

Use of Technology in Mexican State University Libraries*

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Abstract

The results of an information technology adoption survey are presented in this paper. The population, studied through a written questionnaire and when needed, through a telephone interview, was all the 40 Mexican state university library systems. The study was focused on the use of technology for information management and promotion of library services. It included four main aspects: 1) Library management software, 2) Virtual information services, that is search engines, electronic resources management, virtual reference services and digital document repositories; 3) Computer staff and computers for library users; and 4) Use of social networks as collaborative and communication tools for library services promotion. An analysis of performance indicators based on university size identifies strengths and weaknesses in these four components.

Key Terms: Library technology – Library management software – Virtual information services – Social networks – State Mexican universities

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Introduction

The present article broadly analyzes the current status of the use of new technologies in library systems of all state Mexican universities, using quality measurements. Most Mexican libraries use such quality measurement standards to assess the use of physical documents and collection infrastructure but with less emphasis on services related to the use of information and communication technologies (Arriola Navarrete, 2006). Moreover, libraries tend to focus on activities that take place within their facilities without formally considering what happens outside, especially in users' interaction with information technology media.

In this paper, the adoption of new technologies is represented in the internal setting of the library, using four individual aspects (Eleven performance indicators). These components are: 1) Software availability to perform management functions, either bought from a software vendor or developed in-house by the library. 2) Virtual information systems software for management of electronic resources, virtual reference services and digital document repositories. 3) Computer staff and personal computers for library users, and 4) Social communication and/or collaborative tools like Twitter, and Facebook.

The results of the survey were analyzed according to the size of the student population of the universities to identify if the resources available to them had an impact in the adoption of new technologies in their libraries

Trends in Education and Technology

Current education trends can be identified in multiple ways, but especially in the way that people teach and learn. According to Hammond (2008), one of the key elements in daily learning is in the way information is accessed, and in the way knowledge is acquired that, in turn are intrinsically related to the use of technology. Hammond believes, that educational institutions at all levels, if they are to meet their mission, must develop

activities that motivate faculty and students to increase use of information and technology, offering educational alternatives based on Internet. Hence, educators and learners may have more opportunities to access the technological scaffold, structured-information databases, and web repertoires, as well as strategies to promote computer/human productive interfaces.

Hammond's proposal (2008) definitely addresses the responsibility that institutions have, to create information and technological environments with the underlying goal of providing an integral learning to the student. The opposite alternative, not discussed in this paper, is the individual decision to access information and to use technology outside the educational setting. For instance, Attewell (2005) describes the spread of devices allowing free access to information as a recent phenomenon exponentially growing through the use of mobile phones, MP3 players and PCs, which are part of daily life, to a greater or lesser extent, for many students and educators.

The discussed concepts assume the possibility of an educational change from a formal institutional perspective with the inclusion of technology as a key learning ingredient, but other experts' perspectives stress the need to incorporate into the institutional pedagogical process the increasingly popular adoption of technological devices related to pop culture.

Cox and Marshall (2007) give strong reasons to merge information and communication technologies (ICTs) and teaching-learning methodologies, as well as the inclusion of equipment and media products of people formerly considered as part of the entertainment industry into the formal education environment. They suggest the definition of government policies, redirection of education programs, development of a national curriculum, redesign of classroom dynamics and, analysis of education's cost-benefits.

The use of mobile technologies as teaching-learning tools has created a new concept "*m-learning*" or *mobile learning* researched by Herrington and Herrington (2004) and Bruns, Cobcroft, Smith, and Towers (2007), who believe that this type of technological alternatives ignite cognitive processes, similar to the ones in traditional educational

methodologies in which constructivism, collaborative and cooperative, informal, and meaningful, lifelong learning approaches merge. This point is further explored by Herrington et al. (2009), Lefoe and Olney (2007) narrowing the concept to m-learning in higher education, where they also analyze its impact by considering how it may influence faculty and in the different forms of other teaching-learning environments, such as adult education, environmental education, information literacy, virtual education, and the learning of specific subjects such as mathematics, and physics.

The formalization of educational processes using mobile technologies or performing any information search outside a formal context, such as the library, was studied by Patten, Arnedillo-Sánchez and Tangney (2006), stating that these actions, using technology devices, lead the subject (user) to develop information management functions; as well as to develop reference skills by accessing electronic data, such as books, serials, websites, or just by simply responding to certain tasks through these interactive activities.

As a theoretical conclusion, the library can justify its academic role in the midst of these technological changes, considering its decision role to incorporate technology to access information, to digitize collections and to respond to users' individual needs; thus, enhancing remote information availability through the use of new technologies. The academic library needs to formalize the use of technologies that were formerly considered as mere entertainment tools, and turn them into direct access tools to available resources.

Research Objectives

The objective of this survey was to evaluate the adoption of new technologies by library systems of state Mexican universities in management functions and in the provision of information services, with the following specific objectives stated in the introduction of this paper: a) Identify library management software available either produced in-house or subscribed to software companies. b) Identify the use of software for virtual information services through search engines, virtual reference software, and digital repositories

programs. c) Evaluate number of computer staff available to perform information technology functions and number of computers for user services. d) Identify the adoption and use of social networks or collaborative tools for the promotion of information services.

Methodology

The universe of the study was higher education libraries, and the population selected was state university library systems that are the most representative institutions in Mexico, because of their student population and the size of their library holdings, both are the major ones in the country. Among these cases, were the university libraries of Mexico City, but they were excluded because of their macro characteristics which make them outliers in the selected population. The population of state universities share similar legal, political and academic features, with the exception of five libraries of research centers or schools that are not universities in the proper sense of the word. The library systems of these universities are members of the Consejo Nacional para Asuntos Bibliotecarios de las Instituciones de Educación Superior (CONPAB-IES (National Council for University Library Matters in Higher Education Institutions), founded in 1984. The library members who take part at the association are normally directors or deans of the state university library systems. Currently, there are 40 members (only one of them belongs, an additional exception, to a private institution) divided in seven geographical regions (CONPAB-IES, 2009).

Cortés Vera and López Ruelas (2008) state that CONPAB-IES' mission is to promote the development of library systems in universities through the exchange of information resources and expertise, as well through the creation of guidelines to favor collaboration, and the professional growth of personnel, and most importantly, the quality of education at national universities. The Council's strategic goals (CONPAB-IES, 2005): are to a) Make interlibrary cooperation a reality through a coordinated plan; b) Unify, not uniform, the associates' criteria on library science and the development of professional service concepts, and to c) Promote the continuous assessment of user services quality.

The population of academic libraries described was studied, using an eleven-question survey (See Appendix 1: “Questionnaire: Use of Technology: State University Libraries”). Questions were divided into four categories, plus the demographic information section. Participating institutions had the choice to complete the questionnaire by themselves or answer it via a telephone interview. The phone interviews were done directly with the person in charge of the library system or someone specifically appointed to provide the requested information. Thanks to a telephone follow the 40 CONPAB-IES members of the library systems and smaller libraries answered the questionnaire. 72.22% of the respondents were Directors of the Library Network of their university; 22.22% were Directors of Library or Information Centers since they offer centralized services or from one central library; 5.55% were deputy directors or department managers within the library network (these were in the cases when the directors could attend the phone call).

Findings Analysis

It is important to mention before the questionnaire results are analyzed, that participating universities significantly vary in size. Therefore, data analysis was mostly undertaken considering the institutions’ enrollment size, except for some variable results that were globally assessed, when it was felt that some information were better portrayed as a single data block.

According to Galaz Fontes (2005), there is no classification system for universities in Mexico, but the main national organizations such as the Secretaría de Educación Pública (SEP) (Public Education Ministry) and the Asociación Nacional de Universidades e Instituciones de Educación Superior (ANUIES) National Association of Universities and Higher Education Institutions) handle universities’ information in different groupings, that are assumed as classification systems, but there is no general agreement on these categories. Consequently, in this study, the framework of Galaz Fontes (2005) and Galaz Fontes and García Sevilla’s proposal (2006) is used. It consists of grouping institutions

according to their size, not only using enrollment but also including number of majors, and faculty. The criteria categorize state universities as (See Graphic 1):

- a. Small: Institutions with few (less than 15% of total undergraduate enrollment) or no high school students; and between 75 and 100% of the students are in specialized undergraduate programs (4-5 years). They also lack or have just a few graduate programs, if they do, they focus on a few Master level degrees. In some institutions, graduate studies tend to be the major academic offer.
- b. Medium: Higher education institutions with more than 25% of their enrollment at high school level. They offer specialized undergraduate majors and graduate enrollment is small.
- c. Large: These institutions enroll 40,000 or more students. 20 to 50% of the enrollment is at high school level. Specialized undergraduate programs represent more than 90% of the total enrollment. Graduate programs play an important role and research takes place at the institution's own research centers and institutes.

The classification of Mexican universities has different angles, therefore, in this study, the approach was to focus on the size criterion to categorize state universities, because there are other kinds of higher education institutions, with multiple types in between, such as the ones described by Lau (2009) that groups them by general subject and source of their income. This scheme divides into, such as public versus private institution that can be broken down in state universities, institutes of technology, polytechnic universities, technological universities and teacher schools. Public state-funded organizations, the ones that cater for most of the student population, have their income sources from the federal, state or municipal governments, but the majority of them have some funding from the Public Education Ministry. Based on the formerly described classification of state universities library systems, the surveyed population was 13.5% small, 64% medium- and 22% of large institutions (See Graphic 2).

The results of the survey include the assessment of the just 36 library systems and libraries, because four CONPAB-IES member institutions were left out of the study due to their

small enrollment that distorted the study results. Three of them have fewer than 100 graduate students and one of them is basically a school that with three undergraduate programs with an enrollment of approximately 500 students. These institutions, in general, focus on graduate studies or offer a limited number of programs and their conditions skewed the overall data analysis. The institutions that were excluded belong to the metropolitan area (2), one to the Northwestern region and one more to the Central-Western region of Mexico.

The data gathered from the 36 participating universities showed that 83.7% have a library system with a central library and one or more departmental units (in some cases more than 50), usually, one by each school or faculty, and 16.13% indicated they had one library, because their parent institution normally has an administrative departmental model. Findings are arranged, and discussed in the following sections, in the four research axis: software, virtual information services, computer staff, and social networking tools, according to the overall objective and the specific goals previously outlined.

Software

This category was devoted to study the kind and capabilities of software used by each library system or library to manage their overall operation, which is integral software, identifying if they are developed in-house or commercially acquired from a vendor.

The first survey question in regard to whether or not the library system, (as mentioned before, includes also institutions with just one library) had library management software, it was found that 100% of the participating institutions use one. This means that all libraries in the study have, or seem to have, automated operations in all their processes, from collection development and organization to the provision of information services. The result was the expected one because the use of integral software is a tool which has been gradually adopted since the 80's, when the first library automation projects, as well as the use of other computer technologies, began in Mexico (Silva Zamora, 1989). Back then,

there was a glimpse on the positive substantial impact in the development of library services management (Suaiden, 1990).

The library systems in state Mexican universities follow international trends by installing commercial packages from specialized companies, 90.32%, followed by 9.67% who have chosen to develop and rely on their own software. The main library management systems, eight brands in total, are shown in Graphic 3. Obviously, the local software packages have the advantage of providing a better response to the specific needs of the library; but have the disadvantage of generally lacking standardization and strength due to their limitation to one institution (Stallman, 2004).

Home-made systems are usually created at the university's computer department that does not likely stick to international standards, such as the Anglo-American Cataloguing Rules or MARC tags; although there is no study on the subject but taking into account personal experience, they normally have this limitation, which reduces data transfer capacity with other systems.

Virtual Information Services

Paredes and Caldera (2006) state that virtual information services are mainly linked to reference information systematization and digitization; availability to access new technological developments; website design; digital library projects; acquisition of electronic publications; availability of information services to support virtual services; and online public catalogs, just to mention the main services. However, in this study, virtual information services, the second component of the study, was narrowed to the availability of electronic information collections; reference information services, and search engines to locate and retrieve information by users, regardless of their geographic location.

The following question was about the availability of search engines, defined as tools that do not have a database but use other databases' functions to locate the information requested by the user in a federated search, that is, when the query may be done through the

documents' table of contents or it may be forwarded to an external content repository. The survey showed that only 32.25% of the library systems had access to such search engines, and the remaining 67.74% lacked them.

The search engines used as information tools by the surveyed cases were: Metalib (used by 32.25%) and Singlesearch (used by 23.07). 46.05% reported the use of search engines; however, they did not know their names; a fact that raised the question of whether these library systems really had a search engines or not. Taking into account all responses, including the doubted ones, the results were low, confirming that that there is a potential loss of the databases' access, and therefore, a loss of money invested in electronic resources subscriptions at these universities, because usually users do not bother to go beyond two or three databases to find what they are looking for OCLC (2009) (See Graphic 4).

In regard the use of electronic resource management software (i.e. tools that enable the search for electronic periodicals, and e-books) and after providing them some software examples, such as OpenURL Linker, Single Search (SIRSI), OCLC Link Manager and ExLibris SFX; 35.48% of the institutions claimed to have this tools, whereas 64.51% reported not having them. Findings were fairly similar to search engines results. This leads to the conclusion that the same universities may likely have both software resources as part of their virtual library services. A question that was not asked, but it was assumed to be the case, is that most library systems do subscribe to journals and other type of periodicals.

The most common electronic resource management software used were: ExLibris SFX, OCLC and DSpace; even though DSpace does not comply to this category, because it is a repository management software. Each of the four options, correct or not, were reported to be used by three library systems. Nine other systems (23.07%), in addition, reported also using this kind of software; nevertheless, they six of them (15.38%) did not recall their names. Once more, the lack of information about the name of the electronic resource management software raised the question of whether or not these systems are really used or have simply been mistaken by other software.

Virtual reference service software is another essential component of virtual libraries to provide tutoring, coaching and information to users, regardless from the physical distance between them and the library. This software was absent in 64.51% of the state Mexican universities in the survey, with only a 35.48% confirming the use of this kind of services. The virtual reference software reported were: in-house software, online reference Kenvo Module, QuestionPoint (the most frequent 7.69%); plus Linker, Ariel Interlibrary Loan Software, Macromedia Dream Weaver, Macromedia Flash, Filezilla and simply through on-line free commercial chatting services. A simple analysis of the answers showed errors in relation to Ariel Interlibrary Loan Software, Macromedia Dream Weaver, Macromedia Flash, and Filezilla software, because they are not designed for virtual references services. Ariel Interlibrary Loan Software has been designed to digitally transmit documents, and Macromedia Dream Weaver and Macromedia Flash are for webpage design programs. Once more, findings were low, similar to search engines availability. CONPAB-IES members are, in general, the largest universities in the country, with the exception of Mexico City's, and only 26.92% of these institutions offer the virtual reference services.

The question on whether or not the assessed library systems pay software maintenance showed that 70.96% of the cases budget a payment for this service; on the other hand, the remaining 29.02 % did not have this expenditure. The results support the answers to question 1 on "General management library software systems", where most institutions reported that they contracted such systems from a supplier. Likewise, organizations allotting financial resources on software maintenance reported an average expenditure of \$10,650.00 dollars, being \$1,953.00 dollars the lowest, at a small university and \$23,437.00 dollars the highest at one of the largest universities.

Another surveyed variable was digital document repositories. According to Azorín, Jorba and Piera (2006), this kind of repertories have become more popular at university libraries, because it allows them to preserve, and distribute research and academic materials produced in digital and paper formats. Material categories may vary according to content (theses, academic projects, manuscripts, and all type of materials) and its user focus is to provide access to in-house produced documents, as well as to generate a document backup

protection. Based on the answers provided by library systems in state Mexican universities, 25% had developed digital document repositories and 75% did not have these repertories. The operation of the repositories is done by using either free, open source or commercial software. The names reported were Dspace, Aleph ADMA, Phronesis and El Dorado (The last two created in Mexico). Again, the answers to this question showed confusion. Responses provided names of digital collections, for instance, Infoteca, Colección Yucateca, and ANUIES Sur-Sureste.

Results on the use of digital repository software showed, once more, that the largest university library systems in the country, with the exception of Mexico City, need to adopt this technology, at least to provide access to their own library generated documents. Data on whether or not the repository is for general university use was not inquired; however, it is possible that these digital repositories are mainly for internal library systems use.

Computer Staff

Few library systems in state Mexican universities hire staff with university library degrees and/or professional library training. Some libraries even do not have library professionals at all. However, for computer and technological applications, they do hire computer staff with the proper degrees capable of providing service to their ever-increasing computer and information technology infrastructure. The advantage of this second field is that there is a good pool of computer professionals, unlike librarians that are scarce, because library schools or programs are just 10 in the country and some of them are fairly new. In regard to this matter, the survey question about the availability of personnel to take care of the needs of computer and technology services, yielded that 93.54% of the population gave a positive answer, and only 6.45% did not have computer staff. This shows a highly positive result, because, it is an indicator that surveyed university libraries have the staff to benefit from their computer and technology investments.

The number of employees appointed to serve computers and technology services in the library systems of state Mexican universities, on the other hand, did not seem to correlate

with the number of students enrolled by these institutions. Table 1 shows the relation between the average student population by university and the computer/technology staff by institution, where small universities have an average of four computer employees, whereas medium-size institutions have more than three employees, and large universities have almost seven members per library system. In other words, some small universities appoint more employees to this purpose compared to large university; nevertheless, student population varies between two and five thousand students per computer hired staff, a high enrollment variation. Yet, results contrast even more among medium-size universities, because they have the lowest staff average, just over three members per seven thousand students. A plausible explanation to these results would be that the same number of employees may be able to implement, use and provide maintenance to the required equipment and software regardless of the institution size.

The number of computers assigned exclusively for users, an additional question in the survey, showed similar results to the ones in the number of computer staff as it is shown in Table 2. The results showed that small institutions have an average of 166 computers in libraries, with average of one computer for every 50 users. Medium-size universities had fewer with an average of 105 computers per library, that is one per 223 students, and large universities had the largest offer with 591 PCs in libraries, having one computer for every 94 students. In other words, users in large universities have better access to computers, followed by small institutions. Finally, medium-size universities have the more limited access with almost four times fewer computers than smaller institutions.

In other words, computer distribution in relation to number of potential library users does not indicate a normal pattern in relation to equipment assigned to the student population in these institutions. Even though, the levels of computers available to users shown by the three types of universities according to their size may not be enough to meet their students' demands, the lowest levels continued to appear in medium-size institutions. A further literature analysis of small institutions indicate that their high results may be due to their academic characteristics, they are, in general, research centers that have outgrown to offer graduate programs and have been able to attract more funding that correlate to their

academic excellence (Galaz Fontes, 2005). It must be mentioned that the survey did not inquire about other computer services such as printers, scanners, audio and recording equipment, among other types of hardware.

Social Networks

Sanz Menéndez (2003) defines social networks as measurement and analysis tools of social structures emerging from relationships among diverse social actors (individuals, organizations, nations, etc.). Although the origins of social networks go back to origins of sociology, this study focuses only on group structure elements based on the use of technology, because in the past, there were social clubs or “invisible colleges” in the academic realm that somehow included the sharing of knowledge, news and facts but did not necessarily depend on technological tools.

In this survey, social networks are defined as communication and collaborative tools. The findings showed low positive answers if all results are lumped together, where globally 61.29% of libraries use at least one social network tool. On opposite side of the results spectrum were 38.70% of the cases that did not use any kind of social tools. A percentage that was high, meaning that nearly 40% are out of the new communication technology realm that in many cases, users have already implemented as part of their daily life. An analysis by each type of tool indicates that the use of these tools is abysmally low in the surveyed university libraries (Excluding as stated, the macro universities of Mexico City), which are the largest, with the most resources in country. Graphic 5 includes a summary of these results, where Facebook appears as the most used choice among the eight social network tool options (Good for generic text communication, and photos, and video sharing), but the number is still low with only 22%, followed by Blogs with almost 20%, and listservs, including Twitter, (Micro notepads/Blogs), and discussion forums with only 12% and 15% respectively. The use of these tools is low, perhaps due to lack of awareness of their benefits to communicate and promote information resources with users, but this in turn may be caused by the lack of technology staff training and passive library management. Wiki (Shared text software) is used in 10% of cases, and YouTube (Video

uploading) and Flickr (Photo album sharing) was reported by only by 4.87% of the cases. Findings are rather low for most social network tools, taking into account that they are free and popular among university students from low middle class and upwards that typically attend state universities and are therefore users of academic libraries in Mexico. Perhaps state university library personnel needs, as stated, training in the use of these new technologies and they may require, as well, more motivation to update their skills, because, it is assumed that they do not adopt social network tools even for personal use, but these topics require a separate study.

The use of social networks as collaborative tools did not show a significant pattern in relation to participating universities' size and preference for a particular type. Data indicated that large universities reported to use all types of social networks (Table 3), but the frequencies are minimal, in fact, most could be considered irrelevant, because values oscillated between 8% in five tools and 16% (Facebook and Wiki) and 27% (Blog). Medium-size cases stated to use only Listservs (33%) and Discussion Forums (13.33%), Twitter (13.33%), Blog (13.33%) and Facebook (27%). Small universities reported, on the other hand, the use of Facebook (20%), Blog (40%), Wiki (27%) and Discussion Forums (27%). The results are, again, in general, low, a clear indicator that adoption of new social networking technologies is taking time to adopt. This may mean, also, that they might not be reaching the new university entrants, because according to Facebook chief operating officer, Sheryl Sandberg (2010) only 11% of teens email each day. Moreover, the size of the higher education institutions did not seem to play any impact in these results.

Conclusions

Before discussing the overall results of the data collected through the survey answered by the 40 members of CONPAB-IES on the adoption of technology in library systems in state Mexican universities and smaller colleges (technical, and graduate research-oriented schools), it is important to indicate two subjective aspects identified in the survey process that need to be taken into account for the validity of the study: One was the lack of knowledge, by some of the interviewed library officials, about names and functions of

different technologies used in their institutions (search engines, electronic resources and virtual reference services software). In several cases, examples of names and explanation of technology tool functions, had to be provided during the phone calls, but from those who chose to answer the questionnaire by themselves there were several mistaken names of technologies. Second, respondents, in general, did not have the requested information at hand, as one would expect, because in most cases the required data was just the name of the technological tool. Several of them referred to the officials, or departments within the institutions to respond to the inquiry. These two facts were a subjective indicators, because they were not included in the survey, of the unawareness of the technology used in the libraries by library officials that can be interpreted as having no exposure to use such tools or, simply that they are not involved in such management processes. In brief, results indicate that several library heads and directors seem to be not familiar with software tools.

Even though, the analysis of the results was done in relation to the enrollment size of state Mexican universities, as a fixed variable, it must be said that this measure is not a precise one. Student population size is usually considered as a common reference to classify higher education institutions; however, this is not the only parameter because there are also other important aspects such as the strength of postgraduate programs, and academic performance, thus, making it hard for a study of this type to set a precise parameter to group universities. The enrollment size indicator proved inadequate because hypothetically, their size, influences their access and adoption of technologies; nevertheless, the correlation was not clear. Large universities did have more use of technology tools followed by small institutions, but medium-size ones were the exception, a contrasting result, taking into account that they were the majority of the cases. Results, in addition, might be biased by the fact that CONPAB-IES small institutions are not universities in the full meaning of the word. They are considered more as research centers offering postgraduate programs than universities. This gives them the advantage of having more access to resources, including funding to acquire technology. Moreover, they may be more dynamic on the decision-making processes in regard to technology.

The general conclusions are that there is an overall implementation of general library management system software in almost every library system. Another trend is that, in the majority of the cases, they acquire their software from specialized vendors. This is considered a positive aspect especially for national inter-institutional cooperation, as well as, when library systems grow and require migrating information to stronger systems. A minority of the cases who chose the development of their own internal systems that may lack the standard-compliance for data migration, as they might have been developed by personnel from their computer systems department without the presence and involvement of specialized library personnel, because most library systems lack enough library graduates in their staff.

If automation of information management services has reached an adequate level in terms of its adoption, it is not the case of virtual information services implementation, where statistics were low. Search engines, virtual repositories were available in less than 40% of the cases. Virtual references service (36%), perhaps the simplest and less expensive, is a technology that has been available for about ten years, and it is certainly a basic development to be adopted by state university libraries, if they are to meet the current distance information demand of their academic communities. Computer and technology staff, on the other hand had a positive result, because most institutions have personnel devoted to this important task. However, it must be said, that there was no even distribution according to the institution size, where small institutions had good number of staff.

The last survey component related to social network tools yielded emerging trends. The results were low in most technology options, the most commonly adopted tool was Facebook, with only 22%; a figure that is still low for academic institutions, with the largest library systems in the country. The other cited tools were blogs, with 20%, followed by listservs (15%), this last one that has been available for more than two decades still share a low rate adoption. Twitter, the most popular tool worldwide, alongside discussion forums barely reached 12%. Other tools that showed insignificant use were Wiki, YouTube and Flickr with less than 10% of adoption. These results showed that Mexican state

university libraries have the great opportunity to incorporate the latest and most popular social networking tools into their user communication schemes.

As a general conclusion, library systems in state Mexican universities need to catch up with information technology if they are to play an active role in education. They need to set action plans to train their staff and invest in this field. CONPAB-IES, the main association of state university library directors, also needs to have a strategy to create synergies in the adoption of new technologies, otherwise, library systems will remain outside technology antennae of users, who are quickly making these tools part of their everyday life, especially in the middle class population strata, from which most state universities in Mexico get their readers from.

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