The Shift of Information Literacy Towards Research 2.0

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INTRODUCTION

Desk research was done in order to contribute to discussions about the future of academic librarianship, and carried out based on ideas around new trends in scientific research. Our desk research combines sources and insights from a variety of discourses including speculations on the nature of information literacy, scholarly communication, studies in using Web 2.0 in research and professional literature focused on academic librarianship. To examine the relevance of our ideas, we conducted a literature-based theoretical analysis that explores the trends that explores not only the trends that have caused considerable reconfigurations of research processes and scholarly communication and research cultures, but also lead to the re-examination of themes and issues prioritized in information literacy (IL) research and practice.

Both research practices with an emphasis on scholarly communication and information literacy have been extensively discussed in academic librarianship. They reinforce the notion of the library as the heart of the university, an image well established in the first half of the 20th century (Euster, 2005). Information literacy has strengthened the idea of the academic library as a center of learning, while the support of faculty scholarship placed the academic library in the heart of research. However, academic libraries have dealt with research and information literacy mainly as separate entities and from specific problem angles. For instance, in dealing with scholarship and research, the academic library community focused mainly on diverse issues regarding the “output” on scholarly communication, like monograph purchasing, journal cost and electronic journal access, subscriptions, etc. (English, 2004), while the core process of research and the dynamics of change within scholarly communities received less attention (Genoni, Merrick, & Willson, 2006). Changes in researcher information behavior and in the publishing world are in turn calling for a major transformation of the role and tasks of the academic library.

The academic library community has recognized an ever-more pressing need to take these issues and developments into account and began to deal with them more intensively by publishing a white paper entitled Intersections of scholarly communication and information literacy: Creating strategic collaborations for a changing academic environment (ACRL, 2013). The document explores and articulates different intersections between scholarly communication related to research activities and information literacy, arguing that these intersections should be carefully considered by librarians in order that libraries become “resilient” with regard to tremendous changes occurring in the research information environment. The paper offers suggestions and recommendations for moving forward in altering the existing approaches to information and explicitly emphasizes the need to integrate into information literacy issues relating to themes surrounding research environments.

This paper is thus an attempt to examine some of the above stated issues in a more detailed way, by considering topics that need to be prioritized within IL practices. Moreover, intersections of research activities and IL are explored in the light of broader transformations within research landscapes, with the aim of directing the attention of academic librarians to those trends that may determine their future work.

THE NATURE OF INFORMATION LITERACY

The work of today’s researcher presupposes a number of literacies. From among the various types of literacies, at least three
types can be mentioned in this context: information literacy, scientific literacy and academic literacy.

To gain a more accurate picture of their nature, we can consider them from a bird’s-eye view. Such perspective reveals three levels of literacies:

- conceptual competencies that among other things include innovative thinking, problem solving and critical thinking;
- human competencies: social networking skills, self-management and cross-cultural interaction skills;
- practical competencies: media and information literacy (Lee, 2013).

The best known literacy from among practical competencies is information literacy. It is also the one that has received the most attention from the perspective of academic libraries (Behrens, 1994; Breivik, 1999; Grafeinstein, 2002; Owusu-Ansah, 2003; Snively & Cooper, 1997). On a pragmatic level, these discussions resulted in frameworks and standards, like the SCONUL’s Seven pillars of information literacy (1999, 2011) or ACRL Information Literacy Competency standards for higher education (2000), which are currently being revised into a framework for information literacy (ALA, 2014). All these sources point to information literacy as a way for college and university libraries to directly support the educational mission of their institutions, align with institutional goals, and regain some of their historical centrality on campus (Saunders, 2009).

Perhaps the best known and accepted definition of IL says that information literate people are able to recognize when information is needed. They are also able to identify, locate, evaluate, and use information to solve a particular problem (ALA, 1989). This definition has been widely used and further developed by other definitions. IL education emphasizes critical thinking and the necessity of being able to recognize the quality of a given message. It is firmly positioned among other literacies despite a certain amount of (occasionally well-founded) skepticism, which in itself highlights the fact that information literacy and especially its lack has always been of greater importance to academic librarians than to any other group of “players” in the information and education arena (Bawden & Robinson, 2009). A crucial feature of IL is its connectedness with technological changes. IL has appeared, spread and developed as a reflection of shifts in information environments and technological changes (Špiranec & Banek Zorica, 2010).

Functioning in modern society requires that we master the skills of written communication (Morville, 2005). Nonetheless, it has to be supplemented by multiple literacies that represent a response to rapid technological changes.

The complexities of the current information environment make necessary complex and broad forms of literacies that are not restricted to any particular technology and foster understanding, meaning and context (Bawden, 2001). Different literacies depend on varying social contexts and equally varying social conditions of reading and writing. Consequently, they change with time, according to changing purposes and circumstances, as well as people and tools involved (Lankshear & Knobel, 2004). For all these changing circumstances, a rapid development of information and communication technologies (ICTs) represents one of the most crucial factors.

The difference between being able to appreciate and process an aesthetically valuable piece of writing and to cope with socio-technological changes and challenges brought about by the convergence between media, telecommunication and information, and communication technologies, is considerable (Livingstone, van Couvering, & Thumin, 2008). This is one of the reasons, why the existence of the World Wide Web and then also the appearance of Web 2.0 have been playing a significant role in forming literacies. Web 2.0 is generally taken to encompass a variety of sites and tools for shared information creation and updating, and social networking and communication (Bawden & Robinson, 2009). It enables mass participation in social activities. Users and their interests are represented in mediated spaces, which also serve as an environment to activate engagement with others (Jarrett, 2008).

This being said, it seems logical to identify skills and abilities that typically characterize researchers, in particular in relation to the above described changing information environment. It is rather obvious that researchers have to possess skills associated with innovative thinking and problem solving abilities. Likewise, self-management is equally indispensable. We will show here that social networking skills are gaining importance, with differences across different contexts. Furthermore, owing to globalization and a growing international cooperation between researchers, cross-cultural skills are also surfacing as more and more significant. We may add here a selection of the vital skills, as identified by Davies, Fidler, and Gorbis (2011). According to these authors, the ideal researcher is principally characterized by adaptive thinking. Researchers are able to manage their cognitive load properly, filter information based on importance and use a variety of tools and techniques. All this must be accompanied by a specific type of mindset that allows these tools and techniques to be used in work processes aimed at desired outcomes. Sense-making is also absolutely essential, since there is no serious research without the ability to determine the deeper meaning of what is being expressed at face value. Data-based reasoning is typical in a number of research settings, coupled with the ability to translate large amounts of data into abstract concepts. As research is largely determined by computing, these abilities can fit into the framework of computational thinking. IL, as a practical competency, enables the here described necessary abilities of researcher. Sense-making, reasoning, adaptive thinking and problem solving all depend on information and thereby on IL.

A relatively new approach in analyzing the importance of IL is based on interpreting IL as a means of mastering information overload (IO). Information overload is a consequence of receiving and managing huge amounts of information in a great variety of formats and types, delivered through a limited number of interfaces (Bawden & Robinson, 2009). As a consequence, the diverse and abundant information choices that we face in almost all fields are coupled with our inefficiency in performing our tasks (Davis, 2011).

Information overload can be defined as an impediment to efficiently using information due to the amount of relevant and potentially useful information available (Bawden & Robinson, 2009). We can distinguish between two levels of IO: the macro level and the micro level. The first one is related to the limitations of physical storage and processing capacities that present an obstacle to accessing information. The micro level of IO represents a kind of failure in filtering information (Davis, 2011). We have to add here that information overload often remains unrecognized (Badke, 2010) and its very existence is questioned by some authors. However, provided that we take its existence as a matter of fact, information overload can be counterbalanced by information literacy, as it essentially enables us to efficiently process all types of information content. Apparently, it is the micro level where information literacy can be used as an efficient means of managing IO.

Nevertheless, it would be utterly naïve to presume that researchers easily (and readily) accept the need for acquiring IL. There is substantial evidence that people in general hold themselves competent and skillful in dealing with information. This is especially true with regard to their use of technology where people’s aptness in using computers is often mistaken as evidence for a high level of information literacy and in this way disguises the unsatisfactory level of information literacy among the general population (Herman & Nicholas, 2010). The same may be observed among researchers (Nicholas, Huntington, Jamali, & Dobrowolski, 2008). This has been forecasted a decade ago. As Lynch (1994) indicated with the primary literature in digital form reaching a critical mass, “the natural tendency of library patrons is to use the best of what is available and to ignore even very high quality materials that are available only in printed form” (Lynch, 1994).
SCIENTIFIC LITERACY AND ACADEMIC LITERACY

When speaking about research, two additional concepts have to be mentioned alongside information literacy, i.e. scientific literacy and academic literacy. Scientific literacy comprises methods, approaches, attitudes and skills, related to thinking scientifically and doing research. We can also add to this that anyone who has acquired scientific literacy is able to understand articles about research in the popular press and engage in social conversation about the validity of their conclusions (National Academy of Sciences, 1996). This implies that everyone should be scientifically literate, even if only a small number of graduate students become researchers. Academic literacy is more closely associated with formal learning, especially in higher education. It involves the comprehension of the entire system of thinking, values, cultural identity and information flows of academia, which results in the ability to read, interpret, and produce texts valid in academia. All this is based on the cultural identity of academia, in which professional language and literature play a key role. In this system information has a grammatical dimension that information literate students must be taught and researchers must positively master (Elmborg, 2006).

It is relatively easy to see that both literacies mentioned above are prerequisites to becoming a researcher and fulfilling the researcher’s role. It seems to be clear as well that these two literacies complement one another and that at the same time they are strongly dependent on information literacy, at least in research environments.

SHIFTING RESEARCH PARADIGMS TOWARDS RESEARCH 2.0

There is no doubt that research has changed and metamorphosed through the use of ICTs as numerous authors have noted so far (Arns & Larsen, 2007; Borgman, 2007; Nentwich, 2003; Odlyzko, 2009; Van de Sompel, Payette, Erickson, Lagoze, & Warner, 2004; Waldrop, 2008). However, deeper and more radical transformations that potentially could cause changes in the configurations of the principles of research activities have resulted from technological innovations brought about by the Web 2.0 (Lievrouw, 2011; Luzon, 2009; Odlyzko, 2009; Procter et al., 2010; Waldrop, 2008). Given the social and communicative nature of scientific inquiry, it is little surprise that many researchers have become active participants in this new Web, often using services and tools created specifically for research (Prieim & Hemminger, 2010). The Web 2.0 seems to promise to enable researchers to create, annotate, review, re-use and represent information in new ways and make possible a wider promotion of innovations in the communication practices of research, e.g. by publishing work in progress and openly sharing research resources (Procter et al., 2010). In order to express these substantial changes the term “Research 2.0” was coined. The analysis of several definitions shows that the term refers to new approaches in research that promote collaborative knowledge construction, rely on providing online access to raw results, theories and ideas, and focus on the opening up of the research process (Luzon, 2009; Ullmann et al., 2010). Typical examples of “Research 2.0” applications include science blogging, microblogging (e.g. Twitter), information aggregation (Digg), recommender systems, social bookmarking (CiteULike), shared online libraries (Zotero and Mendeley), open peer review, wikis (OpenWetWare), social networking sites (Academia.edu and Researchgate), etc. According to Weller, Mainz, Mainz, and Paulsen (2007), the potentials of coupling Web 2.0 tools and services with research processes may be differentiated into several dimensions. It is the generation and management of collective knowledge that which creates new structures and systems of scholarly communication. It also allows new models of public interaction in the field of research activities through the use of blogs, podcasts, etc. All these features and dimensions differentiate traditional research activities from Research 2.0. Furthermore, while Research 1.0 is characterized by texts and documents as the prevalent record, the Web 2.0 environment research, due to technological developments, to a greater extent revolves around people and communities. In their search for data and information, researchers are able to rely on their peers, communities and networks. Certainly, the community dimension has been always the very essence of research, even when interactions appear in very informal ways. The invisible college has been accepted as a description of such informal social relationships between scientists with common interests (de Solla Price, 1986). However, groups of researchers assembled in an invisible college have been limited in size due to physical and technological constraints. This seems to be changing with the growing use of participatory, interactive “Web 2.0” technologies and social media embodied in various communication channels, networks at different levels or membership groups, and may signal a revival of interpersonal modes of communication on a broader scale (Lievrouw, 2011).

The changes are obviously not just technological and process-based in nature, but are more substantial and have a significantly deeper epistemological impact that could be described as shifting (Dede, 2008), disruptive (Cope & Kalantzis, 2009), or even distorting (Schiltz, Truyen, & Coppens, 2007). Dede describes the “seismic shift in epistemology” resulting from Web 2.0 by drawing on distinctions between classical perceptions of knowledge and approaches to knowledge within Web 2.0 environments. According to these distinctions, in the classical perspective “knowledge” consists of firmly structured interrelationships between facts which are based on unbiased research that produces compelling evidence on systemic causes. Epistemologically, a single right answer is believed to underlie each phenomenon, while in the context of Web 2.0 “knowledge” is defined as a collective agreement on the description of a particular phenomenon that may combine facts with other dimensions of human experience such as opinions, values, and spiritual beliefs. While some authors perceive such disruptive forces as an opportunity for overcoming flaws in scholarly communication (Cope & Kalantzis, 2009), others question the ever-present mantra of the growth of knowledge through information sharing. For example, Schiltz et al. (2007) state that the mere distribution of information does not directly and necessarily amount to the growth of knowledge, since knowledge and information are two different things. Information is something that can lead to knowledge, but the sheer availability of information does not necessarily result in the increase of knowledge.

FACTORS INHIBITING A WIDER UPTAKE OF RESEARCH 2.0

Despite interesting possibilities of applying Web 2.0 technologies in research, a review of published literature shows that the use of Web 2.0 in academic research has not become widespread to date. Research evidence suggests that Web 2.0 will not prompt any radical changes in scholarly communications in the short or medium term. For example, the research findings by Procter et al. (2010) demonstrate that only some Web 2.0 services built upon existing practices (mainly the generic, intuitive and easy-to-use ones) are experiencing a rapid uptake.

A thorough analysis of recent literature dealing with Research 2.0 trends reveals a substantial amount of holding back among researchers when it comes to the actual use of social media for research purposes. This analysis highlights two major hindering factors: recognition and trust. A recent investigation into trust in scholarly communications flagged out that measures of establishing trust and authority significantly deeper compared with trust. A recent investigation into trust in scholarly communications flagged out that measures of establishing trust and authority have not changed despite technological changes, but that in general researchers have become more skeptical about a source’s trustworthiness (University of Tennessee & Ciber Research, 2013). According to Procter et al. (2010), researchers are likely to accept new methods if they improve the research outcomes and do not threaten the reputation associated with research. Researchers are often reluctant to share professional information with a wide and uncontrolled audience. In order to build their academic careers, researchers must publish their work in books and scholarly journals, so social media cannot serve as a wholesale replacement for those channels (Collins, 2013). A cornerstone of the reward system is that most universities intend to use an objective process for evaluating teaching staff. The easiest way to do this is...
to apply mechanical processes in which publication in peer-reviewed journals is central (Arms, 2002).

In most disciplines, it is an outstanding publication record in prestigious peer-reviewed journals that brings (academic) acknowledgement (Harley, Krzys Acord, Earl-Novell, Lawrence, & King, 2010). Academic appointments committees rank academic research output by following citation indicators. As Björk (2004) indicates, publications in the leading or most influential journals – which owe their status to being included in citation indexes – bring the highest rewards. Contrary to this, publications in journals beyond the citation index canon, are not equally acknowledged. Therefore, reluctance to publish research results outside the already established and valued channels of scholarly communication may be expected when analyzing prospects of a wide uptake of Web 2.0 in research-oriented publishing endeavors.

Apart from the fact that research published through Web 2.0 services is not rewarded and therefore not motivating, another factor that prevents Web 2.0 from becoming an equally accepted alternative mainstream channel for publishing academic research is a lack of trust among its (potential) users. The reliability of Web 2.0-generated content is questionable due to disintermediation. Eysenbach (2008) describes disintermediation as a process that empowers and enables users and creators of content to sidestep the middleman or intermediary (e.g. librarians, health professionals, travel agents) and access and even create information or services directly. As a result of that, and in contrast to what happens in centrally-managed and structured information environments, information not stewarded by traditional information gatekeepers enters the research process. This allows users to bypass the expert intermediary in both creating and using content, i.e. to both create and be exposed to unfiltered information, which raises issues of credibility, quality and reliability of information. In the opinion of Herman and Nicholas (2010) present-day information seekers consistently demonstrate characteristic patterns of unproductive information behavior. As a result, they cry out for re-intermediation.

According to Procter et al. (2010) many researchers are discouraged from making use of new forms of scholarly communication because they are unable to put their trust in resources that have not undergone traditional peer review. Similar research results have been documented in other studies (Harley et al., 2010; Researchers of Tomorrow, 2011). Thus, it may be said that Research 2.0 opens up exciting possibilities for improving research processes, but simultaneously creates a zone of risk. When talking about Web 2.0 technologies, analyses of risks and benefits should always include different contexts. While risks in the contexts of everyday life, entertainment or public discourse may be less distressing, they are of paramount importance in domains like education, health or research. In spite of being underlain by an open and participative philosophy, Research 2.0 is still a context for a traditional quest for highly specialized, reliable, accurate and valid information. It is exactly this required standard of research information that turns all the potentials of Research 2.0 into an unstable environment teeming with risks and controversies. The collaborative model of knowledge production, mash-up practices and anonymity result in the creation of information contexts where authenticity, trustworthiness, authority and reliability have to be and are continually questioned. There is an additional risk for researchers who share their preliminary findings and put them online: others could copy or exploit their work to get credit or even patents, particularly in hypercompetitive fields where patents, promotion and tenure normally hinge on who first published a new discovery (Waldrop, 2008). The amateurism that so strongly characterizes Web 2.0 environments, along with issues surrounding privacy, confidentiality and trust (Yuwei, 2008), may be tolerable for entertainment purposes, but they are positively not acceptable in science. Grand, Wilkinson, Baltitude, and Winfield (2012) refer to issues of trust, by arguing that “public spats in the blogosphere will jeopardize science’s position in society” and suggesting that “by exposing the argument, dissent and speculation natural to the scientific process, trust will be eroded”. However, the same authors believe that the opposite could happen: “practising science in the open, facilitating access to information, processes, and conjecture as well as to data, results, and conclusions, could sustain trust through increased transparency and greater completeness. By showing all the workings in the margins and making clear the foundations – or lack of – on which conclusions rest, more people will be enabled to make independent judgments of those conclusions’ validity.”

Still, due to the hindering factors described above, a rapid adoption of Research 2.0 is not expected, while research evidence and opinions are somehow contradictory in this regard. For example, longitudinal data show indications that active or passive use of some social media and networking tools in research is slightly on the increase among Generation Y doctoral students (Researchers of Tomorrow, 2011). This is consistent with the findings of Arms and Larsen (2007) who predict a more intensive uptake and identify younger researchers as early adopters of innovations such as Web search engines, Google Scholar, Wikipedia, and science blogs. Other authors also refer to evidence that many postgraduate and postdoctoral researchers are changing the ways in which they acquire and share research information and using Web 2.0 technologies to “pre-publish” research papers (Research Information Network, 2010). There is also some indication that faculty in newer and less established departments in humanities and social sciences may be more amenable to risk-taking in their publishing practices since their institutions support efforts to carve out the identity of such niche departments (Harley et al., 2010).

On the other hand, some authors believe that not the younger, but established researchers are more willing to experiment with new technologies and forms of information and data dissemination. The situation is rather strange as younger researchers are encouraged to be conservative while the reinterpretation of practice and exploration is left to their established colleagues (Weller, 2011). Or, as Harley et al. (2010) put it, the advice given to young researchers is to focus on publishing in the right venues. While there are no marked differences between different generations of doctoral students in using social media (Researchers of Tomorrow, 2011), established researchers seem to enjoy more freedom in the choice of publication channels than their younger, untenured colleagues. Younger researchers thus do not seem to counteract traditional publishing practices (Harley et al., 2010).

All in all, researchers use new tools in conjunction with traditional ones, and try to find appropriate and more effective uses for them (Weller, 2011). There is little evidence that the use of Web 2.0 services will lead in the near future to radical changes in scholarly communications. Web 2.0 supplements, rather than replaces, the established channels (Procter et al., 2010). Social media are beginning to make their mark on research, but not yet in a sustained or systematic way. Researchers are gradually adopting some social media tools where they see advantages in doing so, while at the same time other participants in the system of scholarly communication are responding to these developments by providing some social media functionality as part of their services (Collins, 2013).

Although at this point of analysis it seems like Web 2.0 services will never entirely replace the established media and information channels in research, the power of Web 2.0 services and technologies should not be underestimated. Web 2.0 services have already brought new qualities into research processes and will therefore at least supplement the traditional ones in many aspects.

The appearance of the Research 2.0 paradigm brought with it serious challenges for academic libraries. Already in 1994, Lynch indicated that the transition from print sources will involve systemic and often subtle changes, which can call the historical role of libraries in collecting, preserving and providing access to information into doubt. He sees the reason for this in the fact that digital information is usually not sold, but licensed that substantially reduces access to this body of information, among others by precluding sharing it through the interlibrary loan system in the way that printed works historically have been shared (Lynch, 1994). The situation of the e-book substantiates these claims, as
in the majority of the cases we do not buy e-books; we license them under typically very complex terms that constrain what we are allowed to do with them (Lynch, 2013). Such arguments focus on transformations in the publishing world, on literature access and provision. Possible changes in researcher information behavior, however, are calling for wider and more substantial transformations in the role and tasks of academic libraries. New approaches need to take account of transformations that go beyond the production and consumption of information, and encompass changes in conversations and cooperative endeavors that are essential to research (Genoni et al., 2006).

The 2013 Ithaka Survey shows that the views on the library’s supporting role among faculty are changing. Compared to 85% in the 2010 survey, only 68% of the respondents rated research support for faculty members as “very important” in 2013 (Long & Schoenfeld, 2014). Such rates suggest that the academic libraries position in supporting the core mission of research, if focused on collection issues and the delivery of academic resources, seems at stake. Although its function has always been to guide users to information, it is important to provide not just the tools, but also the intellectual strategies for thoughtful inquiry to the research community. For that, it would be essential to re-align and re-conceptualize information literacy in the light of current transformations in the research workflow.

INFORMATION LITERACY AND RESEARCH 2.0: CORRELATIVE DIMENSIONS?

The evidence presented above indicates that Research 2.0 may be associated with the realm of rather marginal instead of mainstream behavior of the researcher, in particular when it comes to using new and alternative ways of publishing research. This directs our attention to the fact that there are burning questions to be answered with regard to the interrelationship between IL and Research 2.0. The outcomes of Research 2.0 activities may not be recognized or accepted by the academic community. If this will be the case and the issues of trustworthiness and credibility – which represent the pillars of research – are currently not even near to being resolved within Web 2.0 environments, then it seems futile to seriously consider the possibility of changing IL in the interest of integrating into it the principles of research in Web 2.0 environments. However, in order to determine the potential effects and influences of Research 2.0 on IL, we need different grounds for interpretation. These effects and influences are rooted in the core values of IL which are congruent with Research 2.0 principles in many aspects.

IL comprises – but is not limited to – instrumental and functional dimensions (how to pursue an aim, how to fulfill a specific task, etc.). Ethical values, critical thinking and understanding are also intrinsic to it. Thus, reducing it to elements that count for tenure and promotion would be to miss the entire raison d’être of IL which presupposes the adoption of the broadest possible perspective on information and research landscapes and is closely related to critical insights into the prevailing mechanisms in scholarly publishing. Moreover, the core values of IL are related to social justice, democratization, public good, political empowerment, social responsibility, etc. This at least is what many IL proclamations, declarations or frameworks are suggesting (Prague Declaration: Towards an Information Literate Society, 2003; Alexandria Proclamation on Information Literacy and Lifelong Learning, 2008; Moscow Declaration on Media and Information Literacy, 2012; ACRL Information Literacy Standards for Higher Education, 2000; Australian and New Zealand Information Literacy Framework; 2004). Although the core values are not always a prevalent theme in these documents, each of them refers to these values in introductory statements. It is worth mentioning that academic libraries are committed to these very values that may be conceived as an alternative (and balance) to the commercial space outside libraries (Lilburn, 2012). Jacobs and Berg (2011, p. 385) have tried to reconnect information literacy with core values of librarianship in a similar way, by stating that “part of our purview as professional librarians includes working toward values such as democracy, diversity, education and lifelong learning, the public good and social responsibility.”

Equal analogies are plausible when discussing Research 2.0. One of the key ideas behind Research 2.0 and the related open access (OA) phenomena is to enable access to information, which is also a key tenet of IL initiatives. Open research, Research 2.0 and OA all together are driven by the idea of enabling the sharing of knowledge as public good. Although the spectrum of motives for OA publishing is very complex and not only altruistic from the author’s perspective (Suber, 2012), it is partly driven by the idea of taking away of the control over knowledge resources away from commercial publishers and giving it back to researchers. A guiding principle here is an increase in the efficiency of research which may then lead to higher returns on public investment (Neylon, 2011; Veletsianos & Kimmons, 2012). Such objectives very much fall into the spectrum of core IL values. Democratic values advanced both by IL and OA advocates (which are also advanced by Research 2.0, at least in our opinion) are discussed by Kelly and Autry (2013). They claim that without knowledge transfer, inequalities are quickly created, and political and economic power rapidly becomes concentrated in the hands of only a few at the expense of the public. They also state that smart democracies can only progress when information is open and available to everyone. And the OA movement (and equally that associated with IL) is well on its way to achieve this.

There are points of congruence between IL and Research 2.0 in their core ideas and guiding principles. Apart from that, the need for taking a wider perspective on IL that would be brought into line with Research 2.0 arises from practical considerations. As OA initiatives have shown, the openness of research can improve its visibility. For example, citation analyses have shown that open access materials often have high impact (Ginsparg, 2007). Such a high (and desirable) impact can be complemented by Research 2.0 when it comes to informal modes of scholarly communication. Whereas formal modes of communication are concerned with academic reward, informal modes are central to academic practice and it is difficult to imagine research, functioning without informal communication practices which are prioritized in the Research 2.0 paradigm.

These points of conceptual congruence provide a stimulus to re-define and look critically at the contexts of practice in which mutual relationship between Research 2.0 and IL can evolve. It is not only that the concepts of Research 2.0 and IL show some shared core values as indicated above; pragmatic arguments lead to the necessity of creating IL programs that will address the needs of contemporary researchers who confront new challenges in conducting research and creating their research identity.

Although core aims and values of scholarly research are still the same: to construct an enduring record of objectively validated knowledge (Goodfellow, 2013), the ways to achieve this have multiplied and diversified in Web 2.0 environments. Therefore, academic libraries need to recast their IL endeavors in the light of altering information environments by integrating issues and challenges characterizing contemporary research processes. The many aspects academic libraries should focus on when conceptualizing IL for researchers relate to authority issues, credibility and trust, as well as new modes of scholarly dissemination and recognition. Generally, new approaches should concentrate less on formal resource discovery and prioritize evaluation, information and data management, alternative forms of dissemination and informal modes of scholarly communication. These approaches will not disrupt the conceptual continuity of IL since Research 2.0 ideas are congruent with core values of IL like social justice, empowerment or public good. Additionally, such revised approaches will allow academic libraries to stay relevant and carve out what would be an important and unique role for them in the practices of research and scholarly communication.
CONCLUSION

The rise of the Web 2.0 has brought changes in the way in which researchers discover and access information resources relevant to their research, create or manage information, and communicate their findings. Reconfigurations within domains of research cultures and scholarly communication have a direct impact on IL. The reason for this is quite obvious: the research workflow is based on competencies associated with finding, evaluating, and using information. However, the relationship also works the other way round: research practices may change as a result of their being affected by IL. In our paper we have analyzed these correlative dimensions and argued that research is changing as a result of Web 2.0 developments and that IL for researchers in turn should also affect this interrelation. Although the conceptual core of IL focusing on finding, evaluating and using/communicating information, rises to the challenges of current social media and Web 2.0 environments, the main themes and issues that are prioritized in IL research or practice need to be reconsidered, keeping in mind new information environments that researchers act in. They are associated with many problematic aspects of Web 2.0 such as information overload, credibility, trust, seriousness, recognition, etc. Therefore it comes as no surprise that current studies indicate a slow uptake of Web 2.0 services in the domain of academic research and observations about a marginal influence of Web 2.0 on the “scholarly ivory tower” are not rare.

Still, the congruence between the core values of IL and Research 2.0 principles (e.g. openness, critical thinking, democratization, public good, empowerment or social responsibility, justice, etc.) provides a fruitful interpretative ground for identifying and highlighting an interconnectedness existing between transformations in both concepts. Today more than ever, IL should deal less with finding information and focus on the evaluation, use and communication of research information, considering the many paths opened up as a result of Web 2.0 developments. Primarily, a holistic approach to IL in social media environments implies a shift towards social dimensions and practices that would affect and remodel the processes of discovering, evaluating, using and producing/communicating information. Making IL more “2.0-ish” would result in more critical perspectives on current research landscapes and facilitate the realization of all the positive aspects of Research 2.0 such as openness, fair accessibility and visibility, informal communication, collaboration, etc.

We should not forget that making researchers familiar with appropriate literacies is an important educational activity that might reinstate the profession of information specialist as significant, at least to some extent. We could test libraries acting as apomediators, as outlined by Kwanya, Stilwell, and Underwood (2012). Even though there would be no intermediation in the classic sense, users would neither be left alone to grapple with raw information nor would they be prevented from adventuring into them on their own. Such an approach would be in accordance with the opinion, expressed by Herman and Nicholas (2010), in which they call for and even insist on re-intermediation. Unless academic libraries aim at services that add value to research conducted in a changing milieu, it is not likely that they will retain their traditional central position in research. A revised form of IL, however, that would reflect new needs of researchers, would lend academic libraries an opportunity to prove their value and regain some of the weakening legitimacy in the institution’s core research endeavors.

Recent debates about the relationship of information literacy with scholarly communication (Cowan, 2014; Davis-Kahl & Hensley, 2013) demonstrate an interest that goes far beyond education, and thus address the future of academic libraries. Our paper has examined the complex relationship between possible changes in scholarly communication and information literacy, and touched upon numerous related issues. Presenting our ideas is meant to be a preparatory work for solving related problems and to contribute to an emerging rediscovery and perhaps reinstating the historically close and strong connections between researchers and academic librarians.

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