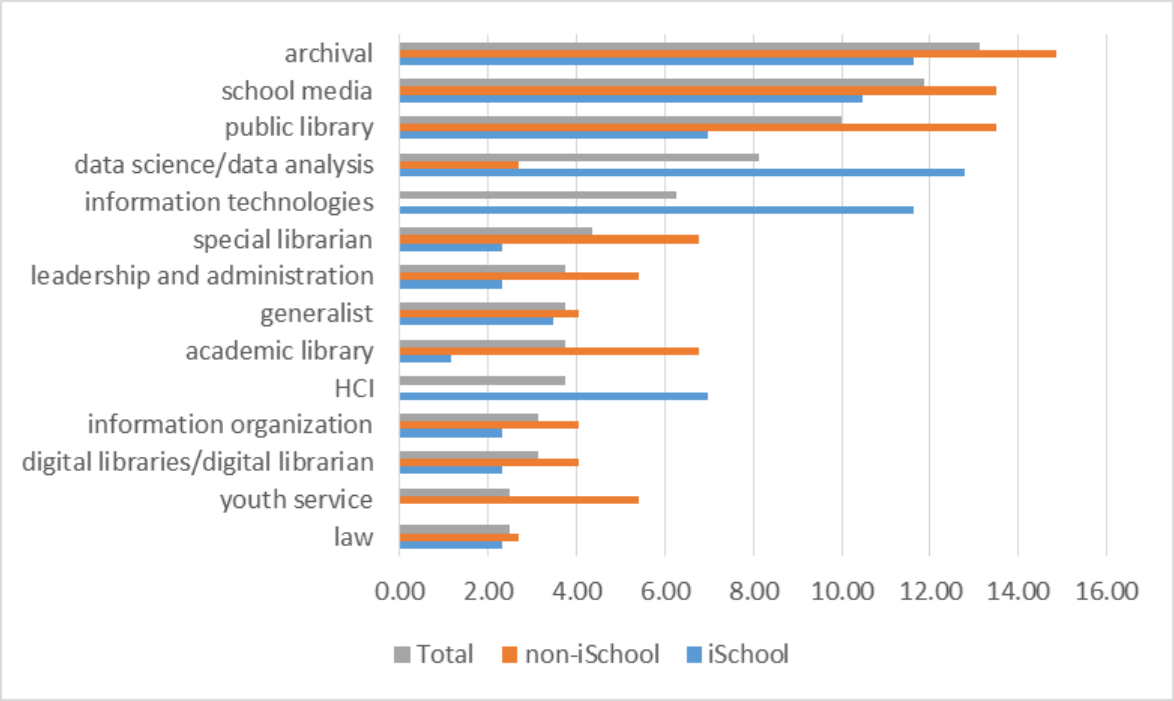

Figure 3. The percentages of the top 13 concentrations in LIS schools (2020). (Source: Table III-41-a)

Post-master or certificate programs

Post-master or certificate programs offer current LIS students, LIS graduates, or paraprofessionals the opportunity to update their competences in specialized areas. Markey (2004) addressed that certification is another way through which students can deepen a specialized area. Figure 4 presents the top 13 post-master or certificate programs. Appendix 4 lists all post-master and certificate programs from over the three years, and Appendix 5 compares iSchools' and non-iSchools for the 2009 and 2020 years. Noticeably, the number of certificate programs offered has increased over the past 20 years (68 programs in 1997, 97 programs in 2009, and 121 programs in 2020).

Additionally, certificate programs have become more diverse. According to the coding categories, 9 unique programs were offered in 1997, 18 programs in 2009, and 20 programs in 2020. According to the 2020 report, Archival (18.08%), Health Informatics (8.26%), Information Technology (9.09%), School Library Media (10.74%), and Advanced/Post (10.74%) were the most popular certificates. Compared to past years, Archival, Health informatics, and Information Technology exhibited a large amount of growth, whereas School Library Media and Advanced/Post have decreased over time, although they still remain relatively popular. In addition to these more popular certificates, Data Science, Digital Humanities, Informatics, Leadership and Management, and Youth Service are emerging as more popular, whereas Knowledge Management, School Library Media and Special Librarianships have decreased.

According to the comparison between iSchools and non-iSchools, Information Technology and Health Informatics-related certificate programs are more popular among iSchools, whereas Archival, School Library Media, and Leadership and Management-related certificates are more popular among non-iSchools. iSchools offered a greater number of post-master and certificate programs than non-iSchools; however, the average number of certificate programs among iSchools has decreased over time (iSchools: 3.08/school (2009), 2.64/school (2020); non-iSchools: 1.36/school (2009), 1.62/school (2020).

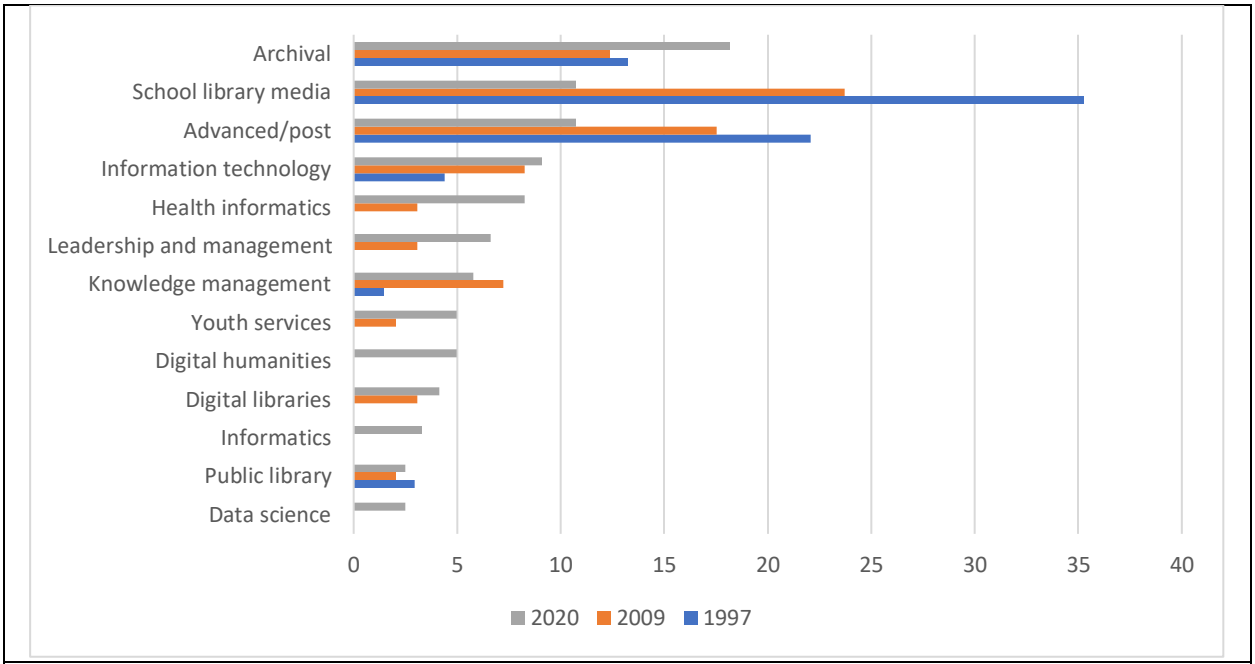

Figure 4-1. Comparison by year.

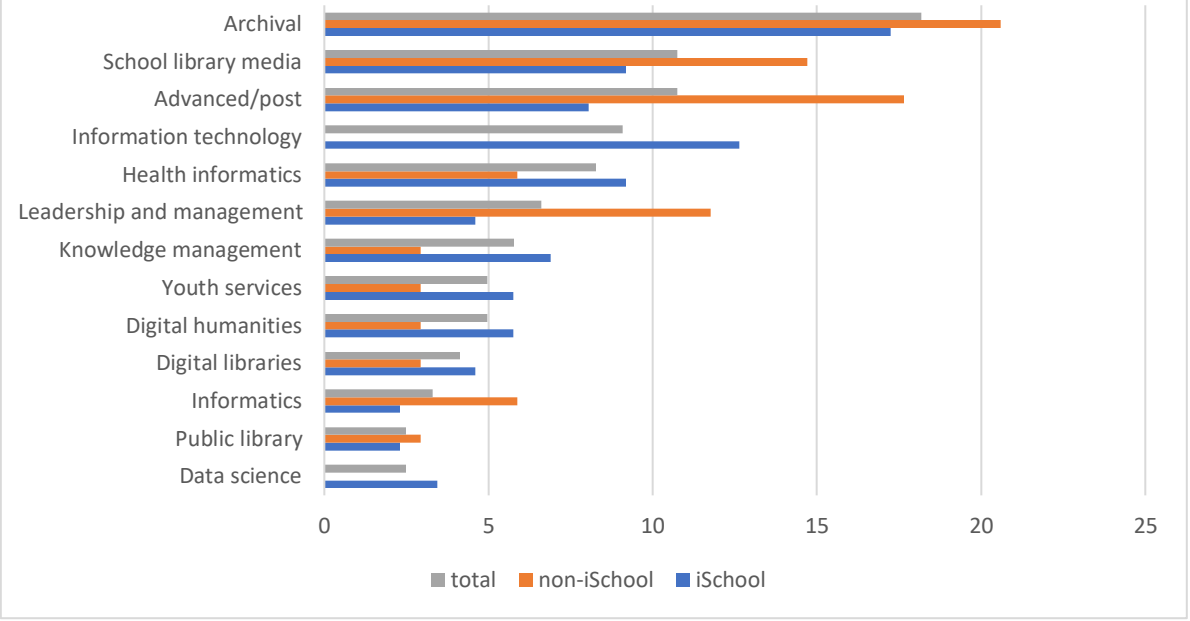

Figure 4-2. iSchool vs. non-iSchool (in 2020).

Figure 4. The percentages of top 13 post-master and certificate programs. (Source: Table III-9)

Joint degree program

Figure 5-1 presents the top 15 departments for joint degree programs based on the 2020 ALISE statistical report, and Figure 5-2 compares these 15 departments between iSchools and non-iSchools. Appendix 6 is the full list of joint degree programs over the three selected years (1997, 2009, and 2020), and Appendix 7 compares iSchools and non-iSchools. It is noticeable that from 1997 to 2009, joint degree programs have increased and become more diverse. As of 2020, History (19.42%), Regional Studies (11.65%), and Language/Literature (10.68%) are the departments which offer joint degree programs with many LIS programs. History is the department which has offered joint degree programs since 1997, and the offering of Regional Studies has constantly increased over time. However, Law departments showed a huge decrease in 2020. A comparison between iSchools and non-iSchools in both the 2009 and 2020 reports demonstrated that joint programs with Art History and Computer Science appear more often among iSchools, whereas joint programs with Language/Literature and Regional Studies appear more commonly among non-iSchools. However, the overall difference between iSchools and non-iSchools has decreased.

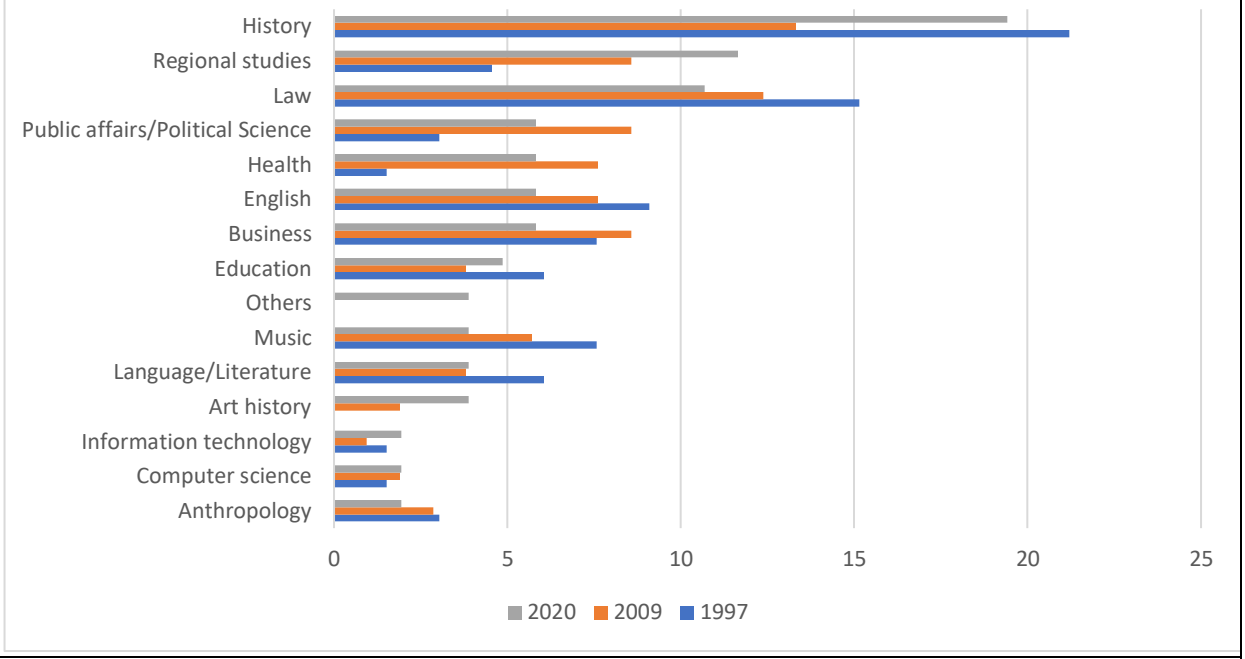

Figure 5-1. Comparison by year.

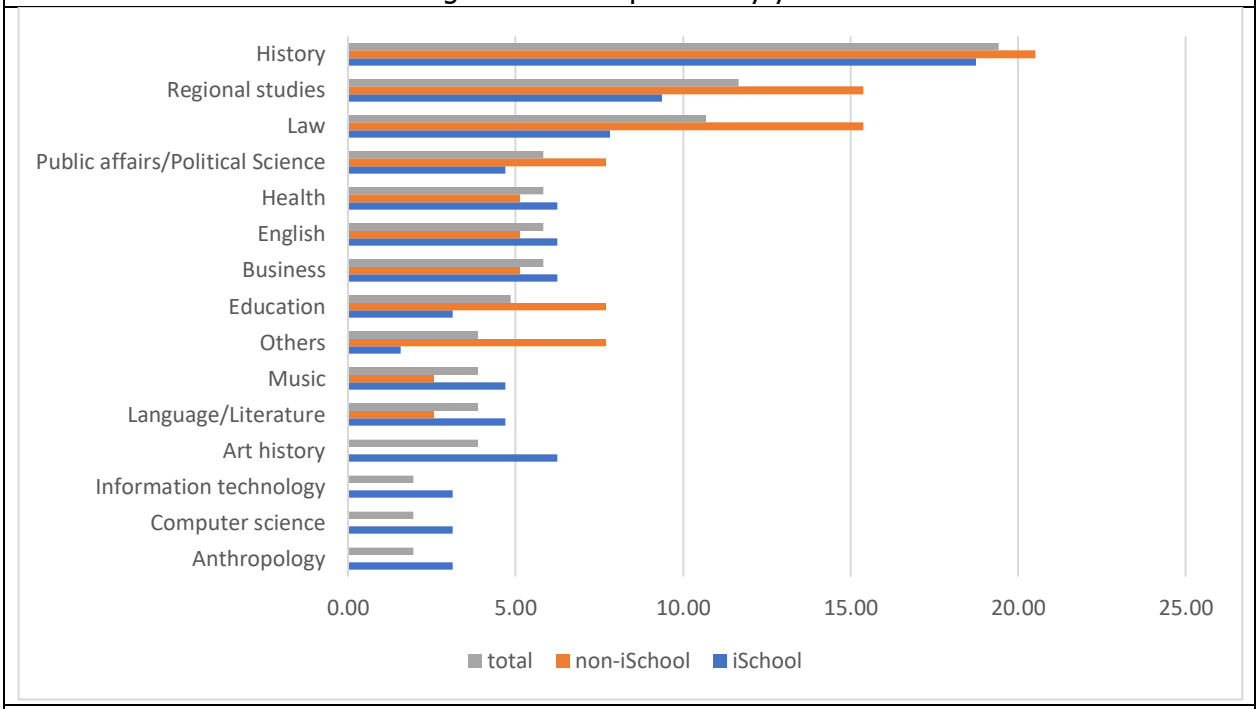

Figure 5-2. iSchool vs. non-iSchool (in 2020).

Figure 5. The percentages of top 15 joint programs. (Source: Table III-10)

Discussion

An LIS curriculum reflects the education of librarians and information professionals, revealing exactly how they are equipped with the skills and knowledge which are necessary in the field, thereby adequately preparing them for the future of libraries (Chu 2006). This study analyzed ALISE statistical reports and examined how

LIS curricula offered by ALA accredited have evolved over the past 20 years by answering three research questions.

RQ1: How have LIS courses and programs evolved over the past 20 years?

First, the overall direction of LIS schools is towards increasing "diversity" within the profession. This trend can be noticed from the changes in the degrees and certificate programs offered by LIS programs, as LIS schools have offered more degrees over the past ten years and developed more diverse certificate programs. LIS schools have provided approximately two times more certificate programs over the past two decades (on average 1.19 certificate programs per LIS school in 1997 and 2.24 in 2020). An analysis of degree names and certificate programs demonstrated which areas have been receiving more attention recently. Information Technology, Archives, Health Informatics, Data Science, HCI, Digital Humanities, Leadership and Management, Information Science, Knowledge Management, and Youth Services are the areas that have increased, whereas School Media and Special Librarianship are decreasing over time, although School Media still remains a somewhat popular area. The trend of increasingly diverse LIS curricula has been observed in previous studies (Chu 2006; KALIPER 2000). Chu (2006, 335) noted that "a wider range of subject topics seem [to be] covered nowadays, [more so] than in the pre-Internet era. […] [D]evelopment[s] in information technology and services have a major impact on curriculum design, and it is common for a curriculum to change with the time and technology. […] [N]evertheless, technology alone does not represent all the changes that take place in the arena of LIS education."

The trend of increasing diversity in LIS curricula may reflect the fact that LIS schools prepare graduates not only for traditional libraries, but also for non-traditional information environments. According to Library Journal's Placements and Salaries 2017 report, more and more LIS graduates find their career paths deviate from traditional library settings, and even within traditional libraries, LIS graduates work within new and emerging roles as information professionals (Allard 2017). Sanders (2019, 4) observed: "[T]he variety of jobs also raises some questions about how these programs can respond to rapid changes and meet the wide range of employers' evolving needs in order to best prepare students for professional positions". The findings of this study show how LIS schools are preparing their graduates for evolving information environments.

Second, the current study which compared the 1997, 2009 and 2020 ALISE statistical reports demonstrated that there is no big change in the number of required courses; between 11 and 15 credit hours has remained as the most common required number of course credit hours over the past 20 years. However, the fact that more programs offer less than 10 credit hours as the number of required courses in the 2020 report supports Chu (2006, 335)'s observation that, "the core requirements are reduced to as few as two courses.". This finding is contradictory with Hall (2009, 63), who compared his study with Irwin (2002)'s and Markey (2004)'s and concluded that "a movement within LIS programs [is] to require more courses."

Core courses "form the basis of a common understanding of librarianship" (Hall 2009, 57). ALA published "ALA's Core Competencies of Librarianship" in 2009, specifying the following eight areas as the basic required knowledge for LIS graduates: Foundations of the Profession, Information Resources, Organization of Recorded Knowledge and Information, Technological Knowledge and Skills, Reference and User Services, Research, Continuing Education and Lifelong Learning, and Administration and Management (American Library Association 2009). However, the trends of required courses found in this study do not correspond to all of these areas of core competencies. According to the 2020 report, Organization of Information sources (74.07%), Foundations (62.96%), Library management (53.70%), and Research methods (53.70%) are required courses for more than 50% of LIS programs. Compared to the 2009 ALISE statistical report, the percentages of required courses have decreased for most programs. Markey (2004) and Hall (2009) addressed the increase in information technology and research as core courses. However, the current study demonstrated that information technology is not as popular as research methods as a required course. Instead, various new courses related to information technologies are offered as electives rather than required courses. It is understandable that emerging technologies are introduced as new courses rather than required courses. Additionally, this study is consistent with previous studies showing that research-based education is being emphasized more (Chu 2006). Markey (2004) and Hall (2009) reported a drop in Reference, which was also observed in this current study.

Third, there are areas which have noticeably expanded with new courses. Cultural Heritage, Digital Humanities, Data Science/Data Analysis, Digital Curation, Social Media, IT-Security and IT-Programming have experienced a remarkable increase of new courses during the period of 2009-2020, whereas during the 1997-2006 period, new courses were actively added in the following areas: Digital Libraries/Digital Librarianship, Instructional Technology, Knowledge Management, User Services and IT-Information System and Design. The trends of these new courses demonstrate what knowledge and skills are expected in order to meet the changing roles of librarians' and information professionals' information environments that are rapidly evolving.

RQ2: How does the iSchool movement influence LIS curricula?

iSchools, which were initiated in 1988 by three LIS schools, have now grown to 119 iSchools as of January 2021. Among the 54 ALA-accredited LIS schools listed in ALISE report, 61.11% of them have been designated iSchools. This study found a few different trends between iSchools and non-iSchools. First, iSchools offer more degrees than non-iSchools, and new degree names appeared mostly in iSchools. Second, iSchools have fewer required courses than non-iSchools. Third, regarding newly added courses, within iSchools, a greater number of new courses appeared in the areas of Data Science/Data Analysis, Digital Curation, HCI, Research Methods, IT-Security and IT-Programming, whereas among non-iSchools, more new courses appeared in the areas of Cultural Heritage and Youth Services. The new courses and degrees among iSchools demonstrate their efforts to become more interdisciplinary, and this issue will be further discussed in the discussion section of RQ3. Fourth, concentrations were more

popular within non-iSchools; however, iSchools offer more certificate programs. Finally, according to the 2020 ALISE statistical report, new courses and concentrations demonstrated that iSchools focused more heavily on data science and data-related fields, which is consistent with the findings from Ortiz-Repiso, Greenberg and Caizada-Prado (2018).

Dillon (2012, 267) stated that "Schools of Information ('iSchools') might better be seen as representative of efforts to extend concerns with information and human users beyond the agency model of traditional LIS approaches." The iSchool movement has been controversial within the LIS field; some point towards the division of communities, whereas others insist that the iSchool would broaden the LIS field (Dillon 2012). As Chu (2010) effectively summarized the arguments, on one hand, the iSchool movement was observed as a branding issue (Wallace 2009) as the MLIS graduates of iSchools still desired to work at libraries. On the other hand, iSchools are expected to offer a unique curriculum that prepares leaders for the future information society (Seadle and Greifeneder 2007). In spite of the debates on iSchool movements, the current study's results demonstrated that more and more LIS schools have joined the ranks of iSchools, and support Wu et al.'s (2012) observation that with the development of the information science field, even the LIS schools which have not joined the iSchools are choosing to integrate information topics into their curricula.

RQ3: How has LIS education been making interdisciplinary collaborations?

Interdisciplinary efforts in LIS education were examined through the occurrence rate of degree names and joint programs. Non-traditional LIS degrees have increased over the past decades, and among them, Health Informatics, Computer Science, Data Science, HCI, and Museums are the ones that have newly appeared. Regarding joint degree programs, the increase was observed between the 1997 and 2009 reports. History, Law, English, and Business are the departments which appeared since 1997, and Regional Studies, Public Affairs/Political Science and Health (medicine, nursing, pharmaceutical science, and public health) appeared since 2009. Although noticeable changes have not been observed since 2009, joint degree programs are still offered. An interesting finding is that joint programs with art history appear more often among iSchools. According to the iSchools' websites which provide dual programs with art history, as museums and galleries adopt new technologies for making arts available digitally, iSchools seem to prepare students who can provide user services and manage/organize art collections in physical and virtual contexts. Technology and computer-related fields have appeared as new degree programs, humanities and social sciences have appeared as joint degree programs, and health is appearing in both. In addition, the areas of new courses tend to have a more interdisciplinary nature, such as Cultural Heritages, Digital Humanities, Data Science/Data Analysis, Digital Curation, Social Media, IT-Security and IT-programming. The findings of this study support Chu (2010)'s observation which insisted that an interdisciplinary viewpoint is the key new feature of LIS curricula through the offering of new courses and joint program features.

Although this study did not conduct comparative analysis between American and Canadian schools, some characteristics of Canadian LIS schools were observed as

follows: (1) According to the 2020 ALISE statistical report, among seven Canadian LIS schools, four schools hold the iSchool memberships (57%), which is a little lower than American LIS schools; (2) Among seven Schools, three schools offer MLIS degree and four schools offer IS degrees. Compared to the American LIS schools, higher percentages of Canadian LIS schools offer IS degrees. (3) Five Canadian schools reported their required courses, and three of them have five required courses. Research methods are required courses in all five schools and Organization of information sources, Information technology, Library management, and Foundation of the field are required courses in three schools. Information Access/Retrieval (2 schools), Reference services and sources (1 school), Information and society (1 school), User needs and behavior (1 school), Capstone/Thesis (1 school) are also identified as required courses in one or two schools. Compared to the American schools, Canadian school curricula tend to emphasize Research methods by specify it as a required course. (4) Regarding Concentration, Certificate, and Joint degree programs, only one or two Canadian schools reported for each of these sections, and it is assumed that these are not as popular as in American LIS schools.

The interdisciplinary trend is more visible in iSchools. In their vision statement, iSchools specifically endorse "interdisciplinary approaches to harnessing the power of information and technology" (iSchools, n.d.). The curriculum analysis in this current study demonstrate that the new courses and concentrations offered by iSchools require knowledge beyond the traditional LIS field. In addition to curriculum, the interdisciplinarity of iSchools has been examined through their research and faculty members. Shu and Mongeon (2016), who examined the subjects of LIS doctoral dissertations, reported on the interdisciplinary trends of LIS doctoral dissertations. iSchool faculty members also have more diverse background fields, such as in computer science, communication, the humanities, the social sciences, the natural sciences, engineering, design, education, policy, information sciences, and library sciences (Wiggins and Sawyer 2012; Zuo, Zhao, and Eichmann 2017). The diverse backgrounds of iSchool faculty members naturally result in more interdisciplinary characteristics in their teaching and research.

Conclusion

This study examined how LIS curricula have been evolved to prepare information professionals. LIS schools are offering more diverse degrees over the past ten years, and iSchools offer more degrees than non-iSchools. According to the 2020 ALISE report, Organization of Information Sources, Foundations, Library Management, and Research Methods are the required courses for more than 50% of LIS programs. Compared to the 2009 report, the percentages of required courses have decreased in most programs. During the 2009-2020 period, new courses were actively added in the areas of Cultural Heritage, Data Science/Data Analysis, Digital Curation, Digital Humanities, Social Media, IT-Security and IT-Programming, whereas during 1997-2006, new courses were actively added in Digital Libraries/Digital Librarianship, Instructional Technology, Knowledge Management, User Services, IT-Information System and Design. According to the same

report, Archives, School Media, Public Library, and Data Science are the most popular concentrations among LIS schools, and the greater number of certificate programs being offered have become diverse. Over the past twenty years, LIS curricula are continually becoming more diverse and interdisciplinary, particularly among iSchools. The limitations of this study stem from the sole use of ALISE statistical reports when examining LIS curricula. ALISE statistical reports are generated through the voluntary reports from the ALISE institutional members. Therefore, not all ALA-accredited schools are included in the ALISE statistical reports, and there are possibilities that some LIS schools did not report accurate data. For a deeper understanding on LIS curricula, other resources, such as department websites, syllabi, surveys or interviews with school administrators, need to be included and analyzed in future studies. In addition, as an anonymous reviewer recommended, LIS curricula analysis would be more insightful if the analysis results are interpreted in the contexts of society, demographics, job market, enrolments, and so on. Further analysis which connects the curricula, job description analysis, the Students section of the ALISE statistical report should be conducted as a future study.

About the authors

EunKyung Chung is a Professor in the Department of Library and Information Science at the Ewha Womans University, Seoul, South Korea. She received her Bachelor's degree in Library and Information Science from Ewha Womans University, her master's degree in Computer Science and Ph.D. in Information Science from the University of North Texas. Her research interests are on the areas of visual information retrieval, network analysis, informetrics. She can be contacted at echung@ewha.ac.kr.

Janet Schalk (schalkj@phsc.edu) is a librarian at Pasco-Hernando State College in Wesley Chapel, Florida. She earned her Master of Arts in Library and Information Science, as well as a Master of Arts in History, both at the University of South Florida. Her research interests include library systems and technology, digital humanities, scholarly communication, and Florida history.

JungWon Yoon (jyoon@jbnu.ac.kr) is a professor at the Department of Library and Information Science, Jeonbuk National University, Jeonju-si, South Korea. She received her Doctor of Philosophy in Information Science from the University of North Texas. Her research areas include information behaviors, particularly underserved populations, multimodal information, health information, and everyday information behaviors.

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Appendix 1. Degrees offered by iSchool and non-iSchool.

		2009						2020					
		iSchool		Non-iSchool		Total		iSchool		Non-iSchool		Total	
		#	%	#	%	#	%	#	%	#	%	#	%
	Library & Information Science	7	28.00	22	40.74	29	36.71	22	32.84	13	43.33	35	36.08
	Information science	6	24.00	5	9.26	11	13.92	12	17.91	3	10.00	15	15.46
	Library science	4	16.00	10	18.52	14	17.72	3	4.48	7	23.33	10	10.31
Others	Information management	3	12.00	3	5.56	6	7.59	7	10.45	2	6.67	9	9.28
	Information technology	1	4.00	0	0.00	1	1.27	5	7.46	0	0.00	5	5.15
	School media	1	4.00	2	3.70	3	3.80	3	4.48	1	3.33	4	4.12
	Archive	0	0.00	2	3.70	2	2.53	4	5.97	0	0.00	4	4.12
	Health informatics	1	4.00	0	0.00	1	1.27	3	4.48	0	0.00	3	3.09
	Computer science	1	4.00	0	0.00	1	1.27	2	2.99	0	0.00	2	2.06
	Data science	0	0.00	0	0.00	0	0.00	2	2.99	0	0.00	2	2.06
	HCI	0	0.00	0	0.00	0	0.00	2	2.99	0	0.00	2	2.06
	Museum	0	0.00	0	0.00	0	0.00	1	1.49	0	0.00	1	1.03
	Media studies	0	0.00	1	1.85	1	1.27	0	0.00	2	6.67	2	2.06
	Not specified	0	0.00	8	14.81	8	10.13	0	0.00	0	0.00	0	0.00
	Others	1	4.00	1	1.85	2	2.53	1	1.49	2	6.67	3	3.09
	Total	25	100.00	54	100.00	79	100.00	67	100.00	30	100.00	97	100.00

Source: Table III-8

Appendix 2. New courses.

	1997-2006						2009-2020					
	iSchool		Non-iSchool		Total		iSchool		Non-iSchool		Total	
	#	%	#	%	#	%	#	%	#	%	#	%
Academic library	7	0.92	5	0.84	12	0.88	8	1.40	4	0.95	12	1.21
Archival & records management	54	7.11	47	7.86	101	7.44	23	4.03	30	7.13	53	5.34
Business Intelligence	8	1.05	7	1.17	15	1.11	10	1.75	7	1.66	17	1.71
Cultural heritage	3	0.40	2	0.33	5	0.37	10	1.75	14	3.33	24	2.42
Data management	1	0.13	0	0.00	1	0.07	5	0.88	1	0.24	6	0.60
Data science/data analysis	7	0.92	5	0.84	12	0.88	54	9.46	27	6.41	81	8.17
Digital curation	4	0.53	2	0.33	6	0.44	26	4.55	5	1.19	31	3.13

Digital humanities	0	0.00	0	0.00	0	0.00	9	1.58	5	1.19	14	1.41
Digital libraries/digital librarianship	24	3.16	20	3.34	44	3.24	2	0.35	8	1.90	10	1.01
Digital media	11	1.45	7	1.17	18	1.33	0	0.00	5	1.19	5	0.50
Diversity and inclusion	13	1.71	12	2.01	25	1.84	12	2.10	16	3.80	28	2.82
E-Government												
Management and Leadership	1	0.13	1	0.17	2	0.15	2	0.35	1	0.24	3	0.30
Ethics	18	2.37	11	1.84	29	2.14	13	2.28	15	3.56	28	2.82
HCI	19	2.50	13	2.17	32	2.36	33	5.78	7	1.66	40	4.03
Health science	18	2.37	17	2.84	35	2.58	19	3.33	17	4.04	36	3.63
Informatics	4	0.53	1	0.17	5	0.37	9	1.58	8	1.90	17	1.71
Information science	23	3.03	20	3.34	43	3.17	15	2.63	2	0.48	17	1.71
Information architecture	14	1.84	8	1.34	22	1.62	6	1.05	4	0.95	10	1.01
Information literacy	6	0.79	4	0.67	10	0.74	3	0.53	12	2.85	15	1.51
Information organization	49	6.46	38	6.35	87	6.41	27	4.73	18	4.28	45	4.54
IT - culture and technology	12	1.58	12	2.01	24	1.77	19	3.33	7	1.66	26	2.62
IT - database and web system	24	3.16	18	3.01	42	3.10	18	3.15	10	2.38	28	2.82
IT - geoinformation	4	0.53	4	0.67	8	0.59	3	0.53	2	0.48	5	0.50
IT - information Security	3	0.40	2	0.33	5	0.37	22	3.85	7	1.66	29	2.92
IT - information systems and design	56	7.38	42	7.02	98	7.22	9	1.58	5	1.19	14	1.41
IT - general	38	5.01	26	4.35	64	4.72	24	4.20	22	5.23	46	4.64
IT - IT leadership	2	0.26	0	0.00	2	0.15	4	0.70	0	0.00	4	0.40
IT - programming	6	0.79	3	0.50	9	0.66	33	5.78	2	0.48	35	3.53
Instructional technology	22	2.90	22	3.68	44	3.24	2	0.35	2	0.48	4	0.40
Knowledge Management and Information Management	46	6.06	36	6.02	82	6.04	11	1.93	18	4.28	29	2.92
Law	14	1.84	15	2.51	29	2.14	3	0.53	2	0.48	5	0.50
Leadership and administration	43	5.67	28	4.68	71	5.23	19	3.33	23	5.46	42	4.23
Networking and communication	17	2.24	13	2.17	30	2.21	5	0.88	1	0.24	6	0.60
Public library	15	1.98	13	2.17	28	2.06	22	3.85	17	4.04	39	3.93
Research methods	20	2.64	17	2.84	37	2.73	28	4.90	9	2.14	37	3.73
School media	13	1.71	13	2.17	26	1.92	7	1.23	9	2.14	16	1.61
Social media	3	0.40	1	0.17	4	0.29	13	2.28	11	2.61	24	2.42

Special librarian/special collection	19	2.50	17	2.84	36	2.65	6	1.05	9	2.14	15	1.51
User studies	11	1.45	10	1.67	21	1.55	6	1.05	13	3.09	19	1.92
User services	64	8.43	42	7.02	106	7.81	12	2.10	8	1.90	20	2.02
Youth services	29	3.82	32	5.35	61	4.50	9	1.58	31	7.36	40	4.03
Other	14	1.84	12	2.01	26	1.92	10	1.75	7	1.66	15	1.51
Total	759	100.00	598	100.00	1357	100.00	571	100.00	421	100.00	992	100.00

Source: (Table III-39 or 40)

Appendix 3. Concentrations (2020).

	iSchool		Non-iSchool		Total	
Concentration	#	%	#	%	#	%
Academic library	1	1.16	5	6.76	6	3.75
Archival	10	11.63	11	14.86	21	13.13
Business Intelligence	1	1.16	0	0.00	1	0.63
Cultural heritage	1	1.16	2	2.70	3	1.88
Data science/data analysis	11	12.79	2	2.70	13	8.13
Digital curation	1	1.16	0	0.00	1	0.63
Digital humanities	1	1.16	0	0.00	1	0.63
Digital libraries/digital librarian	2	2.33	3	4.05	5	3.13
Digital media	1	1.16	0	0.00	1	0.63
E-Government Management	1	1.16	0	0.00	1	0.63
Generalist	3	3.49	3	4.05	6	3.75
HCI	6	6.98	0	0.00	6	3.75
Health science	2	2.33	1	1.35	3	1.88
Informatics	0	0.00	1	1.35	1	0.63
Information analysis	0	0.00	1	1.35	1	0.63
Information architecture	2	2.33	1	1.35	3	1.88
Information consulting	1	1.16	0	0.00	1	0.63
Information organization	2	2.33	3	4.05	5	3.13
Information security	2	2.33	0	0.00	2	1.25
Information technologies	10	11.63	0	0.00	10	6.25
Instructional technology	2	2.33	1	1.35	3	1.88
Knowledge Management & Information Management	1	1.16	1	1.35	2	1.25
Law	2	2.33	2	2.70	4	2.50
Leadership and administration	2	2.33	4	5.41	6	3.75
Networking and communication	0	0.00	1	1.35	1	0.63
Public library	7	8.13	10	13.51	17	10.63
School media	9	10.47	10	13.51	19	11.88

Social media	0	0.00	1	1.35	1	0.63
Special librarian	2	2.33	5	6.76	7	4.38
User service	1	1.16	2	2.70	3	1.88
Youth service	0	0.00	4	5.41	4	2.50
Others	2	2.33	0	0.00	2	1.25
Total	86	100.00	74	100.00	160	100.00

Source: Table III-41-a

Appendix 4. Post-master and certificate programs.

	1997		2009		2020	
Post-master or Certificate Program	# of school	% of school	# of school	% of school	# of school	% of school
Advanced/post	15	22.06	17	17.53	13	10.74
Archival	9	13.24	12	12.37	22	18.18
Book	0	0.00	1	1.03	1	0.83
Children	1	1.47	0	0.00	0	0.00
Data science	0	0.00	0	0.00	3	2.48
Digital humanities	0	0.00	0	0.00	6	4.96
Digital libraries	0	0.00	3	3.09	5	4.13
Health informatics	0	0.00	3	3.09	10	8.26
Informatics	0	0.00	0	0.00	4	3.31
Information literacy	0	0.00	1	1.03	1	0.83
Information policy	0	0.00	0	0.00	1	0.83
Information technology	3	4.41	8	8.25	11	9.09
Instructional technology	0	0.00	0	0.00	2	1.65
Knowledge management	1	1.47	7	7.22	7	5.79
Leadership and management	0	0.00	3	3.09	8	6.61
Museum	0	0.00	2	2.06	2	1.65
Others	8	11.76	2	2.06	0	0.00
Public library	2	2.94	2	2.06	3	2.48
Reference service	0	0.00	1	1.03	1	0.83
School library media	24	35.29	23	23.71	13	10.74
Special collection	0	0.00	2	2.06	0	0.00
Special librarianship	5	7.35	7	7.22	2	1.65
Storytelling	0	0.00	1	1.03	0	0.00
Youth services	0	0.00	2	2.06	6	4.96
Total	68	100.00	97	100.00	121	100.00

Source: Table III-9

Appendix 5. Post-master and certificate programs by iSchool vs. non-iSchool.

	2009				2020			
Post-master or Certificate Program	iSchool		Non-iSchool		iSchool		Non-iSchool	
	#	%	#	%	#	%	#	%
Advanced/post	2	5.00	15	26.32	7	8.05	6	17.65
Archival	3	7.50	9	15.79	15	17.24	7	20.59
Book	0	0.00	1	1.75	0	0.00	1	2.94
Children	0	0.00	0	0.00	0	0.00	0	0.00
Data science	0	0.00	0	0.00	3	3.45	0	0.00
Digital humanities	0	0.00	0	0.00	5	5.75	1	2.94
Digital libraries	3	7.50	0	0.00	4	4.60	1	2.94
Health informatics	2	5.00	1	1.75	8	9.20	2	5.88
Informatics	0	0.00	0	0.00	2	2.30	2	5.88
Information literacy	0	0.00	1	1.75	0	0.00	1	2.94
Information policy	0	0.00	0	0.00	0	0.00	1	2.94
Information technology	8	20.00	0	0.00	11	12.64	0	0.00
Instructional technology	0	0.00	0	0.00	2	2.30	0	0.00
Knowledge management	3	7.50	4	7.02	6	6.90	1	2.94
Leadership and management	2	5.00	1	1.75	4	4.60	4	11.76
Museum	1	2.50	1	1.75	2	2.30	0	0.00
Others	0	0.00	2	3.51	0	0.00	0	0.00
Public library	1	2.50	1	1.75	2	2.30	1	2.94
Reference service	1	2.50	0	0.00	1	1.15	0	0.00
School library media	6	15.00	17	29.82	8	9.20	5	14.71
Special collection	2	5.00	0	0.00	0	0.00	0	0.00
Special librarianship	5	12.50	2	3.51	2	2.30	0	0.00
Storytelling	0	0.00	1	1.75	0	0.00	0	0.00
Youth services	1	2.50	1	1.75	5	5.75	1	2.94
Total	40	100.00	57	100.00	87	100.00	34	100.00

Source: Table III-9

Appendix 6. Departments for joint degree programs.

	1997		2009		2020	
Department	# of school	% of school	# of school	% of school	# of school	% of school
Anthropology	2	3.03	3	2.86	2	1.94
Art history	0	0.00	2	1.90	4	3.88
Biology	1	1.52	1	0.95	1	0.97
Business	5	7.58	9	8.57	6	5.83
Chemistry	1	1.52	0	0.00	0	0.00
Computer science	1	1.52	2	1.90	2	1.94
Digital arts	0	0.00	0	0.00	0	0.00
Digital humanities	0	0.00	1	0.95	0	0.00
Education	4	6.06	4	3.81	5	4.85
English	6	9.09	8	7.62	6	5.83
Environmental studies	0	0.00	1	0.95	1	0.97
Gender studies	0	0.00	1	0.95	1	0.97
Geography	2	3.03	1	0.95	1	0.97
Health	1	1.52	8	7.62	6	5.83
History	14	21.21	14	13.33	20	19.42
History-science	1	1.52	2	1.90	1	0.97
Information technology	1	1.52	1	0.95	2	1.94
Journalism/Communication	2	3.03	1	0.95	0	0.00
Law	10	15.15	13	12.38	4	3.88
Language/Literature	4	6.06	4	3.81	11	10.68
Music	5	7.58	6	5.71	4	3.88
Others	0	0.00	0	0.00	4	3.88
Philosophy	0	0.00	0	0.00	1	0.97
Public affairs/Political Science	2	3.03	9	8.57	6	5.83
Regional studies	3	4.55	9	8.57	12	11.65
Social work	0	0.00	1	0.95	1	0.97
Theatre, film, & creative writing	0	0.00	1	0.95	0	0.00
Theology/Religious study	1	1.52	2	1.90	1	0.97
Urban studies	1	1.52	1	0.95	1	0.97
Total	66	100.00	105	100.00	103	100.00

Source: Table III-10

Appendix 7. Departments for joint degree program by iSchool vs. non-iSchool.

Department for joint degree program	2009				2020			
	iSchool		Non-iSchool		iSchool		Non-iSchool	
	#	%	#	%	#	%	#	%
Anthropology	1	2.94	2	2.82	2	3.13	0	0.00
Art history	2	5.88	0	0.00	4	6.25	0	0.00
Biology	0	0.00	1	1.41	0	0.00	1	2.56
Business	3	8.82	6	8.45	4	6.25	2	5.13
Chemistry	0	0.00	0	0.00	0	0.00	0	0.00
Computer science	0	0.00	2	2.82	2	3.13	0	0.00
Digital arts	0	0.00	0	0.00	0	0.00	0	0.00
Digital humanities	0	0.00	1	1.41	0	0.00	0	0.00
Education	0	0.00	4	5.63	2	3.13	3	7.69
English	1	2.94	7	9.86	4	6.25	2	5.13
Environmental studies	0	0.00	1	1.41	0	0.00	1	2.56
Gender studies	0	0.00	1	1.41	1	1.56	0	0.00
Geography	0	0.00	1	1.41	1	1.56	0	0.00
Health	6	17.65	2	2.82	4	6.25	2	5.13
History	2	5.88	12	16.90	12	18.75	8	20.51
History-science	1	2.94	1	1.41	1	1.56	0	0.00
Information technology	0	0.00	1	1.41	2	3.13	0	0.00
Journalism/Communication	1	2.94	0	0.00	0	0.00	0	0.00
Law	6	17.65	7	9.86	3	4.69	1	2.56
Language/Literature	1	2.94	3	4.23	5	7.81	6	15.38
Music	1	2.94	5	7.04	3	4.69	1	2.56
Others	0	0.00	0	0.00	1	1.56	3	7.69
Philosophy	0	0.00	0	0.00	1	1.56	0	0.00
Public affairs/Political Science	5	14.71	4	5.63	3	4.69	3	7.69
Regional studies	3	8.82	6	8.45	6	9.38	6	15.38
Social work	1	2.94	0	0.00	1	1.56	0	0.00
Theatre, film, & creative writing	0	0.00	1	1.41	0	0.00	0	0.00
Theology/Religious study	0	0.00	2	2.82	1	1.56	0	0.00
Urban studies	0	0.00	1	1.41	1	1.56	0	0.00
Total	34	100.00	71	100.00	64	100.00	39	100.00

Source: Table III-10