Evolution of iSchool Movement (1988-2013): A Bibliometric View

Abstract

iSchool movement is a controversial topic within LIS community. Someone argue that it isolates small size library schools and splits the LIS community while others insist it will broaden the field of LIS and form an open and boundaryless iField. This study investigates the evolution of iSchool movement by analyzing the trends of subject terms in LIS doctoral dissertations since 1970s. The results indicate that iSchool movement reflects the trend of LIS in terms of the change of dominant research topics and the degree of interdisciplinary.

Introduction

Since the 1960s, Library and Information Science (LIS) has been undergoing an identity crisis that questions the relationship between library and information science (Dillon, 2007). It is argued that library science and information science are two different fields that have strong interdisciplinary relations (Holmes, 2002; Saracevic, 1999) rather than being defined as part of the interdisciplinary field of LIS (Tang, 2004). The debate was heated by the evolution of iSchool movement, which is made up of novel academic programs that focus on the relationship between information, technology, and people, beyond the traditional LIS programs (Bruce, 2011; Dillon, 2012).

The "i" of iSchool movement can be interpreted as either "information" (Dillon, 2012) or "interdisciplinary" (King, 2006). The both terms reflect the recent trends in LIS since 1970s: information science surpassed library science and became the major research focus in this field (Finlay, Sugimoto, Li, & Russell, 2012; Larivière, Sugimoto, & Cronin, 2012; Sugimoto, Li, Russell, Finlay, & Ding, 2011); more and more interdisciplinary researches were conducted (Chang & Huang, 2012; Prebor, 2007; Tang, 2004). Although previous studies show the interdisciplinary integration of iSchools in terms of faculties' background (Luo, 2013; Wiggins & Sawyer, 2012), academic research (Holmberg, Tsou, & Sugimoto, 2013; Wu, He, Jiang, Dong, & Vo, 2012) and graduate education (Chu, 2012; Wedgeworth, 2013; Wu et al., 2012), no study indicates whether the evolution of iSchool movement reflects or correlates the recent trends in LIS described as above. The purpose of this study is to investigate the background of iSchool movement through a bibliometric view, and reveal how the evolution of iSchool movement relates the trends of development in LIS.

iSchool Movement

As Table 1 indicates, the iSchool movement originated in 1988 when Toni Carbo, Dean of the School of Library and Information Sciences at University of Pittsburgh, formed the Gang of Three with Donald Marchand (School of Information Studies at Syracuse University) and Richard Lytle (College of Information Science and Technology at Drexel University). The initial purpose of this small group was to share information and facilitate interaction when facing the new intellectual and professional challenges in the field of information science (King, 2006).

Within the next 17 years, other 16 schools with the same interests joined the group and formed a formal organization, iCaucus. At the same year in 2005, the first iConference was established and organized by iSchool organization. In the next ten years, the iSchool movement spread around the world and has 65 members: 30 in North America and 35 in the rest of world.

Table 1 Evolution of iSchool Movement

Year	Event	Members
1988	Gang of Three (G3)	Pittsburgh, Syracuse, Drexel
1990	Gang of Four (G4)	Pittsburgh, Syracuse, Drexel, Rutgers
2001	Gang of Five (G5)	Pittsburgh, Syracuse, Drexel, Washington, Michigan
2003	Gang of Ten (G10)	G5, Illinois, North Caroline, Florida State, Indiana, Texas
2005	iCaucus / iConference	G10, Berkeley, Irvine, UCLA, Georgia Tech, Indiana (LIS), Maryland, Toronto, Rutgers, Penn State

Table 2 List of Institutions with ALA Accreditation and iSchools (North America only*)

ALA Schools		ALA iSchools	Non-ALA iSchools
Alabama	Puerto Rico	Drexel	Carnegie Mellon
Albany, SUNY	Queens	Florida State	Georgia Tech
Alberta	Rhode Island	Indiana	Michigan State
Arizona	St. Catherine	McGill	Pennsylvania State
Buffalo, SUNY	St. John's	Rutgers	Berkeley**
Catholic	San Jose State	Simmons	Irvine
Clarion	South Carolina	Syracuse	Maryland, Baltimore
Dalhousie	South Florida	British Columbia	
Denver	Southern Mississippi	UCLA	
Dominican	Texas Woman's	Illinois	
East Carolina	Valdosta State	Kentucky	
Emporia State	Wayne State	Maryland	
Hawaii	Western	Michigan	
Iowa		Missouri	
Kent State		North Carolina	
Long Island		North Texas	
Louisiana State		Pittsburgh	
Montreal		Tennessee	
North Carolina, Greensboro		Texas, Austin	
North Carolina Central		Toronto	
Oklahoma		Washington	
Ottawa		Wisconsin, Madison	
Pratt		Wisconsin, Milwaukee	

*: 35 iSchools outside the North America are excluded from this study
**: Berkeley withdrew from ALA Schools in 1994 and joined iSchools in 2005

Although iSchools emphasize their distinction from traditional library schools (Bruce, 2011; Brynko, 2012; Carbo, 2012; Dillon, 2012; King, 2006; Olson & Grudin, 2009), the iSchool movement originated from and was deeply rooted in LIS. Among the 19 original

members of iSchools in 2005, 14 (73.7%) were traditional LIS schools offering the graduate program accredited by the American Library Association (ALA). Nowadays, 23 out of the 30 iSchools located in North America (76.7%) still have the ALA accredited program as shown in Table 2. Meanwhile, 59 LIS schools hosting ALA accredited program (hereinafter referred to as ALA schools) are divided into two categories: iSchools (hereinafter referred to as ALA iSchools) and non-iSchools (hereinafter referred to as non-iSchools ALAs).

Literature Review

Since the day of its birth, the iSchool movement has been a controversial topic. Supporters declare that iSchools focus on information use in the lives of people, organizations and cultures compared to traditional emphasis on library or archive (Dillon, 2012); and the iSchool movement advances knowledge from specific to broad approach that ingests the library science into information science (Bonnici, Subramaniam, & Burnett, 2009). On the other hand, opponents assert that iSchool movement will break the LIS education (Wallace, 2009) because small-size LIS schools with less research funding are excluded (Chu, 2012).

Some studies try to find the difference between iSchools and non-iSchools within ALA schools. It is reported that iSchool faculty members have diverse backgrounds and are engaged in various interdisciplinary activities than non-iSchool faculties (Luo, 2013; Wiggins & Sawyer, 2012). However, iSchools still contain many dominant research topics from LIS such as LIS education, library & organization management, information retrieval, information organization, information behavior and digital libraries (Holmberg et al., 2013; Wu et al., 2012). As comparing their master program between iSchools and non-iSchools, Chu (2012) does not find any significant difference. Wallace (2009) argues that the purpose of the iSchool movement is only branding. Leonhardt (2007) points out that most iSchools are still library schools and their master students still want to be librarians or work in a close field.

It seems that the controversy will not end until a disciplinary identity of iSchools is established. However, this identify has been called for a long time but it is still lacking. Carbo (2012) indicates that the “i” not only refers to information but also could be individual, ideas, inspiration or innovation. King (2006) declines to establish an identity of iSchools because it may be the elimination of future options that are not foreseen. Dillon (2012) identifies the key attributes of iSchools in terms of coverage, interdisciplinary and research commitment, but refuses to set up any boundaries.

As an original contribution to the advancement of knowledge (Johnson, 2009; O'Connor & Park, 2001), the LIS doctoral dissertation has been used to investigate disciplinary identity (Sugimoto et al., 2011). Houser (1982) defines the discipline of LIS by analyzing the research interests of all LIS doctoral dissertations, which is also used in the current research. After examining the title and abstract of LIS doctoral dissertations between 1930 and 2009, Sugimoto et al. (2011) report that the main topics in LIS doctoral dissertations have changed substantially during the past 80 years. Library science is no longer the major research focus in this field: the usage of the term “library science” and library-related words such as cataloging, reference, and collection are diminishing in LIS

doctoral dissertations (Finlay et al., 2012; Larivière et al., 2012; Sugimoto et al., 2011).

In addition, Chang and Huang (2012) indicate that the degree of LIS interdisciplinary has increased since the 1970s by investigating the citation, bibliographic coupling, and co-authorship of LIS doctoral dissertations from 1978 to 2007. Prebor (2007) finds that two thirds of doctoral dissertations tagged under "Library Science" or "Information Science" in the ProQuest Thesis and Dissertation Database are contributed by non-LIS students. Sugimoto, Russell, and Grant (2009) reveal that eight out of top ten LIS schools in terms of the number of PhD graduates and the number of future full-time faculties are also iSchool members.

The purpose of this study is to investigate the background of iSchool movement and reveal whether the evolution of iSchool movement correlates the variation tendency in LIS. The study will answer the following research questions:

1. Does the iSchool movement reflect the trend of LIS that information science replaces library science and becomes the dominant research focus in LIS?
2. Does the iSchool movement reflect the trend of LIS that the degree of LIS interdisciplinary has been increasing since 1970s?
3. Does the iSchool movement reflect the different trends in terms of research focus among different traditional ALA schools?

Methodology

In order to investigate the historical development of LIS doctoral dissertations, all PhDs graduated from 44 ALA schools (including five discontinued schools) between 1960 and 2013 were identified. The list of ALA schools was first generated from the searchable database of ALA accreditation program that indicates 37 ALA schools currently offering PhD program. In addition, five discontinued ALA schools and two current ALA schools that had offered PhD program in history were added into the list. In addition, in order to discover the correlation between ALA iSchools and non-ALA iSchools, PhDs graduated from seven non-ALA iSchools between 2000 and 2013 were also included in this study.

Initially, a manually validated list of PhDs who graduated from ALA schools between 1960 and 2013 was compiled from the MPACT database (MPACT, 2010), which records all LIS PhD graduates from 1930 to 2009; and second, LIS PhDs who graduated after 2010 and PhDs graduated from seven non-ALA iSchools between 2000 and 2013 were identified and added to the list by searching the ProQuest Thesis and Dissertation Database and corresponding university websites. When all PhD graduates were identified, their doctoral dissertations were searched and retrieved from the ProQuest Thesis and Dissertation Database. As Table 3 shows, this process produced a list of 4,279 doctoral dissertations out of 4,542 PhD graduates (94.2%).

For each dissertation, controlled topical vocabulary subject terms were retrieved. Dissertations with 2 and more topics were coded as interdisciplinary. Every topic pair assigned to interdisciplinary dissertations was labeled as a co-assigned pair of topics. Each topic co-assignment was imported into the Gephi (2015) graph drawing application in order to generate a visual map of the LIS PhD topics where topics are nodes drawn as

colored circles and topic co-occurrences form edges (i.e. lines) between them. The data was analyzed by number of topics, year, decade, and affiliated university.

Table 3 Numbers of PhDs and Dissertations Retrieved by University

University	PhDs	Dissertations	Notes
Pittsburgh	406	407*	ALA iSchool
Rutgers	275	275	ALA iSchool
Florida State	255	254	ALA iSchool
Illinois	217	216	ALA iSchool
North Texas	199	199	ALA iSchool
Indiana	187	187	ALA iSchool
Michigan	175	175	ALA iSchool
Columbia	160	159	ALA (Discontinued)
Case Western Reserve	134	134	ALA (Discontinued)
North Carolina	114	114	ALA iSchool
Syracuse	108	108	ALA iSchool
Wisconsin, Madison	105	105	ALA iSchool
Berkeley**	95	94	ALA (Discontinued) iSchool
Drexel	93	93	ALA iSchool
Simmons	82	36	ALA iSchool
Texas Woman's	78	78	ALA
Albany, SUNY	77	77	ALA
Texas, Austin	77	67	ALA iSchool
UCLA	75	75	ALA iSchool
Toronto	74	74	ALA iSchool
Western	64	57	ALA
Maryland	64	63	ALA iSchool
Chicago	60	60	ALA (Discontinued)
Southern California	50	50	ALA (Discontinued)
Hawaii	41	41	ALA
Missouri	41	41	ALA iSchool
McGill	33	24	ALA iSchool
Washington	29	29	ALA iSchool
Emporia State	27	27	ALA
Alabama	25	25	ALA
Arizona	17	17	ALA
Minnesota	17	17	ALA
Buffalo, SUNY	16	16	ALA
Tennessee	13	4	ALA iSchool
Long Island	12	12	ALA
Montreal	12	12	ALA
British Columbia	11	0	ALA iSchool
Dominican	9	0	ALA
Wisconsin, Milwaukee	9	8	ALA iSchool
San Jose State	5	0	ALA
Alberta	5	5	ALA

Oklahoma	4	4	ALA
South Carolina	4	4	ALA
Kentucky	1	1	ALA iSchool
Total ALA	**3555**	**3444**	
Georgia Tech	461	366	iSchool
Irvine	261	240	iSchool
Penn State	117	92	iSchool
Berkeley**	37	34	ALA (Discontinued) iSchool
Maryland, Baltimore	56	53	iSchool
Michigan State	54	52	iSchool
Carnegie Mellon	3	0	iSchool
TOTAL	**4542**	**4279**	

*: One PhD graduate from Pittsburgh obtained double doctoral degree
**: Berkeley withdrew from ALA Schools in 1994 and joined iSchools in 2005

Results

As Table 3 indicates, from 1960 to 2013, 3,555 PhDs graduated from 44 ALA schools with the University of Pittsburgh as the largest source with 406 graduates. 2,648 out of 3,555 PhDs (74.5%) were from the 23 ALA iSchools. The number of LIS PhDs has increased from 18 in 1960 to 114 in 2013 and reaches its highest number of graduates (116) in 2010. Among the 3,444 LIS doctoral dissertations, 1,797 can be considered as interdisciplinary dissertations, with 2 to 7 topics. The average number of subjects per dissertation is 1.902; this number has increased from 1.006 in 1960s to 2.701 in 2010s while the ratio of interdisciplinary dissertations increased from 0.6% to 87.3% correspondingly as indicated in Figure 1. For the both values, a significant increase in the late 1980s was observed.

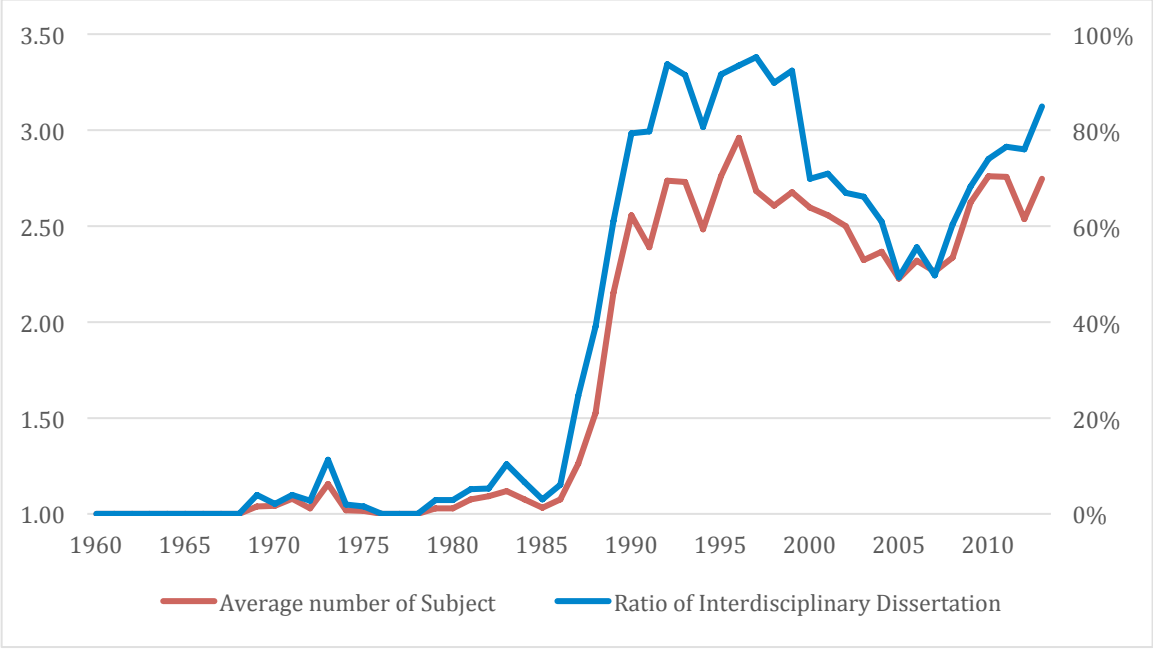

Figure 1 Degree of Interdisciplinary in LIS Doctoral Dissertations

Figure 2 presents the appearance of top subject terms of LIS doctoral dissertations from 1960 to 2013. “Library Science” is the most popular topic appearing in 2,322 dissertations (67.4%), but its preponderance decreases from 96.5% in 1960s to 45.0% in 2010s. “Information Science” appears in 1,539 dissertations (44.6%) and becomes the most popular topic since the late 1990s; its ratio increases from 0% in 1960s to 81.1% in 2010s. “Computer Science”, “Educational Technology”, and “Higher Education” were ranked 3rd to 5th, but their shares are less than 5% in each decade. 562 dissertations (16.3%) contain both “Library Science” and “Information Science” while 46 dissertations (4.2%) have neither.

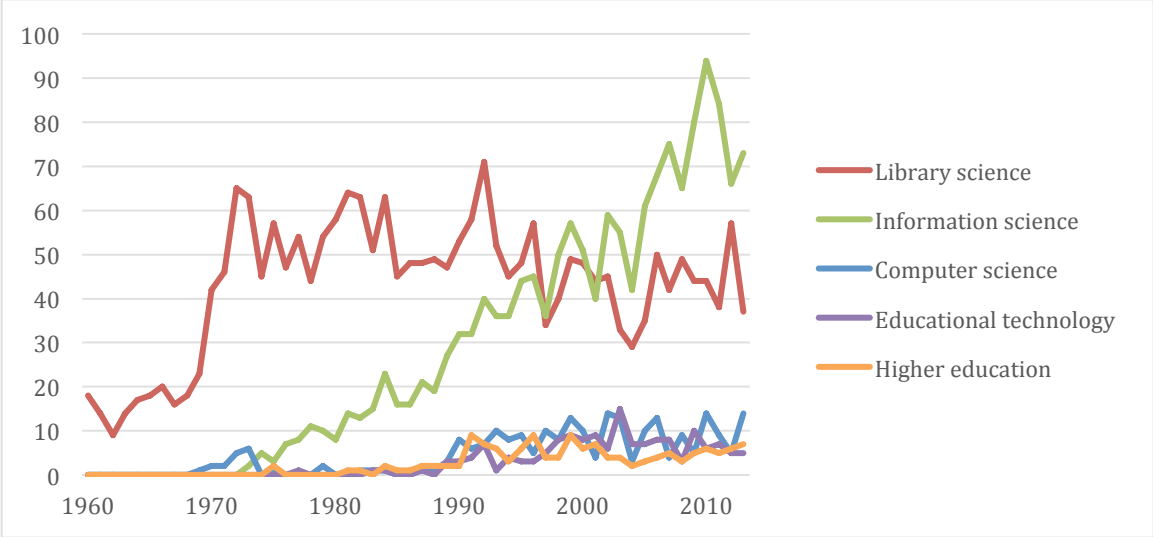

Figure 2 Top 5 Subject Terms of LIS Doctoral Dissertations (1960-2013)

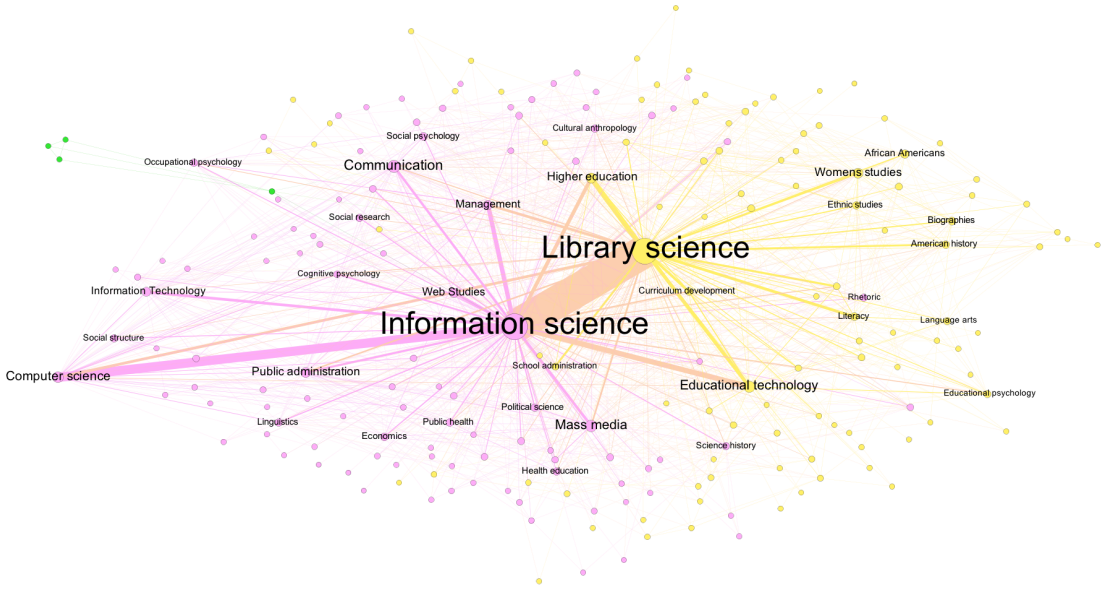

Figure 3 Subject Co-assignment in LIS Doctoral Dissertations (1960-2013)

The visual mapping considers 2,356 co-assignment topic pairs and their 10,182 appearances in 1,797 interdisciplinary dissertations. Using Gephi, the interdisciplinary

topic maps for each decade are presented (see Figure 3). From 1960 to 2013, "Library Science" and "Information Science" accounts for 12.5% (1,272/10,182) of assigned topic pairs, followed by "information Science" and "Computer Science" (350), and "Information Science" and "Educational Technology" (200).

Discussion

Based on the analysis and mapping of the evolution of the interdisciplinary relations found in LIS doctoral dissertations, we found that a radical change in LIS doctoral dissertations in terms of the research topics and the degree of interdisciplinary occurred between 1980s and 1990s while iSchool movement initiated.

Gang of Three

The Gang of Three (G3) is regarded as the origin of iSchool movement. Pittsburgh, Syracuse and Drexel are all leading research universities embracing the "information" in the traditional field of LIS in the late 20th century (Olson & Grudin, 2009). In 1963, the earliest information science degree was conferred at Drexel University as MS in Information Science. The term "information" appeared for the first time in the name of a traditional library school when Graduate Library School at the University of Pittsburgh became the Graduate School of Library and Information Sciences in 1964. In 1974, Syracuse University renamed the School of Library Science as the School of Information Studies, which is considered as the first "iSchool" in history.

When Toni Carbo and his decanal colleagues had the first G3 conversation at the ALISE Conference in 1987, they might feel the impact of the change of research focus in LIS from their PhD students. As shown in Figure 4, within these three schools, the ratio of LIS doctoral dissertations on "Library Science" decreases from 86.7% in 1978 to 73.3% in 1988 while the dissertations on "Information Science" increases almost by five times (13.3% to 60.0%) correspondingly. Such trends do not show up in the rest of ALA schools that the ratio of dissertations on "Library Science" and "Information Science" are always around 80% and 20% during the same period.

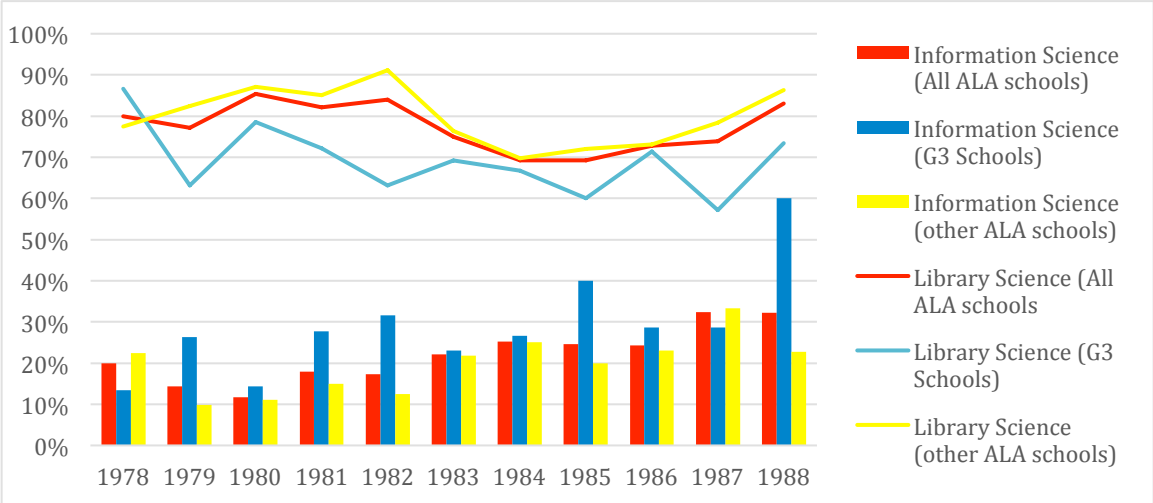

Figure 4 The Trends of Research Topics between Library Science and Information Science in LIS Doctoral Dissertations (1978-1988)

In addition, the number of interdisciplinary dissertations in LIS increases significantly from 1978 to 1988. There is no interdisciplinary LIS doctoral dissertation in 1978; in 1988 when the Gang of Three formed, 46.7% of doctoral dissertations from G3 schools are interdisciplinary. This ratio is 36.4% for the rest of ALA schools and 39.0% for all ALA schools. These three deans were not the prophets but the pioneers who made a quick reaction on such changes.

Gang of Four

Within the next couple of years, Richard Budd, the dean of the School of Communication, Information, and Library Studies at Rutgers University joined the group, making it a Gang of Four (G4). LIS had undergone remarkable changes during these two years between G3 and G4. As Table 4 indicates, the ratio of LIS doctoral dissertations on "Information Science" keeps increasing to over 50% in 1990 while the ratio of interdisciplinary dissertations rushes to almost 80% in 1990. Meanwhile, the research topic "Computer Science" starts to appear in LIS doctoral dissertations.

Table 4 Changes of LIS Doctoral dissertations between 1988 and 1990

	1988	**1989**	**1990**
Ratio of Dissertations on "Information Science"	32.2%	45.8%	50.8%
Ratio of Interdisciplinary Dissertation	39.0%	61.0%	79.4%
Ratio of Dissertations on "Computer Science"	1.1%	2.4%	5.0%
Ratio of Dissertations on "Information Science" (G4)	57.1%	39.1%	55.6%
Ratio of Interdisciplinary Dissertation (G4)	38.1%	60.9%	77.8%
Ratio of Dissertations on "Computer Science" (G4)	0.0%	13.0%	22.2%
Ratio of Dissertations on "Information Science" (others)	18.4%	50.0%	50.0%
Ratio of Interdisciplinary Dissertation (others)	39.5%	61.1%	79.6%
Ratio of Dissertations on "Computer Science" (others)	2.6%	0.0%	11.1%

Note: "G4" refer to Gang of Four schools; "others" refers to other ALA schools than G4

Although we cannot conclude that the changes correlate to the iSchool movement, the trends indicate the necessity of embracing the information technology and interdisciplinary research in LIS, which is also one of the objectives of iSchool movement.

Gang of Five

In 2001, 14 years after the first G3 conversation, Toni Carbo reconstituted the group and formed the Gang of Five (G5) when meeting other four deans at Pittsburgh. These deans had to face some new challenges from the demand of interdisciplinary research related to "Information Science". In 1990s, as shown in Figure 5, the topic "Information Science" surpasses "Library Science" and becomes the most popular LIS dissertation topic, either in all ALA schools or G5 schools. The single subject LIS doctoral dissertations almost disappear as the ratio of interdisciplinary dissertation is over 90% in 1999. As indicated in Table 5, four out of top five pair of interdisciplinary dissertation topics include "Information Science".

Interdisciplinary research needs collaboration and coordination with scholars in other fields or departments; a powerful leader is necessary for managing such collaborations. At universities in North America, schools or colleges are in a politically strong position than departments so that their deans are more powerful than department chairs in the university's administrative structure (Olson & Grudin, 2009). This is also why the iSchool movement originated from schools or colleges at leading research universities, and promoted by those deans.

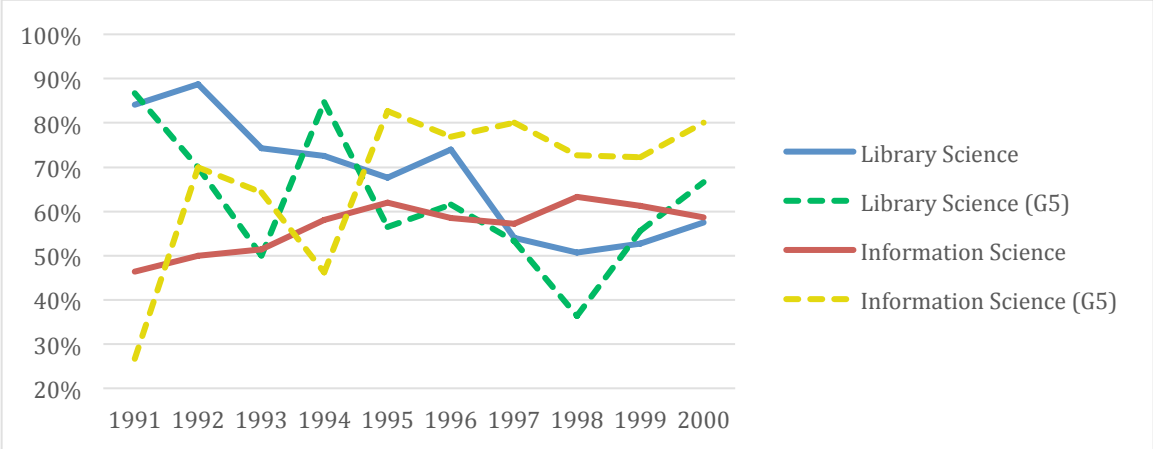

Figure 5 The Ratio of LIS Doctoral Dissertations on Subjects "Library Science" and "Information Science" (1991-2000)

Table 5 Top 5 Pair of Interdisciplinary Doctoral Dissertation Topics in LIS (1991-2000)

Pair		Number of Dissertations
Information Science	Library Science	241
Information Science	Computer Science	66
Higher Education	Library Science	50
Information Science	Management	30
Educational Technology	Information Science	29

Gang of Ten

According to Bruce (2011), iSchools are interdisciplinary including the fields of information science, library science, computer science, engineering, education, history, philosophy, sociology, management and others. The diversity of iSchools showed up when School of Informatics at Indiana University joined the group with other four traditional LIS schools. The Gang of Five (G5) became the Gang of Ten (G10).

The diversity brought more interdisciplinary research, especially in computer science. As Figure 6 shows, within the G10 schools, the ratio of LIS doctoral dissertations on topic "Computer Science" increase by more than six times (3.9% to 25.0%) in two years between G5 and G10. The ratio within the four new members (excluding Indiana) increases from 5.6% in 2002 to 23.5% in 2003 when they joined the Gang. With the contribution from G10 schools, the ratio of LIS doctoral dissertations related to computer science also increases by more than three times (4.9% to 14.9%) correspondingly. As a

result, “Computer Science” becomes the most popular research focus in LIS in addition to “Information Science” and “Library Science” since the early 2000s.

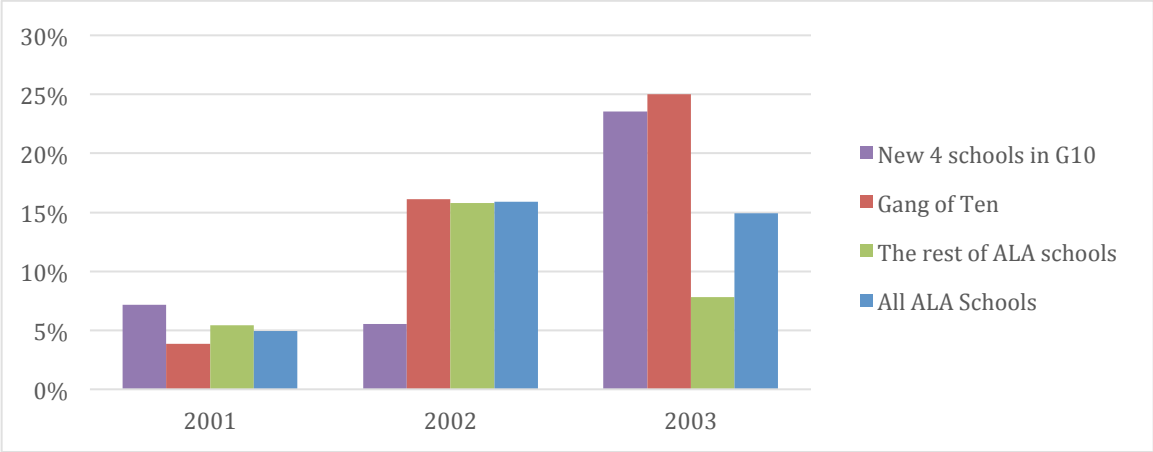

Figure 6 The Ratio of LIS Doctoral Dissertation on “Computer Science” (2001-2003)

iCaucus / iConference

With the growth of Gang membership, the group’s agenda became more focused on building a sense of identity and community among the “iSchools.” In 2005, the group was formally named “the iSchools Caucus” (iCaucus) as a new organization including 19 original members. The 19 original iSchools consist of 14 traditional ALA schools and 4 non-ALA schools focusing more on computer science. It is not surprise that “Computer Science” (65.4%) over “Information Science” (38.5%) became the most popular dissertation topic within iSchools in 2005 because 60 out of 104 PhDs graduates come from the 4 non-ALA iSchools in which “Computer Science” is the dominant dissertation topic (98.3%).

Although some scholars doubt that iSchool movement will split the LIS education and isolate small size LIS schools (Chu, 2012; Leonhardt, 2007; Wallace, 2009), the leaders of iSchools insist that the iSchool movement is open for any involvement without the boundary (Bruce, 2011; Cox & Larsen, 2008; Dillon, 2012; King, 2006; Olson & Grudin, 2009). The debate is also reflected by the results of this study.

As shown in Figure 7, “Information Science” is the hottest topic in LIS doctoral dissertation, either in iSchools (63.5% in 2013) or ALA schools (80.2% in 2013). A significant increase of the ratio of doctoral dissertations on topic “Information Science” was observed within those non-ALA iSchools, from 3.3% in 2005 to 57.1% in 2013. The ratio is even over the ratio within those traditional ALA schools that are not iSchool members (53.9% in 2013).

The iSchool movement did not threat the traditional library science research. As Figure 8 indicates, the ratio of doctoral dissertations on topic “Library Science” is stable during this 8-year period. The surprise is the trend of doctoral dissertations on topic “Computer Science”. As Figure 9 shows, its ratio is less than 20% in 2013, either in iSchools (16.7%) or ALA schools (15.4%). Even within those non-ALA iSchools, “Computer

Science" loses its dominant position (98.3% in 2005) and drops to 23.8% in 2013. One possible reason is that PhDs in these schools would like to use "Information Science" to define their research rather than "Computer Science" because of iSchools recognition.

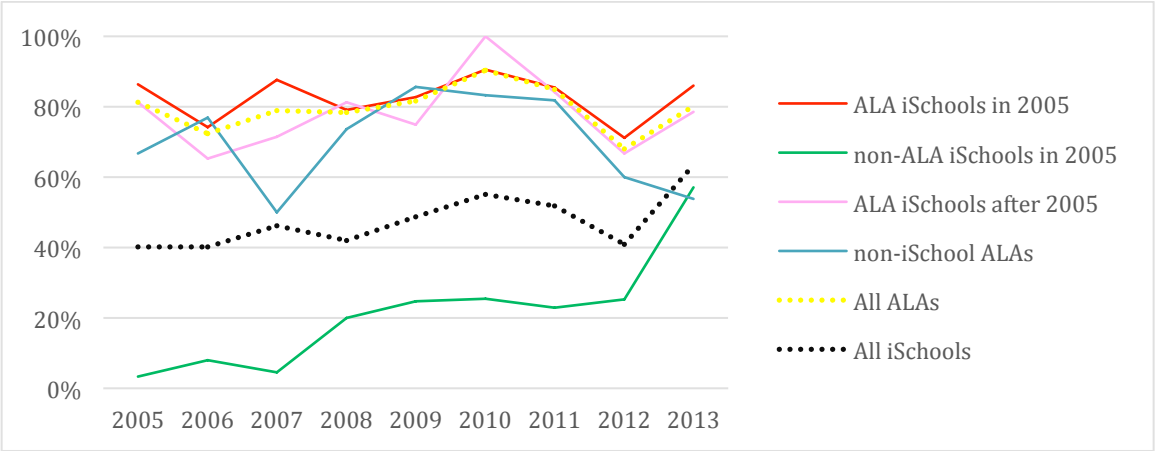

Figure 7 The Trend of Doctoral Dissertation on Topic "Information Science" (2005-2013)

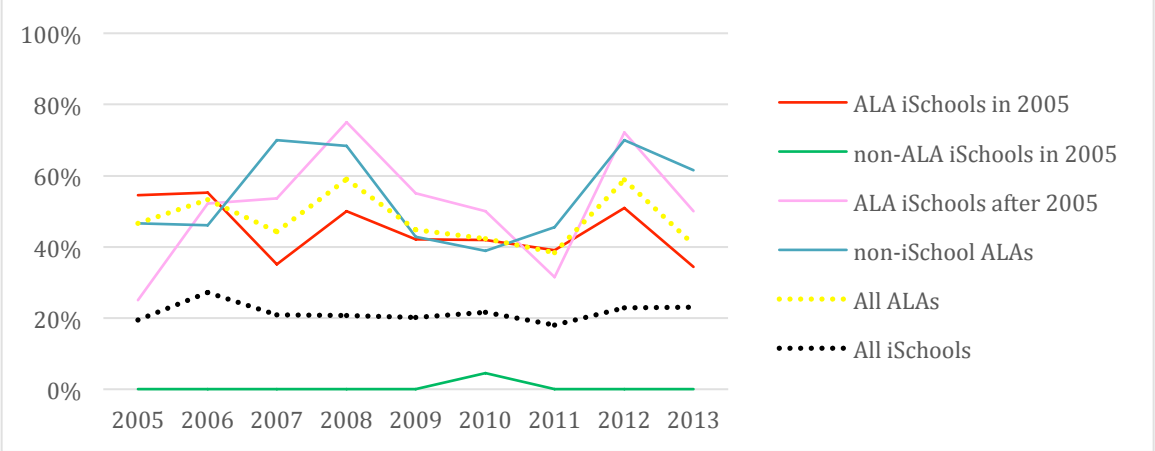

Figure 8 The Trend of Doctoral Dissertation on Topic "Library Science" (2005-2013)

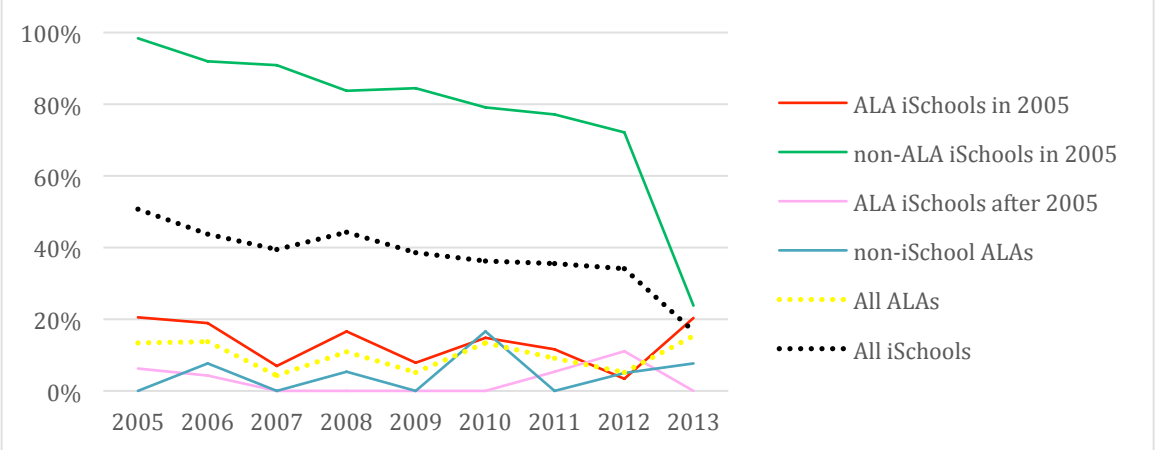

Figure 9 The Trend of Doctoral Dissertation on Topic "Computer Science" (2005-2013)

Since 2005, another nine ALA schools joined iSchools. As indicated in the three figures above, although these nine schools joined the iSchools at different times, they experienced the similar changes in terms of the LIS research topics as original ALA iSchools compared to those ALA schools that are still outside the iSchool movement. This might be the reason why they went close and joined the iSchools eventually.

Conclusion

Bonnici et al. (2009) claim that the iSchool movement moves from specific to broad approach to advancing knowledge and ingests the library science into its heart. It is partly confirmed by the results of this study. This study also indicates that, not only the library science, but also the computer science and other field may be ingested in an open and boundaryless "information Science", referred to as iField (Bruce, 2011). The iSchools movement reflects the trend of research topics and the degree of interdisciplinary research in LIS, and offers a platform for collaborative research on a boundaryless field of information science.

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