

Inclusion of ICT topics from the IFLA Trend Report in Latin American LIS schools

Filiberto Felipe Martínez-Arellano

Institute for Library Science and Information Studies Research

National Autonomous University of Mexico (UNAM)

felipe@unam.mx

Ana María Talavera-Ibarra

Information Sciences Specialty,

Pontifical Catholic University of Peru (PUCP)

atalave@pucp.edu.pe



Copyright © 2015 by Filiberto Felipe Martínez Arellano and María Talavera-Ibarra. This work is made available under the terms of the Creative Commons Attribution 3.0 Unported License:

<http://creativecommons.org/licenses/by/3.0/>

Abstract:

In 2013, IFLA facilitated a reflecting space with a group of experts from the Social Sciences, Economics, Education, and Technology, for creating an interdisciplinary framework and exchange of experiences about the current information world, the advances in ICT and the forthcoming scenario information professional will face in the near future. These contributions originated the IFLA Trend Report, which presents five ICT trends that will impact the library settings: (1) New technologies will both expand and limit who has access to information; (2) Online education will democratise and disrupt global learning; (3) The boundaries of privacy and data protection will be redefined; (4) Hyper-connected societies will listen to and empower new voices and groups; (5) The global information economy will be transformed by new technologies.

Considering the importance of these ICT trends, we decided to examine fifteen topics selected from the IFLA Trend Report, to understand where Latin American LIS schools stand in relation to them, inquiring if they are already included in their curricula or it is being considered to include them. This paper presents the main findings of that study.

Keywords: Latin American LIS schools, LIS education in developing countries, ICT in LIS education IFLA Trend Report.

Introduction

LIS education all over the world is facing a great challenge due to the rapid evolution of Communication and Information Technologies (ICT). Though this is not a new trend during the last three or four decades, the challenges are greater now, as mobile technology and information overload impose new requirements on LIS professionals particularly due to users' demands who are eager to receive more and better services.

Libraries are facing a great problem trying to manage their strained budgets to meet those requirements. Nowadays, changes not happen only in the way people communicate (from fixed to mobile technology), but also in the new and sophisticated tools that continue appearing at the market in a constant competition among providers. This trend causes even more challenges to libraries, which need to deal not only with the provision of digital collections and online services, but also with the acquisition and updating of IT equipment, software, the work of ICT specialists, among others. Perhaps we may think to invest more in ICT than in buildings in the future. On the other side, information overload is also a great challenge, as well as information not only grows at exponential rates, but also is more rapidly produced and analyzed creating what is called the *Big Data* phenomena, causing problems related to its organization, access, privacy, use and the like.

As is known, in 2013 IFLA facilitated a reflecting space with a group of experts from the Social Sciences, Economics, Education, and Technology, for creating an interdisciplinary framework and exchange of experiences about the current information world, the advances in ICT and the forthcoming scenario that librarians and information professionals will face in the near future. These contributions originated the IFLA Trend Report, whose main aspect were summarized in an insights document named *Riding the Waves or Caught in the Tide: Navigating the Evolving Information Environment* (IFLA, 2013). The document presents five ICT trends that will impact the library settings: (1) New technologies will both expand and limit who has access to information; (2) Online education will democratise and disrupt global learning; (3) The boundaries of privacy and data protection will be redefined; (4) Hyper-connected societies will listen to and empower new voices and groups; (5) The global information economy will be transformed by new technologies.

In terms of LIS education, these trends will definitely affect future curricula and continuing and on-the job training of librarians and information professionals. As mentioned, libraries are already immersed in using and maintaining ICT in their daily work and services, but what should librarians and information professionals do in the future?. These challenges need to be thought over, discussed and carefully reflected, by lecturers, practitioners, providers, and all involved, in order to prepare the librarians and information professionals required by the digital natives who are now drowning in this information ocean.

Facing these challenges, which role should be played by Latin American LIS schools? Some of them are trying to keep pace with those changes, but at the same time are conscious of the local constraints and real problems that exist in Latin America. Besides, LIS professors and students must understand the role that technology plays in our profession, particularly for attaining better library and information services.

Considering these important challenges, we decided to examine some main topics included in the IFLA Trend Report, to understand where Latin American LIS schools stand in relation to

them, researching if they are already included in their curricula or it is being considered to include them.

Impact of ICT in Libraries and Library Services

Fox and Sornil (1995) mention that “Libraries traditionally collect, organize, provide access to information and preserve objects from their collections. These may consist of books, magazines, periodicals, videos, maps and multimedia resources. However, the flexibility of the new digital technologies allows a more efficient acquisition of new objects. Also enable libraries to integrate digitized collections exhibited in museums or archives. Therefore, electronic documents become easier to access because the cost of processing and storage is lower.”

Forsman (2014) said databases and online services were subsequently developed with the aim of establishing libraries electronically connected via modems or satellites. Thus, ICT allowed the development of CD-ROM, online catalogs and promoted offer library services and information through the network.

She also said the development of technology currently provides the possibility to implement changes in libraries such as access to electronic resources, which can be used by researchers to produce better results and innovations. Equally, they facilitate creation of those researchers’ profiles to better know their research process. This has widely enabled to develop new services in support of research such as: the management of research data, bibliometric services and publication aid.

According to Rendon (2014), people nowadays are hoping to locate and access information from wherever they are. Because of that, libraries have increased the use of computers in their buildings as well as the possibilities of using mobile devices to access e-books, audiobooks, databases and archives for research.

He also thinks libraries should implement GPS technologies that could help to find materials in the library; mobile applications that encourage patterns to access library services and provide 3-D printers.

In a NISO (2013) Webminar notice, it was stated that mobile devices are the preferred method users utilize to connect to Internet. Based on these needs, different options have been added to mobile devices to access library resources through special applications or optimized sites or platforms.

The Unesco (2007) document “Empowering information professionals. Module 1,” mentions the implementation of ICT in libraries and other information units have encouraged the creation of other digital formats, promoted online access and transfer, and the sharing of information resources. Moreover, the effect on users is notorious obvious when they have increased their level of information literacy, and they demand better and faster access to information.

At the same time, this document points out that the trends in library development are:

- To be connected through Internet
- To have a core collection of multimedia resources

- To allow access to global information
- To be digital or virtual

In relation to library services in the new digital information environment, Zickuhr, Rainie, and Purcell (2013) declare that Internet has had a big impact on how people locate and access information. In this changing landscape, public libraries are trying to adjust their services to this new reality. For example, they mention that 80% of young Americans, considered that book loan is one of the extremely important service libraries offer; while 80% reported that virtual reference librarians are also important in library services; and 77% stated that they should have computers with free Internet access. Also, 35% of young people would like to have mobile applications that allow them to access the library resources, GPS navigation to physically locate them, and to supplement their services with Amazon to better understand the users' profile

Impact of New Technologies in LIS Education

The new information environment and way to access it encourages librarians and information professionals to acquire new knowledge to be able to face these changes.

Firstly, in LIS education it is important that graduates have the skills for information literacy and handling different technological tools. They should promote their use in all people because the new digital world is taking, sharing and accessing information through electronic devices.

As mentioned by Ebrahimi (2009), librarians and information professionals need a diversity of knowledge and skills, including techniques on using software and hardware, selection and analysis of information resources, use of information systems, ability for searching databases and the ability to teach users how to use these technologies. Therefore, the curriculum to train librarians and information professionals should develop skills such as communication, interpersonal relations, research in specific areas of knowledge, analytical skills and flexibility with technology.

Now with the expansion of Internet, many countries have developed courses making use of online educational resources in order to increase the educational opportunities at universities. Information professionals should be aware of those educational resources, adaptive learning technologies and open online courses with the aim of achieving greater opportunities of study, but particularly to offer new educational methods for the user, based on the use of digital information.

For an efficient implementation of these educational resources Del Valle Cuozzo and Ladrón de Guevara (2011) mention that LIS teachers should be competent in the following areas: (1) Instrumental, such as practical and autonomous use of hardware and software as well as video cameras, television, scanner, among others; (2) Cognitive, to be able to use ICT in an intelligent and contextualized manner, like the diverse activities a teacher develops or the access to digital information resources and media (magazines, portals, forums, etc.); (3) Attitudinal, like the focus on the development of positive attitudes towards these resources and (4) Political, to assess transformations and consequences that ICT bring in different areas of the social sphere.

Furthermore, they mention that LIS educators should encourage or improve students skills and knowledge in: hardware, software and networks; use of operating systems and word and image processing; perform searching and selection of information; communicate and work collaboratively on interpersonal networks; have an adequate use of word and image processing, spreadsheets and databases; and the utilization of ICT for entertainment and learning.

Nowadays mobile devices are part of the daily life of people who use these devices to access information from anywhere, not being an exemption libraries and information services. Then, it is an excellent opportunity for libraries to develop specific applications and innovations for smartphones which can attract users.

In a paper by the Australian School Library Association (ASLA, 2012), it is mentioned Information professionals should acquire specialized knowledge, skills and attributes to use ICT confidently, such as:

- i. To organize, retrieve and disseminate information resources in multiple formats
- ii. To identify information resources appropriate to users besides the academic area
- iii. To bring an equal and relevant access to quality resources
- iv. To train users in information behavior, and
- v. To pursue the development of the information organization by creating knowledge, communication, representation, and the like.

Although the economic world of information is very attractive, as mentioned by Simon, Nobel laureate in Economics (cited by Tenzer, 2008), the quantity of information, its easiness and timely access, its attractive presentation, among other things, creates an overload or saturation of information. So the true value of information providers comes from their work of locating, filtering and communicating useful consumer information, in an over changing world where privacy, ownership and data protection are affected (by governments, enterprises, commercial firms, etc.) Libraries, also generate data from their users, for example in an e-loan service, so it is essential that information professionals understand and manage data protection and privacy of their users. Thanks to the initiatives promoted by different countries, legislation that promotes transparency of government information and the creation of open government in order to achieve greater social participation and accountability to citizens through mobile devices, is currently being proposed.

The tasks performed by librarians and information professionals include the knowledge of specialized platforms, applications, tools and other technological innovations to access, manage, and analyze government information.

Sánchez Vanderkast (2013) says librarians and information professionals are able to gauge the access to government information through the following categories:

- Knowledge, which provides opportunities for socioeconomic equality, equity and active participation of information professionals in the democratic life of society and citizenship.
- Technology, which promotes access to information with the support of the technological infrastructure

- Communication, which gives relevance to social, political participation, democracy, equity and power relations
- Control, that deals with the power associated with information and knowledge
- Assets, which give potential to public and social goods
- Participation, the access to information can encourage active citizens' participation in society.

In 2012, the School of LIS at the University of North Carolina at Chapel Hill, on their 80th anniversary, organized a symposium called *Information professionals 2050: Educating the Next Generation of Information Professionals*. The proceedings were edited by Marchionini and Moran (2012). Predictions for all kind of information professionals in 2050 were presented, from “the information architect, data analyst, database administrator, web developer, ontologist, usability engineer, social media strategist, data curator, chief information officer, to the librarian, archivist, and museum curator.”. Thus, the wide range made it more difficult to foresee the preparation needed and the diverse type of careers future information specialists will fulfill, in a virtual environment, mostly in the cloud, and with profound changes in the IT society.

Participants considered that today's information programs should take into account the full information life cycle that includes generation, management, transmission, use/reuse, and preservation of the information. Information professionals should be partners in generating and collecting information, be part of the research, data mining, or design team, use distributed databases and direct data streams, work in a free and open environment and value access and self-directed learning. They mentioned “there is a need for substantial changes in education and these changes would require significant expansion of information infrastructure, which would depend on having skilled information professionals”

From the twenty contributions, we will take some of the inspiring ones coming from the academia, but also from the commercial and services arena.

In her contribution, Chute (2012) states that information is the foundation for most activities in today's world, thus, preparing information professionals on the 21st century, does not include detailed specific subjects such as computer engineering, software development, or even troubleshooting mobile devices, but broader capabilities and approaches to growth and learning. In order to succeed information professionals should develop “critical thinking, curiosity, creativity, the ability to communicate effectively, teamwork, flexibility, the ability to collaborate, and at the base of it all, global awareness.” She considers essential: strategic thinking and facility with evidence-based planning and evaluation; problem solving and to engage in trends analysis; “pedagogy” or the ability to effectively teach, train, and empower the learner of tomorrow; and the skill and ability to respond to the needs of each unique “customer.”

In the proceedings presentation, Moran and Marchionini (2012) agree with Chute, by mentioning that what we need is a professional with the most flexible background possible, which includes technologies that range from papyrus to the cloud, and an umbrella profession that provides a spectrum of opportunities, from preservation to digitization to reference to technology training and development; from community anchor to digital steward. Information professionals will continue their established roles of collecting and providing information resources and services to their users, but will also need to merge traditional

values with individual, social, and institutional actions such as “universal access, collaboration, intellectual freedom and diversity of thought, self-directed learning, creativity, stewardship and preservation of knowledge, and responsiveness to user needs will be evident in everyday work practices of the future.”

On her turn, Caputo (2012), from Down Jones, mentioned we are living in an age of information and knowledge explosion, information in structured and unstructured formats causes an information overload, and concerns about data accessibility, metadata, contents and the like. She summarizes six causes for this dramatic change:

- Globalization: There are no more geographic borders. “Open sourcing, blogging, offshoring, outsourcing, supply chain and informing are all driven or are products of globalization.” As a result, people are interconnected and can instantly share news and contents everywhere.
- Distressed Markets: Economic events in one part of the world affects the other part, global stock market declines, while unemployment and underemployment grow, affecting the information sector, and making the competence for lowering costs and information sources more intense.
- Disintermediation: With the use of internet and self-service activities in many areas, intermediaries are disappearing affecting many of the “library functions” like searching, reading, reference, and the like, transforming the information professionals’ roles in both positive and not so positive ways.
- Disruptive Technologies or Disruptive Innovation: May lead to positive or not so positive changes in commerce, social institutions, healthcare, education and others.
- Competition: as a result of the four factors mentioned, there is an intense competition on commerce, vendors, libraries and services, some of them forced to close. Though, competition may as well provide new and innovative answers.

In the same event, Carroll (2012) asks what we would be seeing in the future. We already have an information machine (an avatar) that answers questions better than smart human beings. Then, what is the role of the information professional? She thinks that by 2050, we will be in a paperless, wireless, and mobile society. “We will expect and get our information anytime and anywhere. It will not be the “document” that contains the information but the information itself.”

When everything started having a fully digital life cycle, many traditional roles continue in a different environment. In the area of user services information professionals continue offering education, training, reference and circulation. Now the ways to perform those functions have changed radically. “This has meant adding new skill sets, mainly technology driven, to the mix.” She adds that information professionals need new and innovative skills due to technologies, like, the information professionals may not be technology developers, but should give an opinion on the better structure of knowledge or the friendliest human interface.

Carroll agreed with Caputo, in some of the main changes information professionals should face in the near future. She highlights four challenges, also included in the IFLA Trend Report (2013). The first is that technologies such as Google, or Facebook, have changed the daily life, in such way, that in few years we will need to accommodate a rapidly changing

user profile (the digital natives). The second is the information overload, although not new, it is now different as data visualization, data analytics, and data mining produce an information revolution and increase the overload. The third one is the globalization of knowledge; we are facing not only changes in the power of countries, but economic competition and national security concerns, which poses challenges in the information provision. The fourth highlights the cultural changes in the social cyber world; especially on intellectual property and personal privacy, which will require the information professionals' immediate position and action.

Discussing the courses that should be taught, she says, "clearly the more technology and tools we understand, the better". As technologies change continuously, it is more important to teach a deep understanding of them in the context of the information life cycle. She concludes that information professionals may play an active role in the design and building of different information interfaces and services, having mathematical and computer science tools, including simulation and modeling.

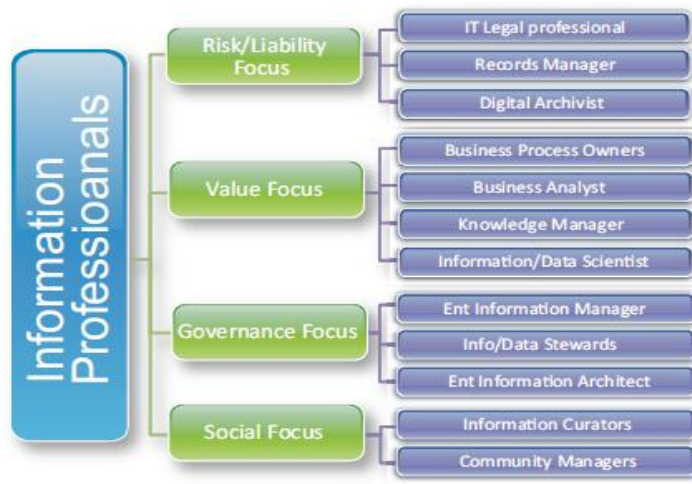
Other participants, like Dempsey (2012), from OCLC, and Marshall (2012), from Microsoft, focus on the problems faced by the analysis, compilation and handling of great amount of data (Big Data). Dempsey highlights the changes in library collections, reduction in spaces, the demand for more services, the shift from an institutionalized systems to worldwide ones, and the like, all due to the advances in ICT (particularly big datasets), and values the information professionals expertise for engaging in a more deeply process on research and learning to provide relevant services to this ever changing society. While Marshall, after narrating her experience in analyzing millions of tweets, considers that Big Data is changing the way we do our job, information professionals will need managerial skills to work with a computer scientist, who should have data management expertise and knowledge of learning machines. It is essential the knowledge of human computer interactions, statistics, data visualization and handling, identification of relevant and non-relevant datasets, privacy, "read the real world" (decide what is important) among others. Thus, she concludes, that a set criteria on how to deal with Big Data will be our near future challenge.

Concluding, the symposium participants agreed on many issues which will affect direct or indirectly the role of future Information professionals, such as (1) Current and future collections: the responsibility of libraries for the intellectual products of their institutions and the access to them (through repositories). The information professionals' expertise will be an asset in that. (2) Selection of resources by information seekers: people is seeking information they can trust and are having difficulty to value it, librarians recommendations are a must (through selection, reviews, courses, etc.). (3) Management and support of information-related scholarly activities: the support to research should be shared between the information manager and the ICT manager. So, as already mentioned, information professionals should be prepared for teaching and learning ICT for a more effective learning process. (4) Data stewardship information professionals: how to handle data sets?, researchers are required by law to maintain their raw data, so information professionals must be prepared to deal with small and large data sets, which means technical support, organization and stewardship professionals skills. They add, that besides all the above, they need a strong leadership information professionals skills to act in difficult situations particularly those where no obvious solutions are to be found, and to understand the changes taking place in the current society.

In other order of ideas about LIS education, a thoughtful paper by Mancini (2012) points out the changes in the information environment nowadays, from the leadership information professionals of ICT and the trend to digitize the information, to the need to engage all ICT systems in an integrated way among producers, users, governments, information professionals, and all involved. In the last ten years the world has radically changed due to mobile technology and the way people access information. Thus, he mentions, that the ICT systems created at enterprises, do not need more sophisticated ICT, but maintenance, and asks, who will be responsible for that?, must be the information professional, even better the information manager, who should be able to foresee the whole panorama, specifically, to understand the management, utilization, and application of information and social assets of the organization.

He mentions the focus of ICT is changing from a traditional focus (the control) on standardizing and automating back-end manual processes to a focus on “empowering and connecting knowledge workers and improving knowledge worker productivity and innovation” (Figure 1). Also he mentions the challenge is that many workers may have these roles in their jobs, for instance, people on legal records, records management, library staff, information architects, or community managers. Thus, we need to breed new information professional nowadays.

Figure 1: The emerging Role of Information Professionals



source: Mancini (2012) <http://www.aiim.org/pdfdocuments/Rise-of-the-Information-Professional-White-Paper.pdf> S

Furthermore, he adds that this revolution in business processes creates six imperatives for organizations, such as: making everything mobile, digitize the processes, make the business a social activity, automate the governance of information, perform contents data mining, and stay on the cloud.

He also points out that in 2011, the AIIM after surveying 1450 potential information professionals, concluded that there were six main areas that he should master: (1) access/use of information in different environments (enterprise, business intelligence, text analytics, etc.); (2) Capture/manage of information in business processes, knowledge management, email and content management; (3) Collaborate/deliver information in social media, workplace, instant messaging, web conferencing and the like; (4) Secure/preserve information in duties such as records management, data privacy, digital rights, archiving, etc.;

(5) Architecture/system, including tasks in information architecture, cloud computing, mobile applications, websites and portals, among others; and (6) Plan/implement information and be involved in strategic planning, implementation, definition of requirements, solution design, change management, and others involved in this area. In summary, they say: organizations need “multitaskers and multidimensional workers.” or information professionals.

The IFLA Trend Report

When thinking on how the ICT will affect the LIS profession and their implications on LIS education, we would like to review the trends in the IFLA Trend Report, already mentioned. As we will see they are thoughtful and in some way controversial, thus their analysis for the wellness of the future librarians and information professionals is essential.

1. New technologies will both expand and limit who has access to information

The new digital information world will be based on information literacy skills like reading and competence with digital tools. So people, who lack those skills and abilities, will face obstacles to inclusion, since most companies are taking advantage of sharing and accessing information through new digital technologies.

The likely evolution of this trend refers to the change in the access to digital information and the increasing importance of information literacy skills to identify authorized commercial information, and to get invaluable information for accessing basic resources for health, education, employment as well as social, political and economic freedom. However, the shortcomings of information literacy and reading skills will probably widen the gap and global inequality.

Moreover, access through mobile devices has changed the traditional concept of intellectual property of the contents established in a particular place. Also the way users consume, share, create and modify various contents through digital platforms, require information professionals confident in managing different technologies with pedagogical skills to train users in the ICT utilization.

2. Online education will democratise and disrupt global learning

Due to the new ways of accessing information, online educational resources will play an important role in the democratization of education, the promotion of cheaper and more accessible opportunities, and they will also offer the possibility of studying formally or informally.

Online educational resources (OER), massive open online courses (MOOC) and various approaches to online education will transform education around the world. These courses and online resources will be essential for lifelong learning and the development of new skills and knowledge. Furthermore, the online courses will increase the students' skills to exploit and retrieve relevant information, and with reduced costs will allow more learning opportunities.

At the same time the open access to scientific publications supplements the OER and MOOC as they support scientists in the discovery and construction of knowledge; to create innovations in health, infrastructure, new trade opportunities and the like. Therefore, online education transforms the teaching-learning methods allowing also complement traditional

classroom activities with virtual tools. This means information professionals, will need to be prepared for organizing and making available to remote students a range of resources needed for their learning, as well as serve as reference and monitor companion to meet their information requirements.

3. The boundaries of privacy and data protection will be redefined

Internet users are registering great amount of personal data and information in the web. Which will make easily easier to profile, monitor and filtering their behavior by governments and companies through sophisticated telecommunication tools. Governments may track and filter information on the activities of citizens through data analysis tools, metadata, platforms and devices. Equally, companies may use cookies and other techniques to obtain information for commercial purposes in order to improve their services, which will affect the privacy of personal data.

Some people begin to be aware of these activities and the level of confidence in the web will decrease significantly. However some others continue to buy goods and services even though companies may use their personal data.

Information professionals should be aware of this situation and act in defense of their users and their personal data, at the same time, prevent and train the users in the appropriate use of the information resources to avoid problems in their privacy.

4. Hyper-connected societies will listen to and empower new voices and groups

The advent of hyper-connected societies in the world will increase the empowerment and emergence of new voices defending social equality, political and cultural movements. Also, the open government initiatives and access to public data will foster greater transparency and services to citizens, as well as more participation in political parties, women in politics, and a better access to health, education, and business information, which altogether may result in a more informed society.

On one hand the use of this hyper technology will promote better communication and collective action to encourage citizen participation and accountability; but on the other hand, this may increase cybercrime, terrorism and drug trafficking networks.

Information professionals will need to have a deep knowledge of those government and non-government information sources and have greater professional capabilities to manage this information and play the role of intermediaries for all citizens who need to access this digital government information. They need to be aware of information as a democratic right that will empower some people but diminish others, if they cannot get equal opportunities to educate themselves.

5. The global information economy will be transformed by new technologies

The growth of mobile devices, networked sensors in infrastructure (the internet of things), three-dimensional printing and translation technologies have transformed the economics of information because the business models generated by these tools, experience change and help people to continue economically active anywhere in the world. Currently, these devices

are becoming the primary means of accessing information and they also allow combining voice recognition and real-time translation or to create digital drawings.

Therefore, users and companies will be better able to participate in the economy of information from anywhere on the planet, which will increase competition, and will untie some developing countries and support social equality between countries with young people and elderly population.

To face this trend, information professionals will require a profound knowledge of these technologies and others to come, in order to organize the data produced by those devices and be ready to support users and companies with the appropriate information they will require.

Comparing the situation described in the papers above and trends from the IFLA Trend Report, we can approach the LIS education in Latin America. It is clear that we should move from traditional “librarians” to those that librarians and information professionals needed for the future.

Methodology

After reviewing papers and opinions of experts from different parts of the world, cited before, we decided to make an inquiry to find out where LIS education in Latin America stands in these topics and to know if they are included in the LIS schools curricula. We considered the whole Spanish and Portuguese- speaking Latin America (from Mexico to the bottom tip of South America). Though it is a big continent with different characteristics, we decided to prepare an unique single survey.

Based on the IFLA Trend Report, we decided to determine fifteen topics considered essential for all LIS graduates to perform as qualified information professionals in the current or future digital era. These are listed in table 1.

Table 1: Topics from the IFLA Trend Report included in the research

Topic Number	IFLA Trend Report Topics
1	Development of information literacy skills
2	Right to information property and digital contents
3	Economics of digital information
4	Open access to scientific publications
5	Open access to educational resources
6	MOOCs (Massive Open Online Courses)
7	Privacy and protection of personal data
8	Information monitoring and tracking for commercial purposes
9	Information monitoring and tracking by governments
10	Access to government information and data
11	Transparency of government information
12	Digital information for building citizenship
13	Use of massive data (Big data) in public policies
14	Use of mobile devices in library and information services
15	Use of emerging technologies in library and information services

These fifteen points were included in a questionnaire and sent by email to directors of the LIS Schools from Mexico, Central and South America. The goal was to assess whether these topics were or not included in the Latin American LIS schools curricula. Moreover, it was asked in which courses are or should be taught these selected topics. Furthermore, we also asked to value (from 1 to 5) the importance of each specific topic in the curriculum, regardless of whether it was being taught or it was considered for future inclusion.

Making use of directories, mailing lists and websites, LIS schools in each Latin American country were identified and their e-mails collected and used to send the Spanish questionnaire. In some cases, we approached national or regional library associations, to reach our target, as was the case of Colombia, where the Library Association (ASCOLBI), helped us to locate the LIS schools. In the case of Brazilian LIS schools, the questionnaire was translated into Portuguese and sent to Brazilian schools, some of them contacted thanks to the Brazilian association (FEBAB).

The numbers of schools contacted are shown in Table 2. It was stated in the questionnaire, as well as in the mail sent to the LIS schools directors that only one answer per school was required. The survey took place from mid-April to the end of May 2015. Of the 41 Latin American LIS schools contacted, we received 16 valid responses.

Table 2: Latin American LIS schools surveyed

Country	LIS schools surveyed	Valid answers received	% valid answers by country
Argentina	8	3	38%
Brazil	12	3	25%
Chile	1	1	100%
Colombia	4	2	50%
Costa Rica	2	2	100%
Ecuador	1	0	00%
Guatemala	1	0	0%
México	6	2	33%
Nicaragua	1	0	0%
Panamá	1	0	0%
Paraguay	1	0	0%
Perú	2	2	100%
Uruguay	1	1	100%
Total	41	16	40%

Time constraints did not allowed us to contact more LIS schools, particularly due to the lack of up to date information in directories or in their own websites. This prevented us to contact other Latin American countries not shown in table 1. A follow up of this study would reach those who were not included at this time.

The results will also show some limitations of the survey which we will be tried try to address next time. For example, it was asked whether or not a specific topic is taught. All the LIS schools answered the ICT topics were included in their curricula but we did not ask for the number of hours or credits devoted to that topic.

Nevertheless, the study give us on overview about inclusion of ICT topics from the IFLA Trend Report in Latin American LIS schools.

Findings

As t it was mentioned above, 16 valid responses were received from the LIS schools, which are listed in table 3.

Table 3: Latin American LIS schools that answered the survey

Country	LIS schools
Argentina	<ul style="list-style-type: none"> • Universidad Nacional de Córdoba. Facultad de Filosofía y Humanidades. Escuela de Bibliotecología. • Universidad Nacional de La Plata. Facultad de Humanidades y Ciencias de la Educación. Departamento de Bibliotecología.
	<ul style="list-style-type: none"> • Universidad Nacional de Mar del Plata. Departamento de Documentación. Facultad de Humanidades
	<ul style="list-style-type: none"> • Universidade Federal do Sao Paulo. Facultade de Filosofia e Letras. Curso de Ciências da Informação, Documentação e Biblioteconomia.
Brazil	<ul style="list-style-type: none"> • Universidade Federal do Sao Paulo. Curso de Bacharelado em Biblioteconomia e Ciências da Informação e da Documentação, Riberão Preto • Universidade Federal do Rio Grande do Sul. Facultade de Biblioteconomia e Documentação
	<ul style="list-style-type: none"> • Universidad Tecnológica Metropolitana. Escuela de Bibliotecología. Carrera de Bibliotecología y Documentación.
	<ul style="list-style-type: none"> • Universidad de La Salle. Facultad de Ciencias Económicas y Sociales. Programa de Sistemas de Información y Documentación.
Chile	<ul style="list-style-type: none"> • Universidad de Antioquia. Escuela Interamericana de Bibliotecología, Medellín.
	<ul style="list-style-type: none"> • Universidad de Costa Rica. Escuela de Bibliotecología y Ciencias de la Información
Colombia	<ul style="list-style-type: none"> • Universidad Nacional de Costa Rica. Escuela de Bibliotecología, Documentación e Información.
	<ul style="list-style-type: none"> • Escuela Nacional de Biblioteconomía y Archivonomía (SEP)
México	<ul style="list-style-type: none"> • Universidad Autónoma de San Luis Potosí. Escuela de Ciencias de la Información.
	<ul style="list-style-type: none"> • Pontificia Universidad Católica del Perú. Facultad de Letras y Ciencias Humanas. Especialidad de Ciencias de la Información.
Perú	<ul style="list-style-type: none"> • Pontificia Universidad Católica del Perú. Facultad de Letras y Ciencias Humanas. Especialidad de Ciencias de la Información.

- Universidad Nacional Mayor de San Marcos. Facultad de Letras y Ciencias Humanas. Escuela Académico-Profesional de Bibliotecología y Ciencias de la Información
- Uruguay
- Universidad de la República. Escuela Universitaria de Bibliotecología y Ciencias Afines (EUBCA).

The findings of this study are showed in table 4. They indicate the fifteen ICT points from the IFLA Trend Report were included in all the Latin American LIS schools curricula, although they did not indicated the amount of time dedicated to each one. The topic ranked in first place is *Open access to scientific publications*, which is included in all the LIS schools, and the lowest ranked topic is *Information monitoring and tracking by governments*, included in only three schools curricula

Table 4: LIS Schools including the IFLA Trend Report topics in their curricula

Topic Ranking	IFLA Trend Report Topics	LIS schools including the topics N=16
1°	Open access to scientific publications	16
2°	Development of information literacy skills	15
3°	Use of mobile devices in library and information services	13
4°	Access to government information and data	12
5°	Open access to educational resources	12
6°	Use of emerging technologies in library and information services	12
7°	Right to information property and digital contents	11
8°	Privacy and protection of personal data	10
9°	Transparency of government information	10
10°	Digital information for building citizenship	9
11°	Information monitoring and tracking for commercial purposes	6
12°	Economics of digital information	5
13°	MOOCs (Massive Open Online Courses)	4
14°	Use of massive data (Big data) in public policies	4
15°	Information monitoring and tracking by governments	3

As we can notice, the most popular topic taught in Latin American LIS schools is *Open access to scientific publications*, which together with *Development of information literacy skills* are addressed by almost all the LIS schools. One reason may be that LIS schools have realized that users are facing many challenges to use digital information whether in open or closed access. Digital information is available through bibliographic databases, especially at

universities and some public libraries, so, users value the provision of these services and require more training to access them in person or remotely.

Reduced budgets in Latin American libraries would be a reason why many libraries adhere to the open access movement, thus, the responses to *Access to government information and data*, and to *Open access to educational resources*, also received high rating (12 mentions each one). It is known that some governments have even made it compulsory to use open software, open information resources, open storage (in the cloud), and the like, in Latin American libraries.

Equally important is the ICT use to provide library and information services, so the topic *Use of mobile devices in library and information services* was mentioned by 13 schools, and the topic *Use of emerging technologies for providing information services* was mentioned by 12 schools. This finding may mean that Latin American LIS schools are making special efforts to equip their students with current topics and trends in LIS education around the world and a clear response to the needs of library and information users, although we do not know how much time they dedicate to these topics nor if they apply a theoretical or practical (or both) approach for teaching them.

A bit lower in the rank appear the topics *Right to information property and digital content*, *Privacy and protection of personal data*, *Transparency of government information*, and *Digital information for building citizenship* (ranging from 11 to 9 mentions). These numbers may indicate that Latin American LIS schools are aware of these issues and their implications for the performance of LIS graduates at work, so they decided to include them in their curricula. However, similarly to the topics mentioned above, we do not know how much time it is dedicated to these topics.

It was also found that few Latin American LIS schools are considering topics related to current issues, such as *Information monitoring and tracking for commercial purposes* (six schools), *Economics of digital information* (five schools), *Use of massive data (bit data) in public policies* (four schools), and *Information monitoring and tracking by governments* (three schools). One reason for this finding would be that for some Latin American countries these issues are not yet present in their economic and social settings. However, two LIS schools mentioned they are planning to include them in their curriculum to be implemented in 2016. Surprisingly, a popular topic mentioned in the literature, *MOOCs in education*, was only mentioned by four schools.

As it has been mentioned above, it was asked in which courses are or should be taught these selected topics. There was a wide amount of answers to this question, so due to this fact and the great differences in courses names, the analysis of these raw data was not possible for including it in this paper. It will be done in another paper.

Another aspect of this study was to determine the importance that LIS schools give to the 15 topics determined from the IFLA Trend Report. Table 5 shows how Latin American LIS schools valued the topics included in the questionnaire. The values assigned were from 1 (the lowest) to 5 (the highest), and the average value obtained for each topic is listed in a ranking order. Likewise, it is shown the number of schools including each one of the topics in their curricula. Comparing the last two columns, we can notice that although some topics obtained a high value, not all the surveyed LIS schools have included them in their curricula.

Table 5: Values given to IFLA Trend Report topics

Topics Ranking	IFLA Trend Report Topics	Average value for topics	LIS schools including the topics N=16
1°	Use of emerging information technologies in library and information services	4.78	12
2°	Development of information literacy skills	4.64	15
3°	Right to information property and digital contents	4.64	11
4°	Use of mobile devices in library and information services	4.50	13
5°	Open access to scientific publications	4.21	16
6°	Open access to educational resources	4.00	12
7°	Digital information for building citizenship	4.00	9
8°	Use of massive data (Big data) in public policies	3.64	4
9°	Access to government information and data	3.57	12
10°	Transparency of government information	3.35	10
11°	MOOCs (Massive Open Online Courses)	3.35	4
12°	Economics of digital information	3.28	5
13°	Privacy and protection of personal data	3.14	10
14°	Information monitoring and tracking by governments	3.14	3
15°	Information monitoring and tracking for commercial purposes	3.07	6

According to the numbers above, we may see that Latin American LIS schools gave the highest value to *Use of emerging technologies in library and information services* with an average of 4.78. However, this topic is taught in 11 of the 16 schools surveyed. It is clear that LIS schools are conscious this is an important topic to be included in the curricula although not all of them have included it in their curriculum.

Similarly, the topics *Development of information literacy skills* and *Right to information property and digital contents*, well discussed in the literature as essential knowledge for the future librarians and information professionals, were valued with an average of 4.64. Regarding the first one, it can be noticed that 15 LIS schools have included it in their curricula, but the second one is only included in 11 LIS schools. Closely, with a 4.50 average, we found the topic *Use of mobile devices in library and information services*, which is particularly important nowadays, and about which some experts predict that in less than 15 years almost all our world will be mobile. This topic is included in the curricula of 13 LIS schools.

It is also important to mention the topics related to open access, *Open access to scientific publications* and *Open access to educational resources*, were well valued in the survey. The first one obtained an average of 4.64 and the second one of 4.00. As mentioned, open access is an issue frequently addressed by institutions in developing countries, not only due to budget constraints, but particularly because of the benefits to access relevant research produced in other parts of the world, as well as for making made visible around the world. Likewise, many universities and research institutions in Latin America are creating their repositories including particularly open access dissertations and journals as well as research papers. Thus, the first topic is included in all the Latin American LIS schools curricula. However, *Open access to educational resource*, has been included in some of them. Similar average (4.00) was given to the topic *Digital information for building citizenship*. It is getting more and more recognized that a high informed society will take thoughtful decisions in all aspects of their daily life, such as economics, socio-political, cultural and educational, and the like. At the same time, the responsible participation of citizens is the basis for the development and welfare of society. However, this topic is only included in nine Latin American LIS schools curricula.

Regarding to the remaining topics, there were eight topics valued with an average less than 4.00. Overall, these topics have not been included in many of the Latin American LIS schools curricula. Nevertheless, three of them, *Access to government information and data*, *Transparency of government information*, and *Privacy and protection of personal data*, have been included at least in 10 LIS schools. This fact is important because students are learning that government information needs to be transparent, publicly available, but also easily accessible to those who need it (i.e. all the society), as well as that citizens need to have privacy and protection for their personal data.

Surprisingly, the topic MOOCs (Massive Open Online Courses), whose importance at the present time is significant to provide users a medium for self-education opportunities and participate in a qualified society, is only included in four LIS schools curricula. Then, information professionals need to know, use and publicize MOOC among their users, and particularly adapt those which better meet their information needs.

Taking into account the averages for this remaining topics, as well as the low number of LIS schools curricula where they have been included, it looks like that Latin American LIS schools are not yet involved in them.

Finally, we may mention that all the topics emerged from the IFLA Trend Report are considered in Latin American LIS schools curricula although in different level of consideration. Therefore, some of them need to be strengthened.

Conclusions

The information collected and its comparison with the IFLA Trend Report, made us to conclude that librarians and information professionals are facing an era full of challenges due to the advances of ICT all over the world.

We find in this research that the main topics that are changing the work of librarians and information professionals all over of the world are the appearance of mobile devices and the information overload. The challenges due to ICT development cause for the creation of more

and more information available not only for use on mobile devices, but as well information generated by sophisticated means such as data mining, data visualization, Big Data, and the like.

As discussed, the most valued topics by Latin American LIS schools are those related to the use of ICT for developing better information services. A fact that shows that librarians and information professionals are well in tune with their main or traditional goal, i.e. “provide information services to users.” Although the tools may change and evolve with time, the mission of librarians and information professionals continues unchanged.

In relation to positions and names that information professionals will adopt in the current and future labor market, we find there is also a great variety of them, from librarians to information workers, information curators, ontologists, and several others. Though we think that Latin American LIS schools should equip their graduates with a sound knowledge in four and essential skills: get confidence with all kind of technologies, develop new and innovative information services to users (including information literacy), organize information in a coherent way; and show leadership in order to make the profession and its mission essential values for society development.

Finally, it can be mentioned that Latin American LIS schools are addressing the topics considered in the IFLA Trend Report, but at different levels and in a wide range of courses. As mentioned, there is a need for further studies to determine the importance that each school gives to diverse topics, in terms of credit/hours and theoretical and practical approaches. However, we expect this initial survey shows a current overview on these issues, and it would be useful for Latin American LIS schools for addressing those topics considered necessities for the future LIS education.

Acknowledgments

We want to thanks all schools in Latin America who answered the questionnaire and all those persons who supported this survey. Special thanks to Juanita Jara for her review of the English version of this paper

References

ASLA. (2012). Statement on school libraries and information and communication technologies. Retrieved from: <http://www.asla.org.au/policy/school-libraries-ICT.aspx> (June 30, 2015).

Caputo, A. (2012). Reflections on the state of specialized libraries: five global trends all knowledge professionals should understand. In: Informational Professionals 2050: educational possibilities and pathways (p. 76-78), ed by G. Marchionini and B. B. Moran. North Carolina: School of Information and Library Science. Retrieved from: <http://sil.unc.edu/sites/default/files/publications/Information-Professionals-2050.pdf> (June 30, 2015).

Carroll, B. C. (2012). From knowledge navigator and Watson to Star Trek: the role of the information professional. In: Informational Professionals 2050: educational possibilities and

pathways (p. 79-83), ed. by G. Marchionini and, B. B. Moran. North Carolina: School of Information and Library Science. Retrieved from: <http://sils.unc.edu/sites/default/files/publications/Information-Professionals-2050.pdf> (June 30, 2015).

Chute, M. L. (2012). A core for flexibility. In: Informational Professionals 2050: educational possibilities and pathways (p. 46-51), ed. by G. Marchionini and B. B. Moran. North Carolina: School of Information and Library Science. Retrieved from: <http://sils.unc.edu/sites/default/files/publications/Information-Professionals-2050.pdf> (June 30, 2015).

Del Valle Cuzzo, G. and Ladrón de Guevara, M. C. (2011). La formación tecnológica del profesor en el campo de la bibliotecología. Retrieved from: <http://conference.ifla.org/past-wlic/2011/110-cuzzo-es.pdf> (June 30, 2015).

Dempsey, L. (2012). Libraries and the informational future: some notes. In: Informational Professionals 2050: educational possibilities and pathways (p. 113-126), ed. by G. Marchionini and, B. B. Moran. North Carolina: School of Information and Library Science. Retrieved from: <http://sils.unc.edu/sites/default/files/publications/Information-Professionals-2050.pdf> (June 30, 2015).

Ebrahimi, R. (2009). The effect of Information and Communication Technology (ICT) on teaching Library and Information Science. Library Philosophy and Practice. Retrieved from: <http://www.webpages.uidaho.edu/~mbolin/ebrahimi.htm> (June 30, 2015).

Forsman, M. (2014). Science, technology, and library work: trends and milestones. Annual IATUL Conference 2014: plenary sessions Retrieved from: <http://docs.lib.purdue.edu/iatul/2014/plenaries/10/> (June 30, 2015).

Fox, E. A. and Sornil O. (1995). Digital libraries. In: Encyclopedia of Computer Science, 576-581. ACM Digital Library Retrieved from: <http://dl.acm.org/citation.cfm?id=1074337> (June 30, 2015).

IFLA (2013). Riding the waves or caught in the tide: navigating the evolving information environment: insights from the IFLA Trend Report. Retrieved from: <http://trends.ifla.org/insights-document> (June 30, 2015).

Mancini, J. F. (2012). The rise of the information professional: a career path to the information economy: AIIM White Paper. Retrieved from: <http://www.aiim.org/pdfdocuments/Rise-of-the-Information-Professional-White-Paper.pdf> (June 30, 2015).

Marchionini, G. and Moran, B. (2012). Information Professionals 2050: educational possibilities and pathways. North Carolina: School of Information and Library Science. Retrieved from: <http://sils.unc.edu/sites/default/files/publications/Information-Professionals-2050.pdf> (June 30, 2015).

Marshall, C. (2012) Big data, the crowd, and me. In: Informational Professionals 2050: educational possibilities and pathways (p. 127-147), ed. by Gary Marchionini and, Barbara B. Moran. North Carolina: School of Information and Library Science. Retrieved from:

<http://sils.unc.edu/sites/default/files/publications/Information-Professionals-2050.pdf> (June 30, 2015).

Moran, B. B. and Marchionini, G. (2012) Presentation. In: Information Professionals 2050: educational possibilities and pathways (p. iii-ix), ed. by G. Marchionini and, B. B. Moran. North Carolina: School of Information and Library Science. Retrieved from: <http://sils.unc.edu/sites/default/files/publications/Information-Professionals-2050.pdf> (June 30, 2015).

NISO (2013). Knowledge in your pocket: mobile technology and libraries. Retrieved from <http://www.niso.org/news/events/2013/webinars/mobile/> (June 30, 2015).

Rendon, F. (2014). How innovation and technology are shaping libraries of today. Retrieved from: http://www.huffingtonpost.com/frankie-rendon/how-innovation-and-techno_b_5244601.html (June 30, 2015).

Sánchez Vanderkast, E. J. (2013). Acceso a la información gubernamental: estudios y tendencias. *Investigación Bibliotecológica* (27) 60, 181-201. Retrieved from: <http://scielo.unam.mx/pdf/ib/v27n60/v27n60a9.pdf> (June 30, 2015).

Tenzer, S. M. (2008). Economía de la información. Retrieved from: <http://www.ccee.edu.uy/ensenian/catcomp/ECONOMIA/EconomInform.pdf> (June 30, 2015).

UNESCO. (2007). Empowering information professionals: Module 1. Introduction to information and communication technologies (ICTS). Retrieved from: http://www2.unescobkk.org/elib/publications/ICTEIP/MODULE1/EIPICT_MOD1_ppt/EIPICT_MOD1_L1.pdf (June 30, 2015).

Zickuhr, K., Rainie, L. and Purcell, K. (2013). Library Services in the Digital Age. Pew Internet & American Life Project. Retrieved from: <http://libraries.pewinternet.org/2013/01/22/library-services/> (June 30, 2015).