Reading and search practices in Rosario, Argentina: A case study of usage practices of digital and paper devices by students and professors in higher education

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Abstract:
The present essay analyzes the construction of reading and search practices in higher education from an epistemological relativist perspective. The starting point was a case study comparing and analyzing said practices by students and professors in the second and fifth years of law and systems engineering at a private university and a public university in the city of Rosario, Argentina. The results of the fieldwork provided data that challenges current societal ideas about reading practices and search processes. The results include a wide use of paper supports, focused reading, scarce database searches and high unawareness of advanced search mechanisms. The research was based on the theory of social construction of technology and its three analytical levels, which evidenced the complexity of these practices. It revealed how readers construct their relationship to print and digital materials, considering reading and searching as two separate yet complementary activities that are combined according to economic, educational, legal and cultural aspects.

Keywords: reading practices, search practices, paper and digital use, higher education, Argentina

Introduction

Reading and *searching* are not synonyms. Although they may seem similar, especially in the digital era, they are not. They refer to different cognitive actions and ways of relating to technology, depending on geographical location, digital access possibilities and knowledge available in higher education. These actions are influenced by several different factors, such as copyright issues, availability of reading materials, language competence and knowledge of source diversity and search criteria. This article presents a case study of different aspects

of the reading and search practices followed by law and systems engineering students of four different faculties – two in the private sphere and two in the public one – in the city of Rosario,[1] Argentina. I use an epistemological relativist point of view, following the theoretical perspective of the social construction of technology (SCOT).

The goal of this essay is to present the main features of reading and search practices at a university level, starting with the characteristics, availability and uses of different reading materials,[2] both print and digital. For this purpose, the main questions are: What are the defining features of reading practices in higher education? What types of reading materials are available on print and digital supports? Do young readers read everything on digital support? What are the defining features of search practices? In this context, *support* refers to the print or digital physical device used. *Format* refers to the form the material adopts; for example, a book, a book chapter, lecture notes or a photocopy summary.

In order to answer these questions excluding any cultural divide or stereotype with no empirical foundation, the research was done from an epistemological relativist perspective. Within this framework, it is possible to construct the object of study during the course of the research. The intention is to discard any previous position or judgment of the research subject that might condition it, allowing the researcher to critically analyze the data by taking into account geographical, historical, spatial, political, economic, cultural and legal aspects of that which is being studied. In other words, it means to avoid theories that involve

> (...) cultural divides [which are] necessarily organized according to a previous social stratified model. One must invert the perspective and outline, primarily, the social areas where each corpus of text and each print genre circulate. (Chartier, 2005, p. 11, translated)

Through the relativist view, the concept of reading was analyzed in its interrelation with current search processes. These were understood as a whole, and their complex interrelation was observed and examined both theoretically and empirically on each of the three analytical levels of the SCOT theory: on the design of supports and interfaces (Chartier, 2005; Simone, 2001), on the way readers construct their relation to them (Cavallo & Chartier, 1998; Darnton, 2003; Chartier, 2005, 2006, 2009; Simone, 2001) and on relevant legal and cultural aspects (O' Donnell, 2000; Darnton, 2003; Wyatt in Oudshoorn & Pinch, 2005; Vercelli, 2009). Deciding on a format to read and search for information involves more than the mere selection of a technological device. As Mangen and van der Weel (2016) explain: 'Entailed in the present conceptualization of 'what we read' is therefore not only the text itself but also the material and technical features of the device or technology presenting or displaying the text' (120). In this sense, the concept of technology is essential in this work because it affects both the reading materials and the search processes. Technology is understood as a reciprocal relationship, as the result of a co-construction of technical and social aspects (Vercelli, 2009).

> What do we speak of when we study technology? We speak of knowledge together with a technique, a sociocultural practice, the use and the relationship established with a particular artifact. We speak of power relations, of processes, of sociocultural practices, of economic and political aspects. (Ayala, 2014, p. 29, translated)

This case study of reading and search practices in higher education in Rosario is part of my doctoral investigation,[3] and provides concrete empirical results rebutting many societal beliefs regarding books, search processes and reading practices, specifically on digital platforms. These beliefs are based on reductionist and determinist ideas of technology, instead of factual aspects that these practices currently entail. Ideas such as 'Nobody reads on paper formats anymore', 'Young people only read on digital platforms' or 'All young adults know how to search online' are not actually representative of current practices discovered in my research. Although there are a number of studies on reading practices (Albarello, 2011; Ravettino Destefanis, 2012; Manguel, 2014; Cerlalc, 2014) and search practices (Ingwersen, 1982, 1987; Rowlands et al., 2008, Hayles, 2012), there is a notorious absence of research tackling the current complexity of these practices using the lens of the SCOT theory. Therefore, the focus of this research was set on qualitative questions, such as 'Who?', 'How?' and 'Why?', instead of 'How many?'. While I provide descriptive statistics, the qualitative responses allow me to explain why readers choose one support over the other or a combination of both; what tools they use to search and select the reading material; and, what material is printed, in which circumstances and for what purposes.

These questions are useful to move away from quantitative views only and to learn about the specific features of this particular case. A relativist analysis of reading materials in universities has several advantages, such as inquiring about reading and search practices from an alternative point of view to the currently predominating ones in Argentine academia,[4] applying SCOT concepts to the analysis, doing the fieldwork with a different vision of the object of study, and inquiring about reality from a different standpoint than 'common sense'. The notion of common sense should be emphasized, since ideas about reading and search practices seem to be deeply ingrained and informed by unfounded stereotypes, instead of critical analyses and empirical data evidencing their current features. The relativist perspective is also coherent with the theoretical postulates of the SCOT theory,[5] and with the possibility of an analytical examination of reading and search practices on three different levels. The main goal of this theoretical perspective, which is critical and interdisciplinary, is to understand the interrelations of the technical, social and cultural aspects of the scientific and technological dimensions, moving away from linear, vertical, reductionist and determinist analyses of technology.

At the same time, the reading materials available at universities offered a stable space to study their use and observe the similarities and differences between reading and search practices. Through the empirical work done with universities in Rosario, Argentina, it was possible to recognize, through an accessible and representative sample – despite

budget limitations – features of reading and search practices in higher education by identifying the reading materials available in digital and paper formats, and the tools and savviness of my participants' search for information. However, the research results presented in this work respond to a specific case study of a city and a country with a particular university logic.

The starting point of this research was the object itself, that is, the reading materials: the meanings attributed to them and the problems encountered when using them. The analysis of reading materials shows 'the uses and appropriations that readers can make of texts, (...) the legibility, highlighting 'the meaning of the shapes'' (Chartier, 2005, p. 10, translated), and showing the specific use modalities at a temporal, spatial and corporal level. Reading or study materials are the 'objects', whether print or digital, used to read and search for information at universities. They are the mandatory or optional bibliography of the course curriculum and they are widely varied. For example, print materials include books, photocopies of book chapters, 'official' lecture notes made by professors and assistant professors, and 'non-official' lecture notes made by students. Students and professors can access print materials and search for the content they need through the library of each university or what is known as *copy center*.[6] Digital materials include Word, PowerPoint and Excel files available on each university's virtual campus, blogs created by professors, search engines like Google or Yahoo, links from online newspapers, websites related to particular disciplines and, though in small percentages, academic papers from scientific databases. Access to digital reading materials is usually through personal computers, that is, desktops or notebooks and, in some cases, tablets.[7] Both print and digital materials contain what is referred to as *content*, which is specialized information on different genres: academic, literary, journalistic, among others.

Even though reading materials are objects in a strictly material sense, they are not *only* objects. They are the product of a series of processes: creation, writing, edition, editorial design, printing and/or digitalization and distribution. From the SCOT perspective, they are the product of social and technological elements that include a creation process either at a macro level, responding to editorial criteria, or at a micro level, such as lecture notes. Thus, study materials are the result of a combination of social, educational, cultural, technological and legal elements. By acknowledging the multiple aspects involved we can view reading materials as the result of a multiplicity of processes and specific of an era, which include macro and micro actions.

Therefore, reading materials can be thought of as technological devices with an access logic to be read; an operating logic, which involves modalities of visual recognition of the text (Vandendorpe, 2003; Simone, 2001) and of reading strategies (Eco, 1981; Barthes, 2004). They co-construct certain use modalities (Eisenstein, 1983; O'Donnell, 2000; Bijker, Hughes and Pinch, 1987; Bijker, 1995; Chartier, 2005; Oudshoorn & Pinch, 2005), possess certain search tools in the case of some digital reading materials (Rowlands, Nicholas, Williams et al., 2008), as well as accessibility (Nielsen, 1999, 2000). As Mangen (2016a) explains quoting Varela, Thompson & Rosch (1991):

> What we attend to in perception are the *affordances* of things and objects – the opportunities for action that objects, tools, and things in our environment provide. Things in our lifeworld have meaning for us by way of the kind of interaction they afford to us as human beings (…) (464-465).

The interface design of print and digital reading materials allows us to look into the underlying rationalities present in the configurations of current reading and search practices. In Mangen's (2016a) words:

> A text displayed on a screen and in a print book may *look* identical page by page, but the two texts differ in kinesthetic affordances. When reading on paper, we can discern visually, as well as sense kinesthetically, our page-by-page progress through the text. In contrast, when reading on screen, we may see (for example, using page numbers), but not kinesthetically sense, our page-by-page progress through the text. (465-466).

We exist in a particular historical time: the coexistence of paper and digital supports. Reading materials are constructed through a variety of supports, formats, technical and design features, and some digital materials include search tools. Their availability and usage possibilities, both material and cognitive, evidence their insertion in a particular game of power relations. A search process is not a mechanical and repetitive action; it condenses cultural, educational and technological capital. 'Every technology, especially information technology, conditions what we can do and express and the way we do so. The control the user holds over the machine is limited' (Levis, 2009, p. 233, translated). The availability of reading materials and how their use is interrelated with the way in which information is searched for is the tip of the iceberg of analyzing current reading and search practices.

By starting the study of reading materials with no preconceived notions, it was possible to draw a map of their design, location, access possibilities, formats and the content available (bibliography, access – or lack of – to the internet and databases). Through the analysis of these data, it was possible to recognize and inquire about how reading and search practices function in these universities, and to understand their features while keeping in mind the identification and analysis of the social and technological interrelations present in the use of the different reading materials. Moreover, the empirical data disproved the preconceived notion that everyone reads and searches the same way; an idea as fallacious and dangerous as the consequences it generates at a social and educational level. In other words, the analysis of reading materials illustrates how the interrelation of multiple factors works when carrying out the assumingly *simple* task of reading and searching for information. Indeed, the configuration of the interrelation that links reading materials with technological and economical access and legal, social, educational, cultural aspects, and the way in which both university practices are immersed in specific power relations, indicates the actual *complexity* of these tasks. It also indicates the need for a

public policy on digital literacy that contemplates all educational levels and is periodically revised.

The Specific Case Study: Theoretical Perspective and Empirical Sample

Theory and practice were treated as two different and divisible aspects (*only* at a methodological level) of the same problem to facilitate the analysis. The theoretical concepts used to analyze reading and search practices had the intention of

> (...) analyzing the specificity of mechanisms of power, (...) they were used as a toolbox, (...) an instrument, a logic of the specificity of power relations (...) on the basis of reflection (which will necessarily be historical in some of its aspects) on given situations. (Foucault, 1992, p. 173, translated)

I 'divided' the reading and search practices as an object of study into different levels of specificity: first, in relation to the design of the reading materials; second, according to how readers construct both practices with the meanings they attribute to them and the problems they encounter; and third, by understanding how different factors (economic, legal, cultural, educational and interface related) influence the design and accessibility, as well as the relationship they construct.

The social and technological factors of reading materials are constantly interrelated; the limit between one and the other fades entirely and they are instead contemplated as a network. This allows for the inclusion and articulation of political and cognitive elements in the analysis. Power is shown in the resistance tactics implemented in the non-uses[8] of print or digital supports, but also in the negotiated and restricted uses according to certain goals and time availability. The relativist perspective and the operationalization of concepts through these three analytical levels have made it possible to empirically observe and identify each concept. It allowed for the recovery and analysis of historical, spatial and temporal specificities of reading and search practices, identifying social, cultural and educational features typical of the conjunction in which the research was done.

In accordance with these theoretical postulates, the data to answer the questions about how university students and professors search and read were obtained from a random sample of students and professors of the second and fifth years of law and systems engineering at four different faculties,[9] two public ones and two private ones,[10] in the city of Rosario, Argentina, during 2012. The sample consisted of 765 surveys, 45 interviews with professors and four focus groups. The institutions decided not to disclose the students' personal information. Therefore, a non-probability convenience sample was used, which involved the selection of respondents that were present at the time and place where each faculty authorized the conduction of the surveys.

The empirical results showed the interrelation of the social and technological features of current reading and search practices, what they mean to readers and how and when students and professors use different devices or adapt them to their goals, schedules

and interests in order to do what they consider to be two different activities. The data were obtained through qualitative-interpretive methods. Through surveys with open and multiple answer questions, in-depth interviews and focus groups, it was possible to identify the meanings that university students and professors attribute to the actions of reading and searching, the ways in which they engage in these actions and how they solve the problems that arise from the use of print and digital technologies.

The Reign of Paper in the Digital Era

Current mainstream ideas about reading and search practices revolve around radical changes. Statements such as 'no one reads on paper anymore' have apparently acquired the status of undisputable truth. However, the fact that there is a wide availability of reading materials online does not mean that said materials are actually read, that the role and importance of books has declined or that the use of paper support has diminished either. In fact, my analysis of reading materials available in higher education shows that the use of digital support for the largest percentage of readers is not associated to the reading of content.

My first level of analysis demonstrates that all digital reading materials, with the exception of online websites, reproduce the logic, the design and the structure of paper. The first level of analysis allows for the identification and investigation of the *technological artifact,* which 'is constructed in a 'development process (...) described as an alternation between variation and selection. (...) This multidirectional perspective is essential for any description of technology based on social constructivism' (Thomas and Buch, 2008, p. 36, translated). In this case, what is identified as *technological artifact* are the reading materials, both print and digital, their interface design, and how they are materially constructed. The meanings attributed by university students and professors to these materials and the problems they identify when using them play a crucial role.

Among my research participants, it is paper that is the preferred support by most students. Its prevalence can be identified by the use of photocopies,[11] which are students' most commonly chosen format at 92.4%. The Table below shows the usage percentage of each format found during the research. The question was multiple choice and respondents could choose more than one option. These figures illustrate that the *reign* of paper has empirically prevailed in the digital era as the preferred support among professors and students at these universities. Among law and systems engineering students from eighteen to twenty-five years old, 75% read over 61% of content on print support. This percentage is remarkably high if we take into account that the students of this age group are considered digital natives or millennials, which means that they supposedly use digital support for all activities, including reading. Similarly, over 60% of law and systems engineering professors aged thirty to sixty read over 50% of content on print support. These data confirm that age is not necessarily a determining factor when it comes to choosing print or digital. Rather, there are a multiplicity of factors that influence the reading practices each reader constructs.

Table 5: What format do you read on?

Format of choice	Percentage %
1) Photocopies	92.4%
2) Internet (online newspapers, blogs, etc.)	72.8%
3) Books	72.4%
4) Book chapters	55.2%
5) Journal articles	24.1%
6) Online subscription databases (EBSCO, Sage, Publications, etc.)	5.6%

As the data shows, both relevant social groups, students and professors, prioritize the use of print support to read. A *relevant social group*[12] is any group of subjects directly related to the technological artifact. The shared meanings and the identified problems are what makes them a group. Taking into account that every technology is implemented based on different goals, we can identify in these usage practices both the sociocultural significance that the diverse groups grant to the reading materials and search processes, and the possible effects and resistance tactics (Foucault, 1996) that result from their use. The goal can be to establish priorities about what to read and where, determine the appropriate search processes, to recommend or dismiss the reading of certain materials or to print, scan or share them.

The participants in this study choose a print support to read because of the advantages regarding its materiality or size (easy to transport), for emotional reasons (the *aura* paper has), for technical reasons (the discomfort of screen brightness, the coldness of digital support or the difficulty of carrying out subsequent interpretative processes) or for its easier access. The diversity and, at the same time, similarity of meanings about the support is referred to as *interpretative flexibility*[13] and it is culturally constructed according to the way in which each social group signifies and interprets the technological artifact, that is, the reading materials as sociopolitical media. In other words:

> In SCOT (...) technological artifacts are constructed and interpreted culturally; (...) (and) the interpretive flexibility of technological artifacts has to be shown (...), the political and sociocultural context of a social group shapes its norms and values which in turn influence the meaning attributed to the artifact. (Thomas and Buch, 2008, p. 51, translated)

University students and professors attribute multiple meanings to the diverse print materials, according to their material and technical features, their usage and access possibilities,[14] and their sociocultural, educational and economic positions. In regard to the emotional reasons, both students and professors highlight the smell of paper and the attachment they feel for it, especially in regard to books, and because they do not need a power source to make them work. The data on my doctoral thesis also shows that paper support facilitates the comprehension of what is read, since it favors interpretative processes and the association of ideas. This finding has also been reported by Mangen (2016b).

The current prevalence of the technological framework of paper in higher education, along with the meanings attributed by readers of all ages, constructs a reading practice in which features of the paper culture stand out in the so-called digital era. In Rosario, photocopies are presented as a format that promotes a plural and democratic reading practice. The low cost of photocopies in comparison to the price of certain books allows access to more content. It is also easier to alter photocopied texts with ideas and they can be easily transported and shared with classmates. Photocopies make it possible to access reading material that is no longer available, avoiding the percentage of copies allowed by law. We can see in this level of analysis the notion of *sociotechnical assemblage.* This enabled the observation and study of how power relations and social, educational, legal and economic factors influence the design of the reading materials, their usage and the way they configure certain search practices. Currently, the relevance of paper constructs not only specific uses for reading materials, but also a specific form of reading and search practices among students and professors.

Field-Specific Reading: Combination and Complementation of Reading Materials

Both students and professors access reading materials through a combination of print and digital formats. Even though the largest percentage of combinations includes multiple varieties of paper formats, in both careers and universities, most combinations are complemented by a digital format, especially for search activities or particular reading. However, there weren't any instances of a completely digital alternative. The following table showing the five most prevalent usage combinations illustrates the prevalence of paper.

The preferred combination of reading materials for second- and fifth-year students of both careers in all four faculties includes only print materials, reaching 25.8%: books, book chapters, photocopies and journals. The student age groups are eighteen to twenty-one years old and twenty-two to twenty-five years old, reaching a usage percentage of 29% and 24.7% respectively. There is a unique career difference with print support used more in law school (31.4%) than in systems engineering (18.4%). The second most popular combination among both careers reaches 16.9%, with books, book chapters, photocopies and internet material. The third combination reaches 15.8%, with books, photocopies and

internet material.[15] These combinations show a second similarity between professors and students: once the desired internet material is found, it is then printed.

Table 6: Combination of materials for reading

Most prominent reading material combinations	Percentage %
1) Print materials (Books, book chapters, photocopies and magazines)	25.8%
2) Books, book chapters, photocopies, internet material	16.9%
3) Books, photocopies, internet material	15.8%
4) Print reading materials combined with database material	5.6%
6) Other combinations (of print and digital materials)	35.9%
Total	100%

This complementarity increases by the last year of both careers. The reading of internet materials increases by 17.8%: it rises from 41.1% in the second year to 58.9% in the fifth year. This is partly because of the need to access technical, expert, specific and up-to-date information that cannot be found in books. Even if said information could be found in paper supports, it would be almost inaccessible due to two main factors: the cost of books is very high, and they are mostly published in English. Another reason is the increasing importance that professors from both careers place on digitalized materials in their classes; for example, for searching and fact-checking the latest data on different websites, such as scientific journals, forums, online newspapers, databases or visiting the faculty's virtual campus in order to get news on internships. Another motive is the need to stay up to date on the latest news and demands of the job market. That fifth-year students will soon graduate modifies the use of supports and contents that must be read. In other words, there is an increase in the search, selection and reading of more specific, focused and field-oriented content (Bourdieu, 2004). The search practices of the last year are more influenced by the predominating characteristics of the professional field of law and the professional field of systems engineering.

In other words, the combined use of diverse reading materials allows for the identification of two actions that university students and professors perform: on the one hand, a process of complementarity, and on the other, an online search of field-specific reading materials, which increases on the fifth year of university. The process of complementarity illustrates an implicit idea: good quality content, that is, content that remains in time as a mandatory bibliography, can be found on paper, particularly in books. These remain the ultimate reference when it comes to inquiring, selecting and analyzing valid and legitimate content. Paper acquires a status of veracity; it constructs the crystallization of knowledge, which is complemented by the digital, resulting in a reading practice that is fast and dynamic, since the digital content that students reportedly read is short and simple, and the result of a search process. However, professors and students acknowledge that a minimum of three sources is required to assure that this complementary digital content is as legitimate, valid and credible as paper content.

The narrowing of reading materials into field-specific content through the use of digital support shows how readers in higher education gradually construct field-specific reading practices in which the use of materials is adapted to the need for up-to-date data or accurate content, format availability, academic and professional demands, personal interests, time and the features of the legal and institutional juxtaposition. The existence of field-specific reading practices shows stages of transition that readers go through, where they reshape and reconstruct the use of print support, especially books, to make it work at a technological and educational level according to their interests, goals and time. In this sense, time is a key element mentioned by professors and students; it configures specific uses for the materials, whether they are on digital support, according to connectivity lag; or on print support, according to the possibility of reading on free time, when for example commuting.

A key task to enter another level of analysis[16] is to identify the existing problems for relevant social groups, and the solutions they construct once the material artifact is stabilized. Here we can see the interaction between *relevant social group* and *artifact*, focusing on the way in which users construct their relation to both the problems they face with the reading materials and the solutions and tactics they construct according to their interests, goals, convenience and time. The notion of a *technological framework* serves to reflect in more depth upon the relationship between usage practices of reading materials and search tools, which are constructed in an interrelation of constant fluctuations and negotiations in the coexistence of paper and digital.

> (...) On the one hand, the technological framework can be used to explain how the social context structures the design of an artifact. (...) On the other hand, (...) it indicates how the existing technology structures the social context. (...) it structures the interaction of the members of a social group. (Thomas and Buch, 2008, p. 82, translated)

This category enabled the analysis of: a) the modalities through which the current technological framework constructs the reading of study materials on a digital device in a way that reproduces the structure of a print device; and b) how paper technology is more prevalent in the interaction between the members of the relevant social groups and makes digital search a complement. The concept of technological framework showed the interaction between each group, their features and the level of inclusivity in its interior, in a partial manner, whether because 'different actors will have different levels of inclusivity in the framework (...) or due to all the actors being in principle members of more than a technological framework' (op.cit., translated). The level of inclusivity of a given reader in a technological framework will vary according to how he or she interacts with the tools of that technological framework. This is why there will never be a full integration, it will always be partial. In other words, readers with greater inclusivity with regards to the use of print or digital support will interact more actively with one technological framework than the other. For example, the level of inclusivity in the digital technological framework can be seen through the use of software programs. Unlike students and professors of systems engineering, the highest percentage of law students and professors only use Word and Excel, avoiding any software that requires a higher level of complexity. Both students and professors find ways of interacting with print and digital supports according to the diverse combinations of materials they use. The problems they find with digital reading materials are replaced by the benefits they find in paper.

Slowly, we see the conformation of a reader who does not broaden his or her view, but instead focuses it on reading materials that are useful, practical, interesting, pertinent and complementary, according to their needs and what that reading material means to them. Students and professors develop resistance tactics in each of the choices and combinations of materials they make. Reading acquires a pragmatic tone: it responds to formative purposes. It adapts to the demands of a professional profile, according to the content that must be read and the time available for it.

Digital Readers ... and Adults

The prevailing societal idea about reading and the latest technological advances in Argentina is that only young people read on digital formats and adults do not. However, as Balling et al in this issue argue, it is not only the young who use digital devices. Indeed, almost 50% of all professors in my study, who are over the age of 35,[17] read long texts on a digital format (as if they were books). They have adapted their reading habits to the material and technical features of the screen, whether the device is a computer, a tablet or an e-reader. However, for students and professors, computers were the most referenced device when talking about digital reading. According to my data, in Rosario, tablets are used for all kinds of tasks but only exceptionally to read. The percentage of e-reader users is very low, due to their low market penetration. Only 5 out of 75 students and 6 out of 58 professors knew about e-readers and how they work. In most cases, these were mistaken for tablets. When surveyed, the largest percentage of university students answered

negatively to readapting their reading practices to the features of digital support. Two of the qualitative responses offered by a second year male student and a fifth-year male student of systems engineering of Public faculty 1 included: 'I do not like reading directly on my computer at all, I'd rather read print/photocopied material' and 'Technology provides many advantages but I'd rather study or read on paper. It is more comfortable, practical and pleasant'. The sentiment is shared by a second-year female law student from Public faculty 2, who answered: 'I don't deny that computers and the internet are important tools, but nothing compares to reading on paper'. These comments are consistent with the large percentage of paper use mentioned above.

The attachment, the pleasure and the taste for paper are the most outstanding features that make young readers keep choosing paper. However, 35% of professors of all four faculties have readapted their practices and now read complete digital texts of the same extension as a book on a screen. The way students and professors have reconstructed their reading practices and renegotiated the meanings they attribute to them, along with their resistance to screen brightness whatever the device may be, has made it possible to construct a typology of the current readers (Ayala, 2014) of both print and digital supports.

Two actions can be recognized in the reading practices of those who are considered digital readers: one is associated to printing; the other, to the reading of short and current online texts. What kinds of texts are printed? Most answers pointed to long and complex texts. Over 70% of students of all four faculties answered the same regarding this type of text: 'I print it'. What students print is material they will take *valuable* time to read: '(...) digital material is saved and then printed to read (...) in more depth to see what ideas can be added', explains a second-year male law student from Private faculty 2. These printing processes coexist with the digital reading of short texts that do not exceed one or two pages, such as information on social media but especially news, where it is not necessary to print the material. The reading of online newspapers is high among both students and professors, as the survey results show: 41.7% of second year students and 58.3% of fifth year students, 43.6% in engineering school and 56.4% in law school and 80% of professors from both schools and years.

Online news texts respond to standard features: short, current and easy to read. By reading the headlines and the highlighted information on links, one can get the most basic and up-to-date information. Some of the answers from students across years and careers serve as an example to show that online newspapers are read on computers. A second-year female systems engineering student from Public faculty 1 answers an open question of the survey: 'I read the news on online newspapers and blogs'. The same answer is given by a fifth-year male law student from Private faculty 2 in the focus group: 'I read digital newspapers and blogs'. Systems engineering and law professors agree. A second- and fifth-year systems engineering professor from Private faculty 1 explains: 'I mainly read newspapers, I watch online videos and movies, I don't even download music anymore; I listen to it online'. This opinion is shared by a fifth-year law professor of Philosophy of Law at Public faculty 2, who states: '(...) I don't buy print newspapers, (...) I read the news online

and I like doing it several times during the day. I have the newspaper bookmarked, so that is the first thing I read when I log into my computer'.

The short length of news stories allows students and professors to construct a reading practice with digital reading materials in which the relationship *text length - reading time - screen brightness* does not become a problem. In other words, professors and students identify the screen as the biggest obstacle when reading digital content, especially lengthy texts. The brightness of the screen, the visual fatigue and the associated long-term health problems are the most prominent inconveniences. These are the main reasons why digital reading practices are restricted in time and content type. This was confirmed in the focus groups and in the in-depth interviews: for the largest percentage, more than 50% of students and professors, the practice of reading on computers is associated to short, current and informative texts.

Computers: A Synonym for Search, not so for Reading
An idea that has been gaining traction in Argentinean society is that all content is available online and that everyone has equal material and cultural access to both reading and searching. However, this does not hold true. While computers are good for searching, this is not the case for reading, due to a number of reasons. Even though university students and professors read content (desktop icons, software name, file information) from the minute they turn on their computers, many actions are not identified as reading processes. This is interesting, given that the recognition and reading of these icons is what makes it possible to use the computer and effectively read content. If these icons cannot be read, no cognitive activity needing the use of a computer can be developed. Computers are used very frequently and even more so among fifth-year students, whose work-related activities increase by 36.69%, a finding that is consistent with the increase of digital materials mentioned above. And still, computers are only associated to searching. While reading practices constructed in a paper culture generate subsequent writing processes, reading on digital support, especially computers, generates the previous process of searching for information.

There are similarities between students and professors in this regard. The use of computers to search for information reaches 60.2% of students and surpasses 70% of professors. However, since a basic search can be achieved by typing key words, students are mostly unaware of advanced search mechanisms and how to fact-check content, and only 5% of professors are aware. Nonetheless, most of the reading-related content searches online are of academic nature. Almost 100% of the students in the sample assume Google is the only search option, considering searching and googling as synonymous; 26.2% of students search for academic material on Google; barely 5.6% search on scientific databases and 94.4% claim not knowing what databases are. The three main search combinations of digital formats support the predominance of Google as the main digital material for searching. The first one, with 7.8% of students, includes: search engines, e-mail/instant messaging, social networks, online newspapers and portals. The second combination, with

5.9% of students, includes: search engines, e-mail/instant messaging and social networks. The last one, with 3.8% of students, includes: search engines, e-mail/instant messaging, social networks, and websites for downloading and streaming software, movies, games and music. University sites, repositories and databases are barely used for searching, with less than 1% of students reporting using them.

These results show that over 70% of students and professors attribute meanings to computers that are not related to reading or reading-related processes (association of ideas, interpretation and writing). Computers are associated to a connection to the web, to communication, to information exchange and storage, but they are not commonly associated to reading. Computers enable multiple combined uses that include certain academic activities, such as schoolwork and work-related activities, and entertainment activities. That is to say, each *usage type* encompasses a set of tasks that vary according to the career, but they all share one, which is the search for information. For example, systems engineering involves activities such as developing programs, designing websites, learning programming languages and downloading different types of files. On the other hand, law involves activities related to the search for jurisprudence and news related to legal topics.

Nevertheless, the data collected show an interesting finding: just like reading processes, search processes are not haphazard tasks, they are directed and focused. This type of search increases in the fifth year of both careers because of the need to find specialized information with the same credibility awarded to materials published on paper supports. The personal search for information by this year of study is complemented by a search that is directed and guided by people with knowledge on the subject. The relevance of websites that are recommended by friends, colleagues and professors holds a resemblance to the idea of *opinion leaders* developed by Katz and Lazarfeld (2006). They explain that information coming from mass media is channeled into two steps: from the media to the leader and from the leader to the groups, the leader being a mediator between the media and the group. It is the leader who understands media content, interprets it, and communicates it to other people with shared interests, needs and goals.

Students seek advice and suggestions from their *opinion leader*, whether it is a colleague, an expert on the subject or a professor, about which sites to visit and what to search. The students give credibility according to shared interests and educational, socioeconomic and demographic attributes of the leader. Searches based on friends' recommendations reach 64.7%;[18] searches based on professor recommendations reach 38.8% and searches based on work colleague recommendation are at 17.3% while only 14.2% use publicity and banner recommendation searches. Therefore, the search for information is a process that involves cultural and interpersonal communication practices; it is personalized and concise. The role of professors, colleagues, friends and family is key: their opinions, knowledge and comments create specific references but also important meanings about search processes and their results. They have an influence on opinions and create relevant references related to web information. Website recommendations increase by 44% among fifth-year students: they increase from 28% in the second year to 72% in the

fifth year. The search is the first step of a process that involves site selection, a scan of the content and a second more detailed reading to analyze relevance and credibility. Over 50% of university students, and particularly second-year students, admit to using the information available on the first Google search results without checking if the source is credible.

Some Considerations

The results shown in this work, which are part of the previously mentioned doctoral investigation, confirm that current reading and search practices are more complex and diverse than ever before. They pose epistemological, conceptual and methodological challenges and the need to establish distinctive features of this era of print and digital supports coexistence. These features include material, idiomatic and cultural access to what can be read and *found*, the logic of algorithms, awareness of different sources and advanced search mechanisms, and new forms of literacy. This themed section, titled *Reading, Readers and Digital Media,* invites us to approach these differences with a critical mindset, especially since it is through higher education that future professionals are trained.

That paper is still the preferred technology on which to read, especially among young readers in this study, urges critical reflection on the role of digital support. Books, which are considered by many to be irrelevant, are still the main source of legitimately valid knowledge, and this merits some thought on its relevancy and its current role in the university. Digital formats (besides the internet) reproduce the design and structure of print formats, which compels us to inquire about the real changes in interface design to facilitate the reading of longer texts that require more cognitive effort. My finding that photocopies are the most popular format among students to highlight ideas, access content and share it is a relevant one in a time where it is claimed that everything can be found online. And, my conclusion that most digital readers are adults over the age of thirty-five refutes current mainstream ideas on reading practices and it has made it possible to construct a typology of readers (Ayala, 2014, 2019) according to the meanings attributed to the diverse reading materials and the way each reader reconfigures its practices. The typology of readers and users constructed with the data obtained through the fieldwork shows the predominant criteria that professors and students in higher education use to choose a certain support and format. This typology also shows certain ways of cultural consumption, since reading materials do not carry 'simple' information, but data, and simultaneously a process of interpretation and consumption of the material, a choice of support, and an index of a current reading practice.

Reading and searching in universities are considered two different practices that the reader shapes according to multiple factors, such as time, interests, the preference for one technology over the other, the specific goals of a course, the level of comprehension of digital devices, among others. In other words, the way in which readers construct their relation to the different reading materials follows a range of actions and meanings that turn into cultural practices that provide a higher density to the analysis. In this sense, the data show that the identification of problems is denser on digital supports than on print

supports: screen brightness, the weight of portable computers, the discomfort of transporting them and the back pain caused by reading for extended periods of time are some of the more significant inconveniences identified by readers. Such problems have solutions, such as printing the digitalized contents or opting for an e-reader in order to rest the eyes, or making advanced searches and taking advice from reliable acquaintances in order to *restrict* search time. On the other hand, the main problem with paper is the elevated cost of books, finding its solution in the more economic reproduction on photocopies. These problems can be solved through reading and searching strategies, through resistance tactics, through negotiations according to *personal needs and convenience, career,* or in the non-uses and limitations, where problems are more evident. The choice of support will depend on the technical or social advantages readers find in the construction of their reading practices and in combination with search options.

In this sense, it is in higher education that we can observe the power relations of this specific case through the interactions between the technological frameworks of print and digital supports, the elevated cost of books, the validity of books as a main source of information in higher education, the low market penetration of e-readers in Argentina, the exponential growth of photocopy use, the scarce use and almost unawareness of scientific databases, advanced search options and content fact-checking, and the wide availability of digital materials that are the result of a scanning process of print materials, among other factors. The notion of power relations (Foucault 1996) shows the set of forces among the diverse factors (legal, economic, educational, access) which predominate and characterize reading practices at a university level. They are force relations specific of the historical juncture in which they develop.

There is a 'marginalization of access to knowledge' (Ayala, 2014, 2019), which is related to material access, ignorance about advanced settings on digital supports, language barriers and the lack of certain competencies. This cognitive marginalization, similar to that of the Middle Ages, when only certain elites could overcome those barriers, proves the need to incorporate digital literacy in higher education, including the development of advanced digital competency.

Higher education offered great possibilities to analyze reading and search practices and their features. Results of the analysis showed that there are more similarities than differences between students and professors. The analysis also provided empirical data to refute those who claim that age marks a distinctive feature in reading practices. Another result was the identification of personalized search processes. Finally, the data showed the credibility that paper and books still have. The changes regarding reading and search practices and the choice of support are slow and gradual, acquiring specific features of the context where they develop. In Argentine universities, Intellectual Property Law No. 11.723 and the low cost of photocopies set a relevant difference regarding what can be read and what can be searched/found. That readers change their practices regarding support choice and are unaware of advanced search mechanisms speaks to the importance of constantly questioning the features of technological change. Constructing new types of usage and

relationships with print and digital technologies is a process that includes a variety of interrelated factors, such as the sensations, the attachment and the pleasure that the materiality of supports can generate in readers, but also the economic cost, the discomfort of screen brightness and the access restrictions of certain content, whether it is due to unawareness of the source or for copyright reasons.

The meanings we attribute to objects turn into practices at a micro level. They lead to certain behaviors and ways of doing. They are not mere words. They involve decisions and relations. The conjuncture of a higher educational level shows how relativism becomes visible. Reading is circumscribed to a ritual influence, a profound and dense cognitive activity (Geertz, 1994), a search and a selection of content. It means to dedicate one's body (both physically and mentally) and time to the construction of knowledge. For contemporary readers, searching on the web is very different than searching in a library. They consider it an *instrumental activity*, automatic and internalized, which complements reading. This is how students and professors in higher education perceive it, ignoring the non-identification of various sources, the unawareness of advanced search mechanisms, the criteria to verify the credibility of the material and the cognitive processes to select the relevant materials. Today, digital devices have modified certain reading habits. However, they have *reinforced* other meanings that transform into actions, for example, those related to reading on paper, attributing to it validity in time that surpasses the advantages and advances in the field of information technology.

What does it mean to read in higher education nowadays? It means to go beyond the book, not only metaphorically, but in a strict sense, to inquire about the interrelations that are constructed between social and technological aspects. It means to start from the object to truly inquire about what is available and how readers construct their relation to it. The influencing factors of reading and search practices should be included in the design of a public policy of digital literacy, explaining the importance of knowing a variety of sources to look up information, which sources are subscription based and which are free, the dangers of using a monopoly search engine and the relevance of language barriers. The importance of reading and having access to a wide variety of sources is related to civic education, democracy and public policies of development and social inclusion (Ayala & Vila, 2016). Access to reading and material diversity is crucial for the construction of critical thinking in civilians, for political participation and the cultural and educational development of a country.

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Notes:

[1] Rosario is the third most populous city in the country, with over a million residents and nine public and private universities.

[2] The expression 'reading materials' will be used as a synonym of study materials.

[3] The thesis, *The Uses of Educational Materials on Digital and Paper Formats in Argentine Universities (2011-12). An Approach to Reading Practices (Ayala, 2014),* is considered a starting point because the results were compared to the ones obtained last year. Five years later, it was corroborated that the digitalization of texts by private companies is associated to high school level texts and public domain texts. On the other hand, reading on paper support continues to be associated to books. This data is supported by the second semester report of 2017 published by the Cámara Argentina del Libro (Argentine Chamber of Books), showing that 80% of publications are still published on paper, against a 20% published on digital support. Data from 2018 is not yet available. The data shows that paper is still the main support to read and construct knowledge on.

[4] This is the case of research done through the lens of cultural studies, semiotics, discourse analysis or sociology.

[5] Currently, the main proponents of this theory are: Wiebe Bijker, professor of the Department of Science, Society and Technology at the Faculty of Arts and Social Sciences of Maastricht University; and American sociologist, Trevor Pinch, PhD in physics and ex chair of the Department of Science, Society and Technology Studies at Cornell University.

[6] A copy center is a place where print and digital reading materials are photocopied or printed and reproduced on paper. These centers have gained importance because they offer low cost options, and thus they have become strategic access nodes to knowledge.

[7] Even though the empirical results shown were obtained five years ago, when smartphones had not yet become widely used, some data were rechecked and showed that the use of smartphones is not directly linked to the reading of materials, but it is however linked to the search of up-to-date information specific of each career. For example, it is widely used in law school to look up laws.

[8] The typology done by Dr. Sally Wyatt (2005) constitutes a reference to understand the implication and significance of non-uses by readers of any of the two supports, but mainly digital.

[9] Research was done in accordance with Personal Data Protection Law No. 25.326, respecting the confidentiality criteria of each of the institutions and people who collaborated in the data collection. For this reason, faculties are cited as follows: Private faculty 1 and Public faculty 1 are the ones in which systems engineering is studied and Private faculty 2 and Public faculty 2 are the ones in which law is studied.

[10] *Private* means that the student must pay enrollment and a monthly tuition.

[11] According to the Centro de Administración de Derechos Reprográficos de Argentina (Argentine Reprographic Rights Administration Center), currently the use of photocopies is still very high. However, universities have started to digitalize reading materials, in compliance with license agreements, and upload them to the virtual campus. Moreover, universities state that once the files are uploaded, students print them, showing the absence of mechanisms that limit the printing or reproduction of the material. These data confirm that currently paper is still the preferred support to read.

[12] This notion is related to active social subjects with the capacity to make decisions, including the most marginal and the ones who resist the use of certain technologies.

[13] Thomas and Buch take the notion of interpretive flexibility from the Empirical Program of Relativism, which tries to establish the final structure of scientific knowledge from a social perspective. Interpretive flexibility can be identified methodologically through surveys with open questions, in-depth interviews, historical sources and other qualitative methods that allow for the demonstration of the different interpretations that each relevant social group makes of the same technological artifact.

[14] The concept of access includes material limitations and also competency, modes of relating with technologies, idiomatic barriers, among others. A meticulous and complete analysis of access was carried out by authors Jan van Dijk and Kenneth Hacker in their article *The Digital Divide as a Complex and Dynamic Phenomenon* (2003).

[15] Internet material includes: online newspapers, blogs, databases, doctrines, rulings and jurisprudence for law students; and forums and specialized websites for systems engineering students.

[16] The concept of sociotechnical framework was operationalized through the usage percentages of the supports, their advantages and disadvantages, the reasons to use them and the role assigned to the search processes. This made it possible to recognize that each reader maintains a specific way of relating to technology, without it being necessarily related to age aspects and including in the analysis the variety of factors present when reading or searching for information.

[17] In his doctoral thesis, Louis Neven, from Twente University in Holland, claims technology designers frequently assume that older people do not know much about digital technology, forgetting that they lived through all of the changes that took place up to the present and adapted to them.

[18] Friends ranking higher than professors as opinion leaders can be thought of as a resistance tactic to academic institutional authority.