## Toward iSchools: from the Perspective of the 5Cs

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#### **ABSTRACT**

A coalition of information schools, called the iSchools Organization, was established to increase the visibility of library and information science and to cope with the new demands of the digital age. As of 2015, sixty-five schools from many different countries have joined the iSchools Organization. While some other schools are interested in adopting iSchools, there are still some issues that need to be considered before adopting the iSchool charter. This paper presents those issues from the perspectives of the 5C groups: curriculum, competencies, convergence, collaboration, and consensus. A survey was conducted to investigate some aspects of the 5Cs. This study identifies five iSchool-related issues - 5Cs. Providing perspectives in the areas of the 5Cs will be useful to establish stronger iSchools. These five Cs will resolve information problems that we are facing, prepare students or any organizations for the digital age, give students digital service skills, and train future data scientists. This paper represents practical guidelines to build a strong iSchool. With the success of iSchools, societies see us as more than the traditional librarian.

Keywords: Digital Age, Data Scientist, iSchool, Library and Information Science, Curriculum, Convergence, Competency, Collaboration, Consensus

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## 1. Introduction

The year 2002 is the beginning of the digital age. The amount of digital data has exceeded the amount of analog data (Hilbert and Lopez 2011). Library and Information Science (LIS) is one of the major disciplines dealing with analog and digital data. LIS could have involved managing technical aspect of digital data; however, other disciplines such as computer science took the role in the digital age. The digital age requires some technical expertise but LIS was not ready to deal with digital data that results from major libraries and information science programs in universities such as Columbia University and University of Chicago were shut down in 1990s.

This LIS crisis brought attention to some schools. In 1988, three LIS schools, Pittsburgh, Syracuse, and Drexel, formed the "Gang of Three" to cope with the LIS crisis by facilitating the collaboration among member schools. The iSchool movement was officially termed the iSchool Organization in 2003 (iSchool 2013). In 2005, the first iSchool conference was held in Penn State University. The three goals of the iConference are as follows.

The first goal is to explore ideas and concepts. The second goal is to advance the information field and prepare students to meet the challenges of the digital age. The third goal is to share new ideas and research fields in information science. The ongoing effort to overcome the LIS crisis and cope with the demands of the digital society promoted many schools to join the iSchool Organization. However, it is vague for many professionals how to prepare and enhance iSchool because there is a lack of comprehensive framework on quality check in iSchool programs. Many studies have examined the various aspects of iSchools, but few of them have looked at the iSchool Organization from the comprehensive perspective of simultaneously establishing the school and enhancing the iSchools. This paper seeks to provide a comprehensive examination of the iSchool-related issues and proposes a framework to initiate and improve iSchool. This study reviews iSchool-related studies from 2004 to 2015.

## 2. Literature Review

#### 2.1 Digital Age

The massive amount of data have created many terms such as big data, cloud computing, linked data and others. The amount of data we create for two days are similar to amount of data we

have created up to 2003. The rise of the Internet and the start of the digital age has changed everything in our lives. It's an exciting time to live through the experience of Web 1.0, while currently living in Web 2.0, and moving to Web 3.0. Using Web 1.0 and Web 2.0 platform or tools, we have created massive amounts of data and interacted with people in new ways. One of the major social media platforms that helps interaction among people, Facebook, has 1.34 billion active users as of October 2014 (Facebook 2015). The approximate number of users who have access to the Internet is 2.48 billion (Miniwatts Marketing Group 2013), which means that 54% of the world's Internet users access also to Facebook. Launched in February 2004, Facebook now serves over 70 different languages. As evidenced by the example of Facebook, social media has allowed people from all over the world to interact and create a huge amount of data. This huge amount (Volume) of different types of data (Variety) is processed quickly and in real time (Velocity). These three Vs are the main characters of Big Data (Laney 2012). We have made a great deal of progress in terms of quantity of information and interactions between people; however, we have created data that is unstructured and therefore hard to find resulting in the low reuse of existing data. With the advent of Web 2.0, interactions among people has increased, but no such interactions increased between people and machines. Web 1.0 and Web 2.0 have little interoperability when it comes to different types of information and organizations unique to each. The digital age has brought new challenges such as digital content chaos, big data, information anxiety (Wurman 1989), and cognitive overload (Kirsh 2000). The massive amount of information we have created requires more creative ways to manage it. System analysts and information architects must understand users better to design relevant systems and provide efficient services.

#### 2.2 LIS Crisis and The iSchool Movement

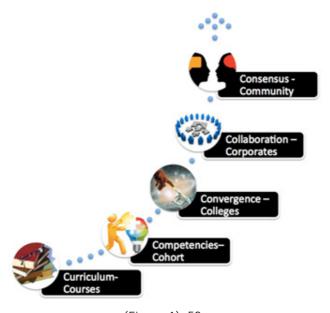
There are two major reasons for the iSchool movement: The onset of the LIS crisis and the reality of the digital age. Wiggins and Sawyer (2012) argue that the growth of computing and the changes in library-oriented professional programs are the two major reasons for the emergence of iSchools.

These problems are not simple tasks to be resolved or researched from a single perspective: they require a multidisciplinary or interdisciplinary approach. Our digital age can be better understood by learning about the relationship between information, people, and technology. The core vision of the iSchool Organization is that people, information and technology are equally important and the development of systems require understanding of all three areas (Diaz et al. 2011). The iSchool members serve as experiments in creating interdisciplinary academic units to deal with the challenges of information in the digital age (Hahn and Lester 2012). The iSchool Organization is significant because it represents a timely response to our era of information exploration (Wu 2012). The iSchool brings various perspectives to address and resolve information problems we are facing in the digital age. Diaz, Giaccardi and Aedo (2011) state that the iSchool movement is one of the most notable academic movements to address issues in the digital age. Craig (2011) goes so far as to state that the iSchool is the single most striking event of our digital convergence of people, technology, and information.

As of 2015, sixty-five schools from many countries have joined the iSchool Organization (see Appendix 1). These iSchools come mainly from three disciplines: library and information science, computer science, and management (Chu 2012).

## 3. The 5Cs

After reviewing iSchool-related studies, the author identified five major categories that start with letter C. As shown in Figure 1, the 5Cs include curriculum and courses, competencies and cohort, convergence and colleges, collaboration and corporates, and consensus and community.



⟨Figure 1⟩ 5Cs

This paper aims to provide how these 5Cs can be used as a comprehensive frame for initiating or enhancing iSchools. These 5C's provide a wide range of perspectives to assist in the implementation of new iSchools and the improvement of existing iSchools. These 5Cs help us to understand the identity of the iSchool approach as applied to academics, business, and the community.

With these disclaimers, the author attempts to enumerate some of the characteristics, 5Cs, that seem to be emerging from recent iSchool establishment. Some of them may seem obvious, but they are listed formally in order that they not be overlooked.

#### 3.1 Curriculum and Courses

With so much of what distinguishes an iSchool from other library and information programs, the curriculum should be a major focus of those programs that wish to join the iSchool Organization. In the area of curriculum and courses, Wu (2012) analyzes the state of iSchools and finds that curriculum design is the main focus for iSchool members. Chu (2012) addresses that the big difference between iSchools and non-iSchools resides in the number of courses they offered: iSchools offer more courses than non-iSchools.

Markey (2004) provides five-core curriculums for iSchool. Markey (2004) asserts that the following five subjects are the core of the curriculum: organization, reference, foundations, management, and information technology. Among these five subjects, a lot of iSchool courses are focused on information technology related courses. Computer science courses are mainly focused on computational hardware and software technologies while Informatics courses are focused on the intersection of people, information, and technology systems (Groth and MacKie-Mason 2010). As Groth and Mackie-Mason (2010) mention, students must learn information technology in a contextualized manner. Even computer science departments had to redesign its courses to teach students critical thinking before programming courses. The order of courses is critical. Groth and MacKie-Mason's (2010) study found that programming courses should come last in the computer science department: critical thinking and ethics should be taught before programming courses. Once the course order was changed, more female students applied to the computer science program. Groth and MacKie-Mason also found that the demand on informatics is increasing while the demand for computer science is decreasing, iSchool curriculums should include human-computer interaction (Wu 2012) and user-centered design courses (Bias et al. 2012). Wu's study (2012) also emphasizes the importance of digital libraries because they also bring technology, information, and users together. Chu (2012) compared five iSchools and five non-iSchools to find that their curriculums differ on many significant aspects. Course on information behavior is an example. Five iSchools require information behavior course while the non-iSchools did not. Noh (2012) conducts a study that reviewed twenty years (1991-2011) of LIS curriculum changes in Korea and summarized them into these seven core areas: fundamentals of library and information science, information organization, information service, management of library and information center, information system, bibliography, and records and archives management. The priority of the seven core modules changed from 1991 to 2011 from the management of library and information centers in 1991 to information systems in 2011. Still no addition to these seven areas occurred. Even though the Korean LIS curriculums cover seven major areas, the programs still lack human-computer interaction and social computing aspects.

An iSchool curriculum must prepare future information and technology professionals to use critical thinking when utilizing technology to address our information problems. The curriculum must be flexible and robust enough to allow students to learn skills, knowledge, and attitudes. The curriculum can also meet the changing employer's needs and societal demands. The core value of iSchool is to understand information, people, and technology; ignorance of any of these areas results in the dissolution of the iSchool concept. To form an iSchool, the iSchool programs must be changed to include courses like human-computer interaction and social computing, while balancing all other courses without giving a bias toward any particular focus.

#### 3.2 Competencies and Cohort

Curriculum and courses are developed and taught by faculty members in order to equip students skills and knowledge. Therefore, understanding competencies of the faculty members and students is important.

In the area of competencies and cohort, diversity is very important. The digital age demands different competencies thus faculty members should help students to build these competencies. An established faculty need professional development to prepare them for the transition of framework from LIS to that of iSchools. Diaz et al. mentioned that we must let students know the meaning and influence of the digital age and how the iSchool approach can help them meet those challenges (2011). To equip students with competencies for the digital age, we need to teach them by having faculty members with various expert areas. Hahn and Lester (2012) review how the faculties of new iSchools need education to meet the needs of the new curriculum. Dillon (2012) as well as Wiggins and Sawyer (2012) point out the importance of faculty diversity for iSchools. Dillon (2012) mentions that iSchools should have faculty members with diverse backgrounds. His school

has 23 faculty members and only 12 of them have different PhDs. Larson (2010) said that these trends help make iSchools truly interdisciplinary. Wiggins and Sawyer's (2012) study found that information technology plays a major role in the iSchool faculty experience, but diversity is even more important. The issues we are dealing with require a background in more than one discipline in both our faculty and our students.

By encouraging students from different undergraduate programs, as well as the faculty members from different disciplines, the iSchool can become academically strong. Wiggins and Sawyer (2012) assert that the intellectual distribution and faculty composition of academic units involved in the iSchool community need to be analyzed.

We explored the faculty composition of LIS in Korea. As of 2013, there are thirty-five universities that offer LIS programs and 167 full time tenured-track faculty members in the field of library and information science in Korea. We analyzed 35 school websites and 158 faculty member websites to find out their PhD areas. The PhD areas of the faculty were divided into nine broad disciplinary categories (Wiggins and Sawyer 2012) as shown in Table 1. As shown in Table 1, 70.9% of faculty members have degrees in library and information science which means that majority of the faculty members have a library science background. However, the faculty members in LIS do not have PhDs in Computing, Social and Behavioral Studies, Science and Engineering, or Communication. As Wiggins and Sawyer (2012) emphasize that diversity is an important factor for iSchool, the faculty composition of LIS in Korea needs diversity.

Harvey (2011) expresses concern about losing the battle in quality in Australian education for librarianship. Harvey said that "in 2011, Australian LIS education is clearly not dead, but it appears to be in decline" (p. 346). Harvey pointed out that library schools do not attract highly talented students. It is a challenge to recruit the right students and to educate them so they can be successful. Hiring the right faculty is also a challenge. To establish an iSchool program, we must provide not only innovative curriculum but also a plan for bringing in talented, interdisciplinary students and faculty (Diaz et al. 2011).

Master's students in library and information science program enter the program with excitement but leave with concerns about their job prospects (Carter 2011). Cherry's (2011) study shows that participants rated librarians and archivists 6.2 and 6 out of 10 for the social status in the information professions. They rated system analysts higher, showing that students believe that a great deal of computer knowledge will be required in their field. They understand the need for interdisciplinary competent faculty to give them a diverse skill set, so students will be successful in their careers.

The visibility of LIS has increased since iSchool graduates have started working for major information technology companies such as Google, Facebook, and Microsoft. These companies need professionals who know about users, information, and technology to implement useful and dynamic systems. iSchool graduates must be able to articulate their identity and the value of their interdisciplinary approach to secure employment, as they cannot rely on traditional framework to establish their identity. Our community still thinks iSchools are another name for library schools. iSchool graduates still lack technical ability to understand how users and information interact with technologies. Many iSchools provide different tracks such as information management, information security, and telecommunication, and students must strive for sufficient competencies.

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PhD Areas	N (%)	Component Areas
Computing	0 (0%)	Computer Science, Electrical Engineering, Mathematics
Information Science	19 (12%)	Information Science, Information Studies, Information Transfer
Library Science	112 (70.9%)	Library Science, Information and Library Science, Librarianship, Bibliography
Social and Behavioral	0 (0%)	Psychology, Sociology, Social Sciences
Management and Policy	1 (0.6%)	Business, Management, Policy, Economics
Science and Engineering	0 (0%)	Life Sciences, Physical Sciences, Statistics
Education	3 (1.8%)	Education
Humanities	2 (1.2%)	History, Philosophy, Korean Literature
Communication	0 (0%)	Communication
Etc.	1 (0.6%)	Printing Engineering
NA	20 (12.1%)	Not Available

⟨Table 1⟩ Classification of Disciplinary Areas for the 2013 Korea LIS School's Faculty

## 3.3 Convergence and Colleges

In the area of convergence and colleges, Wu (2012) classifies iSchools into three categories: library and information science, iSchools (LISiSchools), computer science iSchools (CSiSchools), and business and management iSchools (BMiSchools).

To increase the visibility of the benefits of iSchool programs within the university, we need to collaborate with other departments such as computer science, business administration, communication science, mathematics, psychology, and education. We share common interests on users, information, and technology among these departments. Working with different departments allows us to see the same problems from different perspectives. Therefore we can resolve different issues such as the digital divide, security and privacy issues.

We also need to promote the benefits and application of our program to students from other disciplines. The issues we are dealing with in the digital age are so complex that an interdisciplinary, multidisciplinary, and transdisciplinary approach is essential. Convergence is one way to approach collaboration with other departments.

Groth and MacKie-Mason (2010) assert that the online auction system is a good example: we need students from various backgrounds such as in social sciences, arts, humanities, and computer science. User requirements, business processes, system analysis, system design, and implementation require different skills and competencies. Students with different majors and backgrounds collaborating will provide good understanding of users, information, and technology.

According to Wiggins and Sawyer, there are two types of iSchools (2012): mergers and expanders. Rutgers is an example of a merger because the school merged its library program with its communication and journalism program. UCLA is another example of a merger: it partnered with its education program. Berkeley, Syracuse, and Michigan are some example of expanders. These schools either realigned or expanded their LIS programs with programs related to information technology. One example in Korea is Seoul National University (SNU). They established a collaboration between two of their departments, Computer Science with Information and Culture Technology, into a new graduate school called Digital Contents and Information Studies.

Wu also (2012) classifies iSchools, but into three categories: library and information science iSchools (LIS iSchools), computer science iSchools (CS iSchools), and business and management iSchools (BM iSchools). Most iSchools are LIS schools; however, the University of California-Irvine and Georgia Institute of Technology are examples of CS iSchools (focus on computer science with user and information in mind), while the University of California-Berkeley is an example of a BM iSchool.

As evidenced by all these successful collaborations, we need to work with different departments to resolve information problems. We need to collaborate with different departments to increase our visibility in our institutions. One of iSchools in Korea, Sungkyunkwan University, provides various courses from different departments such as business and statistics.

## 3.4 Collaboration and Corporates

In the area of collaboration and corporations, Smith (2012) shows concern about LIS graduate school programs; this influenced the iSchool strategic initiative emphasis on connecting with the community (Willmer 2013). Maata's study (2008) shows information school graduates earned

almost 20% more on average than regular library school graduates.

According to Smith (2012) Library and Information Science is the one of the worst master's degree to obtain in terms of low pay rank and estimated growth rank. Students and faculty members in the LIS field are concerned about this prediction. To resolve these issues, iSchools need to develop relationships with various sources such as non-profit organizations, including local, national, and international libraries, and the private sector must create collaborate with programs in research. Our digital age is a golden opportunity for the Library and Information Science field because our information problems are very complex and are related to users, information, and technology. Every industry is struggling with the same intersection of elements so the potential research collaborations are vast.

To increase visibility and practicality of our iSchool programs, schools should conduct many collaborative research projects with industry. iSchools must address areas of students and potential employers' demand and that reflect societal needs. Making the program worthwhile for both students and their future employers is a huge challenge and responsibility (Diaz et al. 2011). More and more employers look for practical experience as part of their hiring criteria. By including practical research projects in the iSchool curriculum, the program gives students practical experience as well as keeping the program focused on practical application skills.

There are a couple of iSchool programs for this purpose: the iAffiliate and the iField. The University of Washington's iSchool program introduced the iAffiliate program. It is an iSchool strategic initiative to connect with the community (Willmer 2013). Drexel University created the iField program to prepare students for practical work in the information field (Drexel 2013). The information field (iField) is at the heart of everything individuals, organizations, and societies need in order to advance in any area of human endeavor from the arts to the sciences.

Data-driven decisions are critical for private and public sectors. Since companies and government agencies have collected enormous amount of data, they can analyze data to make decisions. Therefore, corporations need information professional who can collect, refine, and analyze their data. Syracuse University collaborates with companies to analyze their data. Current employees bring their actual data to students to analyze.

There are some visible advantages for iSchool graduates. iSchool alumni now work at leading companies like Apple, Twitter, Google, Netflix, Facebook, Chevron, Kaiser Permanente, Goldman Sachs, Deloitte & Touche, and many more (UC Berkely School of Information 2013). This is a good sign for those studying in iSchools. The emergence and adoption of iSchools has helped to gain the visibility of library and information sciences studies within education, industry, and

society. Each year, Library Journal conducts a salary survey of the previous year's graduates of all American Library Association (ALA) accredited programs. The survey includes employment status, job description, and whether they work in traditional LIS fields, IT fields, or other industries. Information about where our graduates work is important, regardless of the type of position. Graduates of the iSchool programs continue to place well in the salary survey. According to Maata's study (2008), information school graduates earned almost 20% more on average than regular library school graduates. This is encouraging information for prospective students.

#### 3.5 Consensus and Community

In the area of consensus and community, Finlay (2012) points out that iSchool have changed dissertation topics. Active participation in the Big Data trend provides a good opportunity to further change the iSchool identity (Gordon-Murnane 2012). With all of these changes, establishing a unique iSchool identity remains a challenge (Wiggins and Sawyer 2012).

The digital age is a golden opportunity for the field of LIS because problems in our digital lives require multiple approaches to address them. The computational approach is not good enough. LIS should take advantage of this demand. iSchools should deal with trends suggested by research companies such as Gartner to meet needs from students, education, industry, and community. To be a successful iSchool, the program needs to identify problems and issues relevant to the particular society or culture they wish to serve. Issues from health, education, retail, or finance are some examples.

Collecting, refining, and analyzing data from various fields will direct or resolve some of the issues we face. For example, social analytics from social media on a certain product can provide insight for business decision makers to set up online and offline marketing events. Becoming an iSchool is not just a name change but a change of curriculum, competencies, convergence, collaborations, and consensus. Establishing a unique iSchool identity remains a challenge (Wiggins and Sawyer 2012), but by identifying the unique applications of the iSchool curriculum to their unique community can help. It also helps students articulate their talents and focus when searching for employment.

The LIS identity is changing. One indication of this is the changing dissertation topic. Finlay (2012) finds that libraries are no longer the major dissertation topic in LIS. Syracuse University has produced only one dissertation that has the word library in it in the last thirty years (Finlay 2012). After the dropping the "L" from library and information science, students tend to get a job at information technology companies such as Google, Microsoft, and so on. The percentage of IT-related employment has increased as we claim our identity as an information professionals and data scientists (SJSU 2014). What will be our competencies in iSchools? What are the areas we have to focus to increase visibility? What does society want from library and information or the iSchool field? Computing is a major player but students must learn it in contextualized ways (Groth and MacKie-Mason 2010).

Are we competing with computer science field? Computer science mainly focuses on computing; however, iSchools see issues from multiple perspectives and iSchools' faculty have increased intellectual diversity. Wiggins and Sawyer (2012) point out that iSchools have increasing enrollments when declining enrolment is a matter of increasing concern in the fields of Computer Science and Information Systems. Our competencies are to have critical thinking on the social influence of computing on digital life and the digital age.

An encouraging trend in our digital age was expressed by Gartner in their annual report. Gartner is the world's leading information technology research and advisory company. According to Gartner's top 10 technologies (Gartner 2013) for 2011-2013, social analytics, big data, cloud computing, the personal cloud, and social collaboration are some examples of trends in the digital age. One of the major trends for the last three years has been big data. This big data trend is a big deal for librarians (Gordon-Murnane 2012). Librarians have provided traditional services such as cataloguing, indexing, and metadata. These services are in high demand in digital age where various, huge amounts of data are being transmitted all over the world.

Gordon-Murnane (2012) names these librarians as data scientists. Data scientists could be a new name or identity for librarians in the digital age. Data scientists can provide both traditional services and data curation services. There are two major programs to train data scientist: data curation programs and data science programs. Syracuse University provides a data science program. They believe data science is the answer to solving the big data problem. Information analytics is one of the courses they provide to collect, organize, store, analyze, and share big data (Østerlund 2015). University of North Carolina (UNC) and University of Illinois (UIUC) provide data curation programs. Syracuse University and University of Washington provide data science programs. The purpose of the data curation program at UNC is to educate information professionals who are charged with the management and preservation of data assets of their organization (UNC 2013). UIUC defines data curation as an active and continuous management of data (UIUC 2013). In addition, there are several other university libraries such as Purdue University and University of California where data curation centers are running.

## 4. Conclusion

This is an exciting time because most of us experienced Web 1.0, live in Web 2.0 and are moving towards Web 3.0. We have made a great deal of progress in terms of quantity of information and interaction between people; however, we have created data that are unstructured therefore hard to find and have low reuse rates of existing data. The massive information we have created requires more creative ways to manage it. Our society needs professionals who can deal and resolve various information problems. Effective searching, providing accurate information, and data preservation are some services our society wants. The problems of the digital age are not simple tasks to be resolved or researched from a single perspective: they require multidisciplinary or interdisciplinary approach. iSchools can meet various demands in the digital age.

There are many things to consider creating and improving iSchool. This study proposed what iSchools should do in five different perspectives. One of the major findings for this study is a diversity issue. We need more faculty members with different background to bring diversity in the faculty composition of LIS in Korea. Cross appointments would be an easier option than hiring new faculty members in Korea. Different aspects of iSchool and how to become a member of the iSchool Organization can be examined using the 5Cs. Curriculum, Competencies, Convergence, Collaboration, and Community might help in the formation and application for inclusion into the iSchool Organization (Cox et al. 2012). Demand for collaboration between universities and companies in korea is increasing. Korean LIS schools should take advantage of this trend. Providing perspectives in the areas of 5C will be useful to establish stronger iSchools. These 5Cs will resolve information problems that we are facing, prepare students for the digital age, give students digital service skills, and train future data scientists. With the success of the iSchool, societies see us as more than the traditional librarian. Data scientists is one of the job titles we can be. Data scientists will be highly demanded in the near future and we need expand or improve iSchools where data scientists are trained. Therefore, we can make our society a better place to make decision based on data analytics in private and public sectors. Furthermore, the use of 5Cs as a theoretical framework to measure the strength and weakness of selected iSchool is an excellent starting point for future study.

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# [Appendix 1] The list of iSchools (as of July, 2015)

Countries	iSchools		
Australia (3)	Charles Sturt University: School of Information Studies		
	University of Melbourne: Melbourne School of Information		
	University of South Australia: School of Computer and Information Science		
Canada (3)	University of British Columbia: School of Library-Archival & Information Studies		
	University of Toronto: Faculty of Information		
	McGill University, Montreal: School of Information Studies		
China (3)	Nanjing University: Department of Information Management		
	Wuhan University: School of Information Management		
	Sun Yat-sen University, Guangzhou: School of Information Management		
Czech Republic (1)	Charles University in Prague: Institute of Information Studies and Librarianship		
Denmark (1)	University of Copenhagen: Royal School of Library and Information Science		
France (1)	Télécom Bretagne: Department of Logic Uses, Social Sciences and Information		
Finland (1)	University of Tampere: School of Information Sciences		
Germany (2)	University of Siegen: Institute for Media Research		
	Humboldt-Universitat zu Berlin: Berlin School of Library and Information Science		
Ireland (1)	University College Dublin: School of Information and Library Studies		
Israel (1)	Bar-Ilan University: Department of Information Science		
Japan (1)	University of Tsukuba: Graduate School of Library, Information and Media Studies		
Korea (3)	Seoul National University, Korea: School of Convergence Science and Technology		
	Sungkyunkwan University, Seoul, Korea: Library and Information Science Department		
	Yonsei University: Library and Information Science		
Nederland (1)	University of Amsterdam: Graduate School of Humanities (Archives and Information Studies)		
Norway (1)	University College: Oslo and Akershus: Department of Archivists, Library and Information Science		
Portugal (2)	NOVA University of Lisbon: School of Statistics and Information Management (ISEGI)		
	University of Porto: Faculty of Engineering in cooperation with the Faculty of Arts		
Scotland (1)	University of Glasgow: Humanities Advanced Technology and Information Institute		
Singapore(1)	Singapore Management University: School of Information Systems		
Spain (3)	Universidad Carlos III de Madrid: Department of Library and Information Sciences		
	Open University of Catalonia: Information and Communications Science Studies		
	Polytechnic University of Valencia: School of Informatics		
Sweden (1)	University of Boras: The Swedish School of Library and Information Science		
Turkey (1)	Hacettepe University: Department of Information Management, Faculty of Letters		