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Schools of infomation : What do they mean by that ?

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"Schools of infomation" : What do they mean by that ?

There are 18 Schools of Information in the USA. Someone who comes across this name – School of Information (I-School) – might not understand what it refers to. All schools are about information, aren't they? According to the I-School Charter, these schools are "interested in the relationship between information, technology, and people"[2]. If this relationship is obviously at the core of many problems that companies are facing today, how could a school address such a broad issue?

In France, there isn't any School of Information *per se*. There is a National School: ENSSIB, which is the "Ecole Nationale Supérieure des Sciences de l'Information et des Bibliothèques". But the purpose of this school is restricted to the training of librarians so it is not exactly a School of Information. In Europe, there are some other schools with "information studies" or "information management" included in their name. For instance, there is a Department of Information studies at the University of Wales Aberystwyth and an International Centre for Information Management Systems and Services in Poland (Tedd, 2003). But once again, these schools are more about training professionals who are going to work in very specific institutions such as libraries, archives and museums.

Other institutions like the German Center for Digital Technology and Management or the Chartered Institute of Library and Information Professionals in the UK adopt a multidisciplinary approach on issues related to information, technology and people[3]. Their goal is to "promote the information society" (Molloy 2005) and could be compared, to a certain extent, to the I-Schools. However, these institutions remain unusual in Europe and they do not represent a whole network as do the American I-Schools.

In this paper, we describe the purpose of American I-Schools which, far from being homogeneous, differ in their history, organization and major goals. We shall explore whether they have the same roots, centered around "information professions", "information economy", and "information science". First, we examine to what extent these roots are the founding features of the I-schools. Second, we provide a description of these schools to characterize both their similarities and differences. Finally, we address the future perspectives of these atypical institutions and conclude.

The Information Professions

P. Drucker was one of the most influential writers in the field of management who diffused this idea of a new knowledge society (Drucker, 1950; 1974). He claimed that information workers were essential resources for any company (Drucker, 1992; 1995). Information as "a distinctive field of expertise" (Black *et al.* 2007, p. 190) is a relatively old notion and "information-rich occupations" ground their origins before the age of the computer (Black *et al.* 2007). Of course, with the emergence of the

information technologies (IT), the information professions are more and more diverse and abundant.

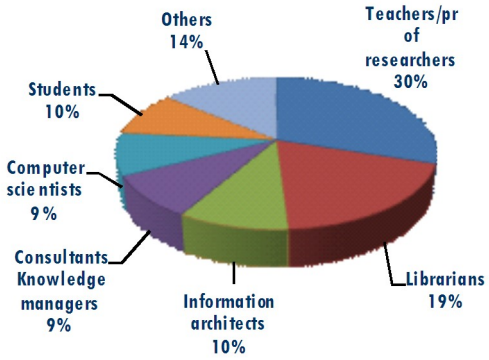
Abbott carried out a macro-level research on the case of the "Information Professions", which are, "*by definition*, involved in continuously negotiated and contested professional divisions of labor" (Abbott 1988, p.223). These information professionals, who "help clients overburdened with material from which they cannot retrieve usable information" (Abbott, 1988, p.216), come in two general types: qualitative (librarians, academics, advertisers, journalists, etc.) and quantitative (accountants, statisticians, operations researchers, systems analysts, etc.).

Based on a large national survey in the USA, in 1980 there were 1.6 million information professionals in some 1,500 discrete occupational titles requiring a bachelor's degree or higher (Debons *et al.* 1981). The Information Profession survey identified nine primary information functions:

- Managing Information Operations, Program, Services, or Databases
- Preparing Data and Information for Use by Others
- Analyzing Data and Information on Behalf of Others
- Searching for Data and Information on Behalf of Others
- Remaining Operational Information Functions
- Information Systems Analysis
- Information Systems Design
- Information Research and Development, and
- Educating and Training Information Workers (*op. cit.*, p. 19).

However the debate regarding the definition and perimeter of the information professionals is recurrent. Elliott and Jacobson declare that the academic group with "the most obvious claim to defining the body of knowledge for the new information professionals are the accounting professionals" (2002). Before asking why they single out accountants; it may be relevant to state that Elliott and Jacobson were members of the Chairman of KPMG when they wrote this piece.

Others consider information professionals as being primarily librarians, archivists or catalogers (Williamson *et al.* 2005). Recently, the American Society for Information Science and Technology carried out a survey to define the occupational group of its members (May 2003, web survey, 823 answers). According to this study, information professionals are essentially teachers/professors/researchers (30%), librarians (19%), information architects (9%), consultants (9%) and computer scientists (9%).



This brief discussion about information professions underlines how wide the perimeter would be if I-Schools were the schools which were in charge of training all information professionals. A way of giving a finer definition of information professions is to consider the information economy and its various sectors.

Information economy

In the 70's Porat and Rubin (1977) wrote nine volumes referring to the emergence of information economy. In this book, which remains a reference today (Pemberton,

1995), they categorize the information sector into two main groups: the "primary information sector" and the "secondary information sector". The "primary information sector" workers are those who are almost wholly concerned with creating or handling information, like scientists, writers, librarians, etc. They include in this sector the following industries:

- knowledge production and invention (private R&D and information services)
- information distribution and communication (education, public information services, telecommunications);
- risk management (insurance and finance industries);
- search and coordination (brokerage industries, advertising);
- information processing and transmission services (computer based information processing, telecommunications infrastructure);
- information goods (calculators, semiconductors, computers);
- selected government activities (education and postal service);
- support facilities (buildings, office furniture);
- wholesale and retail trade in information goods and services (Porat and Rubin, 1977).

The "secondary information sector" workers are those who work mainly on non-information items but whose job involves information work as a secondary aspect. They are the workers in non-information firms and industries who produce information for internal use in the production of agricultural or industrial (i.e. non-information) goods.

This distinction between several sectors provides an interesting overview but it remains far too general to explain why some schools are named "information schools" in the USA; and once again, the scope is so wide that it seems almost impossible for a professional school to provide relevant training in so many areas. As schools ground their legitimacy on academic science and discipline, the last founding principle to consider is information science.

Information science

Information science is the study of the mediating aspects of data, information, knowledge and message phenomena (Zins, 2007). This definition, shared by many researchers, remains so general that it is hard to figure out what the scope of this discipline is. According to a recent study, there are more than 50 definitions of information science (Zins, 2007). In order to characterize more precisely the scope of this science, Hawkins *et al.* designed a new taxonomy of information science based on 3000 abstracts from the Information Science Abstracts[4] database (2003). This taxonomy illustrates very well the diversity of subjects and issues addressed by Information science. The first level of this classification ranges from information science research (user behaviour and uses of information systems, human-computer interface, communication, operations research/mathematics...), knowledge organization (cataloguing, classification, standards and protocols...), the information profession, societal issues (information ethics, information societies...), to the information industry (information and knowledge management, e-commerce...), the publishing and distribution (print and electronic versions), the information technologies (Internet, intranet, hardware...), the electronic information systems and services (customized information systems, geographic information systems…), the subject-specific sources and applications (physical sciences, life sciences, social sciences…), the libraries and library services (digital and virtual libraries, education

and training…) and includes governance and legal information and issues (intellectual property protection, systems and infrastructure…).

Eventually, basing his research on a large review, Hawkins defined Information Science as "an interdisciplinary field concerned with the theoretical and practical concepts, as well as the technologies, laws, and industry dealing with knowledge transfer and the sources, generation, organization, representation, processing, distribution, communication, and uses of information, as well as communications among users and their behaviour as they seek to satisfy their information needs" (Hawkins, 2001, p.49).

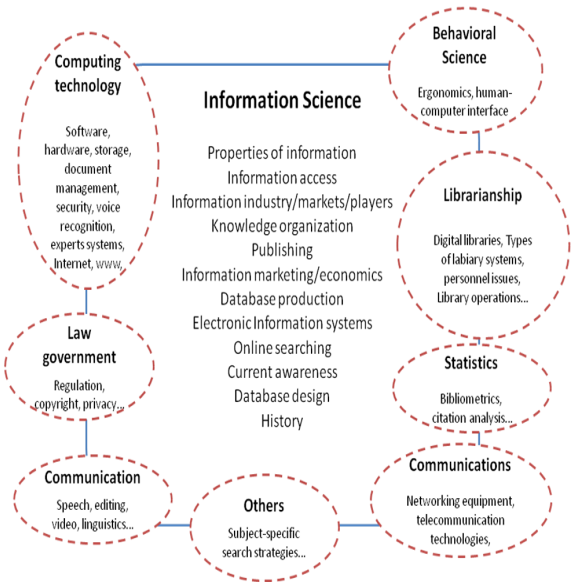


Figure 2 : Information science domains (adapted from Hawkins, 2001, p. 51)

It is important to remember how this field is related to the history of librarians and that "the greatest difficulty one faces in deriving a definition of information science is how to distinguish it from librarianship" (Hawkins, 2001). Indeed, "the name "information scientist" was first coined in 1953 (Farradane, 1953). The term describes a scientist who is also an information professional (...) In other countries, terms such as "documentalists" were used for what are now called information scientists" (Summers *et al.*, 1999, p. 1154). Other fields such as that of computer science are more and more related to information science. The figure p. 46 describes all the links that information science has with other disciplines.

Whatever the definition may be, everybody agrees on the idea that information science is a multidisciplinary field which focuses on the problem of information overload and that this science should help to find new ways "to support the user's access to required information" (Summes *et al.*, 1999, p. 1159).

It is probably pointless to seek to give an essentialist definition of the information professions, information economy or information science. The scope is too broad and the evolutions too quick to provide a relevant definition. Information schools are obviously related to these three dimensions – professions, the economy and science – but obviously, it is not enough to analyze them to understand what the I-schools are, and what they have been created for. In the second part of this paper, we describe what these schools are and what they do. We base our study on three sources: the I-schools' websites, several documents and papers related to these schools and two interviews of Ph.D students at the UC Berkeley I-School.

The Information Schools

In July 2005, 18 schools in the USA and one in Canada (see list below) signed the I-Schools Charter (http://www.ischools.org/oc/). This charter defines the mission of I-Schools in a very broad way: "The I-Schools Project (ISP) consists of schools interested in the relationship between information, technology, and people".

History: Where do these schools come from?

At first, most of these schools were librarianship schools. Some of them were created more than a hundred years ago[5]. Some schools abandoned the librarianship

The Schools of Information in North America:

1. **University of California, Berkeley:** School of Information
2. **University of California, Irvine:** The Donald Bren School of Information and Computer Sciences
3. **University of California, Los Angeles:** Graduate School of Education and Information Studies
4. **Drexel University:** College of Information Science and Technology
5. **Florida State University:** College of Information
6. **Georgia Institute of Technology:** College of Computing
7. **University of Illinois Urbana-Champaign:** The Graduate School of Library and Information Science
8. **Indiana University:** School of Informatics
9. **Indiana University:** School of Library and Information Science
10. **University of Maryland:** College of Information Studies
11. **University of Michigan:** The School of Information
12. **University of North Carolina:** School of Information and Library Science
13. **The Pennsylvania State University:** College of Information Sciences and Technology
14. **University of Pittsburg:** School of Information Sciences
15. **Rutgers, the State University of New Jersey:** School of Communication, Information, and Library Studies
16. **Syracuse University:** School of Information Studies
17. **University of Texas, Austin:** School of Information
18. **University of Toronto:** Faculty of Information Studies
19. **University of Washington:** Information School

dimension of their curriculum, as did UC Berkeley, others, like the University of Illinois Urbana-Champaign, the University of North Carolina, or the State University of New Jersey, still claim this identity. In fact, the name "School of Information" did not appear before the mid-nineties. The case of UC Berkeley is rather representative of the evolutions that many schools have faced:

1920 School of Librarianship
1976 School of Library and Information Studies
1993 School of Information Management and Systems
2006 School of Information

The quotation below helps to better understand what the original goal was. Written on December, 6, 1993 by several professors, this text was drawn up in order to convince the deans of UC Berkeley to create a School of Information on campus:

> *"There currently exists no academic structure — at Berkeley or elsewhere — of the specific sort that we are proposing. What is unique about this program is the focus on the use and management of information through the merger of the technical and social sciences approaches; and the broad scope, addressing applications that cut across disciplinary and organizational contexts. (…) The proposed school has as its focus the organization, management and use of information and information systems, operating at the interfaces between information technology, producers of information, and users of information."*

Of course, this history is a simplification and one could write a different story for each school. Moreover, the I-Schools do not have the same organization, structures and do not offer the same courses. Even if these schools agreed on the same guidelines, what they do in practice is quite different from one school to another.

We propose to distinguish three main models based on two dimensions. The first dimension is the "technical focus". Each I-School offers courses on IT but some have many courses in computer science and share a culture which is closer to the engineering world than to the librarianship one. The second dimension is the "institutional constrain". Some schools continue to stay very close to old and traditional institutions such as librarian or archivist associations. For example, the I-school of Illinois University is accredited by the American Library Association, and the one of Florida University delivers certifications of "library media specialist" and a degree in "museum studies". On the contrary, others abandoned these fields to create new institutional frameworks and establish a community of I-schools which is self-defined[6].

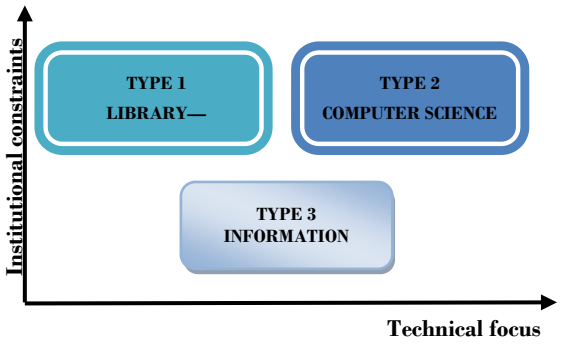


Figure 3 : Three main types of I-Schools

Based on the information collected on the I-Schools' website (summer 2007), we designed a classification of the schools. This classification is not set and some choices might be discussed or changed because of the recent evolutions some of these schools may have adopted. We present this classification in the table below.

The third type of I-Schools: A multidisciplinary vision on information.

What makes schools of the third type very special are both the multidisciplinary courses that students have to follow and the central focus on information. The mission of the school of information of Michigan[8] could be used as a synthetic definition of what most I-Schools of the third type do:

> *"Faculty and students conduct multidisciplinary research to discover new knowledge about the interplay between information, technology, and people with the aim of unifying human-centered design approaches and sophisticated technologies" (http://www.si.umich.edu/about-SI/mission.htm).*

Type 1 Library – Education	Type 2 Computer Science	Type 3 Information
Illinois	Georgia	Drexel
Indiana (Library)	Indiana (informatics)	Florida
Rutgers	UC Irvine	Maryland
Pittsburg		Michigan
UC Los Angeles		Pennsylvania
UNC		Syracuse
		Texas
		UC Berkeley
		Washington

Table 1 : Classification of the American I-Schools[7]

As these schools are relatively small and as they look for different perspectives on information issues, they try to take advantage of the resources they can access on campus to increase this multidisciplinary philosophy. The Dean of UC Berkeley's I-School underlines this characteristic in the welcome message on the website:

> *"Our campus presence underscores our diverse and ongoing interactions with scholars in the social sciences, humanities, and arts; with the professional and technical disciplines; and with pioneering initiatives championed by the university, such as the Center for New Media and the Center for Information Technology Research in the Interest of Society (CITRIS)."*

The originality of these schools appears their syllabus (we detail UC Berkeley's syllabus in the appendix). Usually these schools offer both a Master of Science and a Ph.D degree; however, the titles given vary. Here are a few examples:

- Master of Science in:
  - *Information management and systems (UC Berkeley)*
  - *Information studies (Florida)*
  - *Information (Michigan)*
  - *Library and Information science (Drexel)*
- Ph.D in:
  - *Information (Michigan)*
  - *Information studies (Drexel)*
  - *Library and Information science (Illinois)*
  - *Information science and technology (Penn)*

As already mentioned, the main specificity of these schools is to focus on information with various scientific perspectives: management science, social science, but also computer science and information science. The figure 4[9] provides an overview of this multidisciplinary approach:

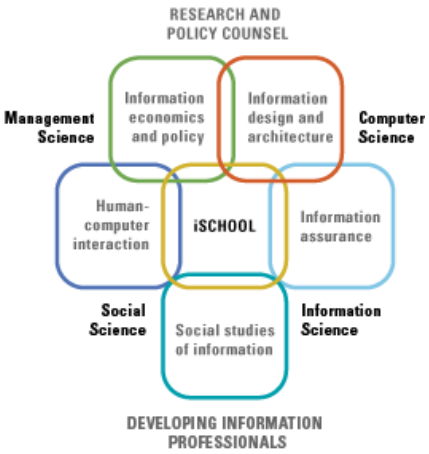


Figure 4 : Academic fields at the UC Berkeley I-School

Students are not required to attend courses in all four academic fields for an equal amount of time: the number of hours in each area varies depending on the I-school's orientation or on the students' career prospects. A chart presenting the specific course organization at UC Berkeley is given figure 5:

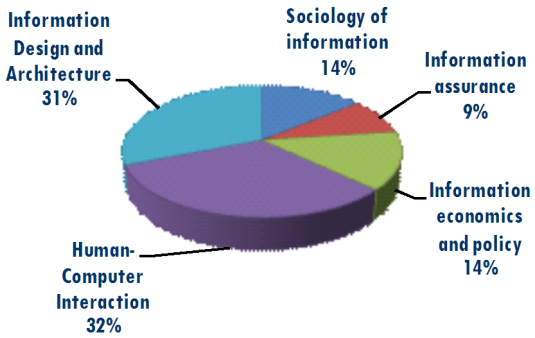


Figure 5 : Course specialization at the I-School

The subjects of Ph.Ds are also interesting to look at to put forward the variety of scientific disciplines which are used in these schools[10]:

- Post-disaster information ecology
- Understanding how self-interested actors affect information security systems;
- ICT and SME development in Central Asia;
- Exploring the connection between democracy and information;
- Information economics;
- Archives and records management;
- Understanding the requirements for successful video-mediated communication systems in order to design, prototype, and test systems in the field;
- Medical settings and patient safety;
- Tools that support awareness;
- The building of self-sustainable virtual communities;
- How technology can mediate and transform the development of artistic practices and collaboration.

This multidisciplinary perspective is much appreciated by the industry. Many I-schools, and namely UC Berkeley, are used to working and collaborating with firms on research projects. These agreements are of great help for master students who want to find a position in the private sector or in NGOs. However, on the contrary it does not appear very easy for Ph.D students to find a position in the academia as they are not from a traditional scientific discipline. It is still a major challenge for doctoral students to find jobs in universities. I-schools are multidisciplinary, but the universities that hire are not necessarily so.

Table 2 : Examples of job titles of I-school alumni

Business	Librarian	Engineering	Information	Other
Business / IT analyst	Academic librarian	Search / language engineer	Information architect	Policy analyst
Human factors analyst	Digital librarian	Usability specialist / engineer	Information specialist	Economic development consultant
Information and record manager	Health/medical librarian	User interface designer / Web development	School media specialist	
IT/manager consultant	Business archivist	Database / Systems analyst	Digital curator	
KM specialist	College / university archivist			
Product strategy / marketing manager	Government archivist			

From multidisciplinary research and education to traditional professions?

As we have just mentioned, students follow courses in many different disciplines. However, it is essential to notice that professors are not multidisciplinary; they are economists, sociologists, computer scientists, or designers. Moreover, most students specialize in one domain like engineering, librarianship, or business. What makes the difference is not so much the title of their job profile (the table 2 gives examples of job titles

found on I-Schools' websites) than the fact that they know more about what the other professionals do. Indeed, as they followed courses in four to five scientific domains, they better understand what others do and the challenges they have to face. To avoid a lack of thorough knowledge within a field, it might be more relevant to have a core specialty before entering an I-School or to have worked for a while as a specialist and then follow a program within an I-School.

According to the I-school of UC Berkeley career survey (2007), most students of the master program find positions in information design and architecture or in human-computer interaction:

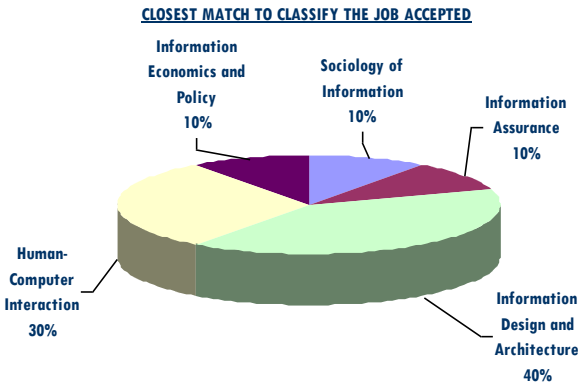


Figure 6: Career prospects

All I-school students are not equal. If some schools declare an honorable wage average ($85,238 at UC Berkeley, 2007), career paths after following degrees in I-Schools can be very different from one institution to another. From a first level librarian who earns around $33 000 to a system analyst ($48 000) or a consultant ($87 000), work, wages and evolution perspectives are diverse[11].

Moreover, it appears relevant to highlight that some positions are very old contrary to others which are fairly recent:

"Many positions have well-developed legacies and traditions from the past (for example, archival work; academic, public, school and special librarianship; museum work; preservation and conservation; records management); many have been created during the past two decades (digital information system design, creation and management, multimedia production, information architecture and usability, information policy); and many (yet unnamed) will come into existence through the natural evolution of social structures and technological advances" (http://www.ischool.utexas.edu/about/vision.php).

This evolution has been quite quick in the last ten years and although the existence of I-schools does not seem to be questioned, their future is not easy to define.

What future for I-schools?

Several schools seem to look for new paths and new directions to reaffirm their legitimacy. Indeed, it is not simple to maintain a multidisciplinary position, the risk being that these schools appear as lacking in scientific credibility. As a consequence, some academics have had a hard time finding a place and gaining recognition on their campus.

To find a solution to this uncomfortable position, different schools present their strategic plan on line. For instance, the University of Washington provides a brief example of generic visions that some I-Schools have. It is interesting to notice that they reaffirm their multidisciplinary approach but remain very general and assert that the sole focus is on information. Here is a brief extract of this strategic plan: "The University of Washington Information School is a community of diverse disciplines, professionals and fields, and areas of expertise engaged with the study of information and its use by people and organizations (…) We are inspired by information (…) We make information work" (http://www.ischool.washington.edu/strategic-plan/default.aspx).

Conclusion

With the diffusion of IT and the development of the information economy and society, new problems related to the relationship between information, technology and people have appeared. I-Schools address these problems by training professionals who are neither purely engineers nor social scientists. Beyond this functionalist explanation, the I-schools' history is illustrative of the creation of a new institutional field. The emergence of a new institution is generally the outcome of a long process of negotiations and confrontations. In the case of I-schools, competition has been and is still hard. To exist, I-schools have had to unite to face other traditional schools, namely engineering and business schools. Today, even if their facade looks the same – with a same brand name: "School of information" – these institutions do not have the same history, syllabuses and goals.

Recently, faculty members of the UC Berkeley I-school were asked to tell their "elevator stories" on their institution[12]. The 15 interviews carried out confirm pretty well the statements in this paper - that is, that there is a large range of stories from people who think they are doing the same thing. Answers were divergent on several aspects and illustrated the various possible subjective interpretations of the problems related to the relationship between information, technology and people. For instance, it can be considered from a quantitative or qualitative point of view, from a technical or social approach, or from economical, social or psychological perspectives. These different interpretations lead to a form of competition between the groups which hold them. I-schools seem to have an organizational frame which structures this competition and forces the different academic groups to work together exactly as various occupational groups do within firms. In this institutional design the various subjective dimensions can be confronted and mixed. If we exclude the objects studied in I-schools – that is, information and technology – the core of these institutions is certainly their multidisciplinary character. The members of I-schools refuse to consider universities like a series of silos, specialized in a topic and isolated from one another.

What makes the I-schools so original and interesting is probably this ability to be at the boundary of different disciplines and professionals concerns. These institutions could be effective as "the knowledge boundaries are not only a critical challenge, but also a perceptual necessity because much of what organizations produce has a foundation in the specialization of different kinds of knowledge" (Carlile, 2002). Eventually, Schools of Information could be conceptualized as some sort of *boundary institution*, which has the same function as boundary objects, at a macro level[13]. In the 15 interviews, this idea of boundary institution appears implicit. Here are some verbatims which illustrate this vision: "we exist 'in the middle'", "we are not tied to any one theoretical or methodological tradition", we are "partly computer science and partly social science", we are "good at bridging", and we have a "trans-disciplinary approach" "where social science and technology meet".

We have many institutions to improve the specialization of knowledge and to train brilliant experts, we might need more schools to train professionals who can stand boundary positions and communicate with the numerous specialists working in companies. I-schools could provide opportunities to develop such skills and give, as Paul Duguid[14] told us recently, "the possibility of doing work (…) that could be done nowhere else". Of course this position is quite uncomfortable and might be hard to sustain as the competition with business schools and engineering schools is tough, but it is essential to claim the training of trans-boarder professionals in *boundary*

institutions. For students, it is a way to learn in an open-minded context and have a more realistic view of the complex problems they will face in their futures organizations.

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1. We would like to thank Paul Duguid for his comments and suggestions. The usual disclaimer applies.
2. http://www.ischools.org/oc/
3. http://www.cdtm.de/
4. "Information Science Abstracts is the oldest abstracting and indexing publication [1966] covering the field of information science" (Hawkins, 2001)
5. The school of information of Washington designed web pages retracing the school's history since its foundation in 1900: http://projects.ischool.washington.edu/90years/
6. In this perspective, they organize an I-conference every year: http://iconference.si.umich.edu/
7. This classification has been achieved through a content analysis of the schools' websites. It might not be relevant because of recent evolutions or discrepancies between what is presented on the website and what is really done in the school.
8. With more than 50 professors, the School of Information of Michigan is one of the largest.
9. http://www.ischool.berkeley.edu/programs/overview.
10. These subjects have been found on different I-schools' websites.
11. Texas University I-School salary survey, 2007.
12. http://people.ischool.berkeley.edu/~nunberg/ElevatorStories.html
13. Boundary objects refer to a broad range of artifacts that "are plastic enough to adapt to local needs and constrains of the several parties employing them, yet robust enough to maintain a common identity across sites" (Star 1989, p. 393). Examples of boundary objects are very numerous in the literature (Levina and Vaast, 2005): it can be design drawing, physical prototypes, accounting ledgers or even ERP. They have three main functions: they establish a shared syntax or language for individuals to represent their knowledge, they provide a concrete means for individuals to specify and learn about their differences and dependencies across a given boundary and facilitate a process where individuals can jointly transform their knowledge (Carlile, 2002).
14. Paul Duguid is a professor of the I-school of UC Berkeley.

APPENDIX:

UC Berkeley – School of Information.

Courses in the Master's degree:

Information Assurance

219: Privacy, Security, and Cryptography
224: Strategic Computing and Communications Technology
243: Document Engineering
250: Computer-Based Communications Systems and Networks
257: Database Management

Human-Computer Interaction

211: Group and Organizational Approaches to Information System Use
213: User Interface Design and Development
214: Needs Assessment and Evaluation of Information Systems
247: Information Visualization and Presentation

Information Design and Architecture

214: Needs Assessment and Evaluation of Information Systems
219: Privacy, Security and Cryptography
240: Principles of Information Retrieval
243: Document Engineering
246: Multimedia Information
250: Computer-Based Communications Systems and Networks
257: Database Management

Information Economics and Policy

212: Information in Society
221: Information Policy
224: Strategic Computing and Communications Technology
230: Economic Methods for Decision-Making
231: Economics of Information
235: Legal Issues in Information Management
237: Intellectual Property

Social Studies of Information

211: Group and Organizational Approaches to Information System Use
212: Information in Society
272: Qualitative Research Methods for Information Management

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