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A practice-based exploration of the enactment of information literacy among PhD students in an interdisciplinary research field
Ola Pilerot

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Ola Pilerot
Swedish School of Library and Information Science, University of Borås, Borås, Sweden

Abstract

Purpose – The study aims to explore the interaction between the students, the material objects surrounding them, and their social site. The purpose of this paper is to identify and elucidate information literacy as it is being enacted within a complex and heterogeneous community of PhD students.

Design/methodology/approach – The study is conducted from a practice-based perspective, according to which information literacy is conceived as learnt through interaction within the socio-material practice where the learner is active. In order to produce empirical material, semi-structured interviews were conducted with ten doctoral students in an interdisciplinary research network, and their workplaces were visited.

Findings – The PhD students in this interdisciplinary network are more or less constantly engaged in the enactment of information literacy. It takes place in dialogue with others who can be both co-located and distantly located, and occurs through discussions about work in progress, through processes of evaluation and assessment of texts and authors, and through mundane everyday activities such as participating in meetings, which offer insights into how to navigate, in the broadest sense, the world of academia. A crucial part of the enactment of information literacy, which in practice is inseparable from interaction with others, is to pay attention to physical surroundings and material objects.

Practical implications – The findings have implications for prospective PhD students in interdisciplinary fields, for their supervisors, and potentially also for librarians who are supposed to serve these groups.

Originality/value – Research on the information literacies of PhD students in interdisciplinary fields is scarce. The practice-based approach applied in this study offers an extended and deepened understanding of the enactment of information literacy among PhD students in one interdisciplinary research practice.

Keywords Information literacy, PhD students, Design research, Interdisciplinary research, Practice theory, Information practice

Paper type Research paper

Introduction

This paper is a contribution to the research area of information practices (e.g. Rivera and Cox, 2014; Lloyd *et al.*, 2013; Cox, 2013; Haider, 2012; Huizing and Cavanagh, 2011; Pilerot and Limberg, 2011; Talja, 2010). It reports a study of how information literacy of PhD students is enacted in a Nordic network of design researchers. The concept of information practice indicates the importance of taking a broad perspective when investigating information literacy. Such a perspective embraces historically shaped socio-cultural aspects, such as norms, conventions, and routines, the people acting in the site, material aspects, including the use of ICT tools, as well as the interaction between physical setting and the social site. In accordance with this view, information literacy is understood as something more than a decontextualized set of skills. IL is

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seen as the embodied capacity to understand and be familiar with how information is created, sought, used, and valued in a certain practice (cf. Lloyd, 2011).

The design research network under study functions as an example of interdisciplinary research. As will be explained further on in this introduction, students in interdisciplinary fields face a number of challenges concerning epistemic traditions and variation in research practices. They therefore constitute an eligible group for the kind of research presented in this paper.

Being a doctoral student in the Nordic countries means being in a position where one is outside of the higher education system as most people know of it. This system is generally characterized, among other things, by a fairly set schedule of lectures and classes which the student attend together with, often, a quite big group of fellow students who are supposed to be reading the same literature and are assigned the same tasks. The transition from large-scale studies, for example, in the shape of undergraduate study programs, to more individually designed study trajectories such as doctoral studies as these are carried out in the Nordic countries, does not only comprise a move from a big group of fellow students to a smaller community of PhD students; it also involves a change of position with regards to the hierarchy of academia. At the same time as the PhD student is on the way of leaving something behind, he or she is also approaching a social arrangement, which to most newly recruited doctoral students is relatively unfamiliar. In this new setting, the student is likely to be exposed to a number of new colleagues comprising the full range of positions in the academic hierarchy system, all with their varying expectations and assumptions regarding what the student is supposed to do and not do. Moreover, the PhD student is expected to take greater responsibility for his or her studies and research activities than he or she did before embarking on the doctoral program. With a particular focus on the specific discourse that dominates research work, Charles Bazerman (1997) has aptly described the complexities that characterize the entry passage to a research field:

> Each person entering the discursive complexes of a scientific field must learn to cope with those communicative means and processes that mediate participation with others. […] [He or she] must draw on a common body of resources, cope with the same body of material and symbolic artifacts, master the same tools, and gain legitimacy for any new resources they want to bring into the field by addressing the same mechanisms of evaluation by which new concepts, tools, or phenomena gain standing in the discourse (Bazerman, 1997, p. 305).

Information literacy, the way it is conceptualized according to a practice-based approach (e.g. Lloyd, 2011; Pilerot and Lindberg, 2011), epitomizes the common body of resources referred to in the quote above. Being information literate in a specific research practice accordingly entails knowledge about what information sources, in the widest sense of the word, that are deemed credible and thus valuable, what intellectual and physical tools to use for seeking information, and how to communicate in relation to the information used in the research practice.

Another dimension of complexity is added to the scenario outlined here when considering that research activities are structured in accordance with an intricate system of fields and disciplines (e.g. Whitley, 2000). It is well-established that information practices vary by discipline (e.g. Hjörland and Albrechtsen, 1995; Talja and Maula, 2003) which implies that the newly recruited PhD student will have to pay attention to and learn how information is sought and used in the specific discipline he or she is active. The fact that the doctoral students, who have participated in the present study, are active in an interdisciplinary research field with lopsidedness toward the social sciences thus contributes to further complicate the understanding of how information literacy is enacted in the practice under study. From an information perspective, interdisciplinarity can be related to the notions of core and scatter (Chubin, 1976), according to which literatures are more or less concentrated to one discipline or distributed over a number of disciplines. In a similar vein but on the notion of "subject dispersion," Crane (1972) asserts that "[s]ocial sciences have a higher level of subject dispersion than do the natural sciences" (p. 102). In her review of the literature, Bates (1996) concludes, with reference to both Chubin and Crane, that "there may be dramatic differences in the kinds of strategies needed and the amount of effort needed to seek information, depending on the degree of coherence of the bibliographic resources of a field" (Bates, 1996, p. 158). In conclusion, it can thus be asserted that the newly recruited PhD student in an interdisciplinary field faces a demanding challenge with regards to information literacy.

The majority of studies of information literacy have been conducted in educational settings (Whitworth, 2014). There are also a multitude of studies within the area of information behavior that have explored how students on different levels in the education system search for and use information (Case, 2012). Even though there are an increasing number of studies that have taken a particular interest in the information practices of PhD students (e.g. Catalano, 2013), research is scarce when it comes to PhD students in interdisciplinary fields.

The overarching aim of this study is to gain deeper knowledge about the information literacy of PhD students as it is being enacted in an interdisciplinary field of research. The purpose is to identify and elucidate information literacy within the complex and heterogeneous community of PhD students under study. In accordance with the study's practice theory approach, this necessarily involves the explication of the interaction between the students, the material objects surrounding them, and their social site. The objectives will be met by exploring the following research questions:

RQ1. How is information literacy enacted in the investigated practice?

RQ2. In what ways does information literacy relate to people and material objects in the practice under study?

Apart from its main goal, which is to contribute to the area of information literacy research, the present study aspires to provide guidance and food for thought for prospective PhD students and their supervisors. Another potential target audience is librarians who are in the position of supporting PhD students' information practices.

The next section contains a selective review of related literature. Thereafter follows an account of the research context, which is followed by a section on theory. The method and the setting are then explicated. After the results, the paper ends with a concluding discussion.

Literature review

The literature review is divided into two parts, one which is aimed at presenting a selective review of previous studies of PhD students' information practices, and one that concentrates on the area of information literacy literature and research. While recognizing that theories of learning, communities of practice (e.g. Wenger, 1998), and social cognition (e.g. Bandura, 1986) could also inform this study, they are considered to be outside the scope of this paper.

PhD students' information practices

Among the contributions to the LIS research literature that investigate PhD students, a majority is occupied with identifying, describing, and analyzing information practices of this particular group. Other studies concern, for example, the relationship between student and supervisor (e.g. Sugimoto, 2012; Research Information Network, 2011). Most of the studies of doctoral students' information practice concentrate on specific aspects such as searching patterns (e.g. Carpenter, 2012; Mehrad and Rahimi, 2009), library use (e.g. Delgadillo and Lynch, 1999), citation or referencing practices (e.g. Larivière *et al.*, 2013), source use and information management (e.g. Wiliamson *et al.*, 2007), information needs (Vezzosi, 2009), relevance assessment (e.g. Steinerová, 2008), and the role of people in the research process (e.g. George *et al.*, 2006).

A number of studies have employed a library perspective, which means that they strive to explore in what ways libraries and librarians can work in order to meet the interests of PhD students (e.g. Fleming-May and Yuro, 2009; George *et al.*, 2006; Gullbekk *et al.*, 2013). Most likely from necessity, the majority of studies concentrate on specific groups of students, often based on disciplinary abode. There is hence a range of studies investigating, for example, the information practices of PhD students in biology (e.g. Vezzosi, 2009; Brown, 2005), history (e.g. Delgadillo and Lynch, 1999), business (e.g. Böyum and Aabö, 2015), physics and astronomy (e.g. Jamali and Nicholas, 2010), and library and information science (e.g. Lee *et al.*, 2014; O'Farrell and Bates, 2009). Others are less specified and comprise broader groups of PhD students from areas such as the social sciences (e.g. Fleming-May and Yuro, 2009; Steinerová, 2008).

A comprehensive meta-synthesis of the literature on graduate students' information behavior (Catalano, 2013), comprising some 50 studies reported in English since 1997, found that graduate students tend to begin their research on the Web, that they consult supervisors before other people, and that they use libraries in diverse ways. It was also emphasized that future research on the topic should delineate between masters' and doctoral students since "[t]he needs of doctoral students are often as different from those of masters students as graduate students' are from undergraduates" (Catalano, 2013, p. 269).

In sum, it can be concluded that most previous studies focus on what PhD students do (or ought to do) in relation to information. In this respect they can throw light on the present study even though the paper at hand aspires to explicate how PhD students' information literacy unfolds in practice, how the students acquire and develop the skills and knowledge required for being a PhD student, and how they are prepared for becoming researchers.

Information literacy research

The literature on information literacy is extensive. It includes a variety of contributions which spans areas such as examples of best-practice produced by professional librarians; policies and guidelines such as the Framework for Information Literacy for Higher Education (ACRL, 2015); and empirical and theoretical research studies (cf. Pilerot, n.d.). A clear majority of papers are produced within the discipline of library and information science, while two other prominent fields of study are computer science, and education (Whitworth, 2014, p. 76). IL is most often written about as taking place in specific sectors such as workplaces, everyday-life, or formal education. A recent analysis of the literature clearly shows that higher education is the predominant sector for IL issues. Nearly 70 percent of the contributions deal with IL in higher education, which is more than the other contributions dealing with sectors of K-12, community, workplace, and public health, taken together (Whitworth, 2014, p. 77).

Research studies of IL are conducted from various theoretical points of departure, which are not always explicitly expressed. Since theory contributes to shape the way research is conducted, different studies tend to emphasize different aspects of IL. In their review of three alternative theoretical understandings of IL, Limberg *et al.* (2012) analyze and discuss phenomenography, socio cultural theory, and Foucauldian discourse analysis. These three understandings are deemed influential and representative of various approaches to IL research and therefore reviewed here.

Phenomenography, or variation theory, aims to elucidate variations in how people in different groups experience, understand and conceptualize different phenomena such as, for example, IL (e.g. Bruce, 1997), information seeking (e.g. Limberg, 1999), or information use (e.g. Yates *et al.*, 2012). Phenomenographic studies of IL thus serve to contribute to the knowledge about how IL can be perceived and experienced from a range of different perspectives.

At the core of a socio-cultural perspective on IL is the idea of viewing information seeking and use as socially situated and materially mediated activities embedded in social practices. Information literacy is thus a matter of learning how to engage in information and communicate in a certain socio-cultural practice (e.g. Lloyd, 2007, 2010; Sundin, 2008).

A discourse analytical perspective on IL concentrates on the various ways that people assign meaning to the activities of information seeking and use. It serves to critically analyze and discuss IL discourses, thereby trying to capture the historically and socio-culturally shaped ways in which IL is understood and represented in, for example, policy documents and IL standards (e.g. Kapitzke, 2003), or how deeply rooted power-infused tensions are inherent in the discourse and practice of IL (Pawley, 2003).

The present study concurs with a socio-cultural perspective in that it sees IL as something that is enacted in relation to a manifold of information sources, and viewed as a collective competence embedded in socio-cultural practices which vary according to situations, activities and practices (e.g. Eckerdal, 2011; Francke *et al.*, 2011; Lloyd, 2010; Lloyd *et al.*, 2013). However, since the study also assumes "an ecological model in which agency is distributed between humans and non-humans" (Gherardi, 2009, p. 115), a more correct description would be to say that it embraces a practice-based approach to IL; an approach that will be further developed in the theory section.

Research context

The presentation of the research context concentrates, in turn, on three aspects that taken together provide an understanding of the setting in which the study was conducted.

Interdisciplinarity

There is no definite conceptual or definitional clarity regarding the concept of interdisciplinarity (Salter and Hearn, 1997, p. 26). The general definition applied in this study is to describe it as an area of knowledge production that crosses disciplinary boundaries (see Frodeman, 2010). However, by applying the notions of bridge building and restructuring (Klein, 2010), it is possible to discern different types of interdisciplinarity. When bridges are built that establish connections between "complete and firm disciplines" (Klein, 2010, p. 21) research practices that are reasonable to describe as interdisciplinary may be the result. In the case of restructuring, it is a matter of disciplines, or parts of disciplines, being detached "to form a new coherent whole" (Klein, 2010). Specific topics and professional preparation are categories that have been identified as pertinent in the process of restructuring. Examples of topics that Klein (2010) suggests, and that may appear in a range of disciplines, are "crime," "environment," and "labor." In the present context, it is suggested that "design" could be seen as a topic, which lay as the foundation of a new coherent whole, namely the interdiscipline of design research.

Design research

The interdisciplinary practice of design research is characterized by heterogeneity and complexity. The following account serves to illustrate the multifaceted and complex landscape toward which the participants in this study are headed.

From a general perspective, it can be claimed that researchers in the area are occupied with the development of historical, theoretical and critical knowledge about design itself and design practice (Boradkar, 2010, p. 279). There are authors that suggest that design research can be seen as one discipline among others (e.g. Chakrabarti, 2011) but even more contributions emphasize the indistinct character of design research. Cross (2007), for example, asserts that "there is still a long way to go before we can begin to have much sense of having achieved a real understanding of design as a discipline – we have only begun to make rough maps of the territory" (p. 30). In a similar vein, Friedman (2003) concludes that "design is by nature an interdisciplinary, integrative discipline" (p. 508). Regarding the content of design research, i.e. the problems and issues dealt with by researchers and designers, Buchanan's (2001) four orders of design can function as an indicator. According to this taxonomy, this interdiscipline can be divided into the following areas: symbols (represented by graphic design); things (represented by industrial design); actions (represented by interaction design); and thoughts (represented by environmental design).

Another level of complexity is added to the perception of design research when drawing on the typology discussed by Cross (2007) and elaborated on by Bærenholdt *et al.* (2010). They identify three different "design-research relations" (p. 3) and thus separate between research for design, research into design, and research through design. Research for design is exemplified by referring to studies of materials, mechanics and functions that inform design. Research into design, on the other hand, typically investigates how design processes work, whereas research through design is a kind of design research where design and research cannot be kept separate; it is the matter of a complicated set-up "where design becomes as much a medium and process of research, as a result" (Bærenholdt *et al.*, 2010, p. 4).

In sum, it can be concluded that design research is characterized by intellectual variety and fluidity in the sense that it is dealing with a range of different problems through the means of a variety of methods.

PhD students in Nordcode

The participating PhD students are all members of Nordcode, the research network that has been explored in the present study. To a great extent Nordcode mirrors the multifaceted and complex interdiscipline presented in the previous section. The intellectual landscape of Nordcode encompasses a range of more or less interrelated subjects collectively described by the network itself as research on communicative product design. At the core of the network is a conglomerate of areas such as engineering, aesthetics, product development, and semiotics, which well describes the multifaceted approach prominent in Nordcode. The network was established in 2000 and is geographically dispersed over four Nordic countries and eight universities. It gathers approximately 100 researchers and doctoral students. Even though the students come from different countries, the length and form of their PhD education is similar; they all include a certain portion of course work and the writing of a doctoral thesis.

Theory

The overarching theoretical framework guiding the study is grounded in practice theory. There is not one practice theory, but rather several ways to conceptualize and study practices (e.g. Schatzki *et al.*, 2001; Gherardi, 2006; Feldman and Orlikowski, 2011; Shove *et al.*, 2012, Nicolini, 2012). A common denominator for practice-based studies is the underlying assumption that social life is in flux and constantly and contingently transformed through establishments and dissolutions of connections. Accordingly, it can be claimed that, in a sense, everything hangs together through a fluid field of more or less interrelated practices. These practices are here seen as "routinized way[s] in which bodies are moved, objects are handled, subjects are treated, things are described and the world is understood" (Reckwitz, 2002, p. 250).

In the words of Gherardi (2009), theories of practice "assume an ecological model in […] which the relationality between the social world and materiality can be subjected to inquiry." Furthermore, theories of practice "view actions as 'taking place' or 'happening', as being performed through a network of connections-in-action" (p. 115). The present study is based on an idea that is concurrent with the assumptions presented in the above quotation. The notion of practices taking place correlates with an ontological aspect of the study object. It is thereby indicated that the theoretical approach can contribute to say something about the constitution of the enactment of information literacy. The statement that practices happen connects to a temporal aspect which ties in with the view of practices as unfolding and being in flux. This relates to a widespread idea in the field of practice theories, which is to regard "social life [a]s an ongoing production [that] emerges through people's recurrent actions" (Feldman and Orlikowski, 2011, p. 1240). For this paper, this idea has motivated the close focus on the participants' everyday activities. Another key point in the practice-based approach, as it is operationalized in this study, is that it considers epistemological and ontological dimensions in consort.

It has been suggested (Nicolini, 2012) that a fruitful approach is to embrace the plurality of practice theories and turning the differences into strength. Hence, five principles in tune with the empirical material and derived from this plurality have been developed and applied in order to guide the theorizing (see Pilerot, 2014). The first guiding principle is that activities, if ever so mundane, provide access to practices. Therefore, in the analysis as well as in the empirical work, focus is on what is done rather than on who is doing. Second: practices are always in a state of tension regarding what can be done and who can do what; therefore in this study practices are perceived as constellations of power that allow people to do certain things but not others. In order to facilitate the use of the concept of power, the Foulcaudian notion of governmentality is applied. Foucault (1991) describes governmentality as an "ensemble formed by the institutions, procedures, analyses and reflections, the calculations and tactics that allow the exercise of this very specific albeit complex form of power […]" (p. 102) over a population. This is a kind of power, or domination, which is somewhat subtle in the sense that it is not physical or violent. It can rather be described as seeping through discourses, infusing material objects, and operating through routines and conventions in order to legitimize, making orders seem rational, and thereby influence, or shape, ways of seeing, thinking, acting, and identity formation. The third guiding principle regards the ambition of bringing material objects into focus (see Knorr Cetina, 1997; Suchman, 2005; Barad, 2003). In accordance here with, it is argued that material objects contribute to coordinate and align practices. Fourth, the analytical approach has striven for opportunities to include individual agency in the analysis. This is an ambition that relates to a core idea of most versions of practice theories, namely to "steer a path between individualism and societism" (Schatzki, 2005, p. 469) and thereby avoid the dualism between individual and system. To focus on agency is also a matter of including a basic idea of theories of practice, namely the view upon actions "as 'taking place' or 'happening,' as being performed through a network of connections-in-action [in which] agency is distributed between humans and non-humans" (Gherardi, 2009, p. 115). The fifth and last principle concerns knowledge which is conceived of as collective. To be knowledgeable is, consequently, a matter of being able to act together with others, knowing what to do, what to say, how to speak and to know what tools to use in practice. These guiding principles in concert shape the theoretical lens through which the study object is explored.

Method

It is of great importance when conducting a practice-based study to carefully consider how practices can be explored and studied. In the present study, a blended strategy inspired by Schatzki (2012) has been applied. He suggests that "[u]nderstanding people's words for activities and practices […] provides access to the activities and practices that make up their practice-arrangement bundles" (p. 24). Furthermore, it is recommended that the researcher is "hanging out with, joining in with, talking to and watching, and getting together the people concerned" (p. 25). Additionally, the study of relevant documents, about the practice in question, is suggested. Therefore, documents, such as the network website, personal websites, and documentation from seminars and meetings, were consulted. However, the bulk of the empirical material was produced through the means of interviews with the participating PhD students. In order to develop a sense for and knowledge about the investigated practice, further material was produced through a number of visits to the students' workplaces.

The empirical material analyzed in the present study was produced in connection to a previous project that served to illuminate the information practices of design researchers. Since ten of the then recruited participants were PhD students who talked a lot about what it is like to be a PhD student in the Nordcode network, the decision was made to return to the transcribed interviews and analyze the material under the guidance of the research questions formulated for the present study. In connection to the original recruitment process, all participants were informed that the produced material would be used for a number of articles, to which they all gave their consent.

Ten PhD students were interviewed, seven women and three men, all in their 30s. They are located in six universities in four Nordic countries. They are at slightly different stages in their educational processes but all of them have participated in more than one network seminar and in doctoral courses arranged within the research network. All of them have published research in the shape of journal articles or conference contributions.

Seven of the interviews took place in the participants' workplaces, face-to-face. The others were conducted over Skype. Three of the interviews were carried out in English, the other seven in the Scandinavian languages. Swedish quotes have been translated into English by the author. The interviews were recorded and lasted for approximately one and a half hours. The semi-structured interviews were conducted on the basis of an interview guide arranged in accordance with specific themes, of which, for the present study, the following theme was especially fruitful to address: measures taken to find and manage information and to be updated with the information area of the field.

The interview transcripts were analyzed in accordance with qualitative content analysis (Zhang and Wildemuth, 2009). In focus were themes derived in synergy from the theoretical framework and the empirical material. At the beginning of the analytical process, open coding was applied in order to identify prominent themes in the empirical material. The process was then extended through constant comparative method (Corbin and Strauss, 2008) comprising a systematic comparison of each passage assigned to a specific theme with those already assigned to that theme. This strategy resulted in an analytical process moving from the descriptive to the unfolding of more theoretical levels (see Kvale and Brinkmann, 2009, p. 202). The analysis can be described as a recurrent close reading of the empirical material with a focus on instances related to the enactment of information literacy as these appear through the theoretical lens. Generated through the participants' narratives and from the observations made in workplaces and meetings, a "texture of activities becomes the background or 'context' against which" (Nicolini, 2012, p. 155) the enactment of IL emerges. Throughout the presentation of the results, excerpts from the empirical material are used to illustrate and support the analysis.

Results

Even though the ambition to systematically explain and account for practice is a task that risks falling "prey to the scientific urge to build simplifying, diagrammatic models of social life" (Schatzki, 2002, p. xii), the presentation of the results is structured according to the guiding principles presented in the theory section. To avoid the risk of simplification, in the beginning of the discussion section there is a summary of the results that aspires to elucidate the complexity of the investigated practice. Since attention to activities provides access to practice, the results section starts with an account of a set of salient activities in the enactment of IL among the PhD students in Nordcode.

Activities

The enactment of IL among the participants is associated with a range of different activities, that each contributes to the shaping of IL in the investigated practice. Several of the activities that appear as crucial for the enactment of IL are associated with collective action, of people doing things together. It is, for example, asserted that attending conferences is important because they provide opportunities for learning how "researchers reason […] and how networking works" (P1)[1]. In order to learn how to reason like a researcher, one needs to spend time with other researchers, listen to and interact with them, which can be done at conferences. But also to find out what conferences to attend, there is a need for networking and socializing, because:

> […] what really forms the ground for your decisions regarding what conferences to attend is information that you receive when you talk to people, "we usually go there" or "I was there last year and that conference is also visited by them […]" (P1).

From the above quote, it appears that there is a process of reproduction going on: the student receives advice from a colleague, which grounds his or her advice on the basis of someone else, who obviously is deemed credible and worth following and who has also been attending the conference in question. This is an observation that can also be traced to other prominent activities, namely those of writing and citing. It is generally asserted that much of the work carried out is conducted in "dialogue with those around you" (P8). For example, when you write "you are supposed to dutifully relate to what others have done before you" (P7). Even if it is not a matter of obligation, as expressed in the previous quote where the writer obviously feels obliged to cite, the activity of writing can still have a collective character. Following the discussions of others can be a matter of generating ideas and to get to know what to write about, as in the subsequent example where the student is discussing an e-mail list, which (s)he is subscribing to:

> If you go in there you can sometimes find a thread that can be winded up. I have found articles that way that have led me to full research questions, projects and so on (P2).

The idea of winding up a thread, as it is put in the excerpt above, corresponds with a picture that transpires from the empirical material, namely that the participants are engaged in an established, albeit elusive, tradition of writing and of doing research. To develop information literacy to a great extent seems to be a matter of subsuming under this tradition. At the same time, however, it can be asserted that this winding activity constitutes a great challenge to these particular students:

> I have difficulties pigeonholing myself, I have been jumping around a bit but if I would place myself somewhere it would be in some kind of design- or innovation research, which is characterized by being a mess [since there is] no common theoretical ground. People are borrowing stuff from one place or another, from marketing, from the behavioural sciences, from psychology, from sociology, from here and there, what is suitable for the moment (P3).

That the students are active in an interdisciplinary field of research and that this is seen as problematic, as expressed in the above quote, is a prominent theme in the empirical material.

Another key activity in the practice, which is related to that of writing, is to engage in discussions. Learning to become a researcher entails acting as one, which is something that needs to be exercised; the students are thus:

> […] supposed to practice being in academic discussions and challenge each other but not necessarily very formally, as may be the case in other conferences (P4).

Passages such as the one above, in which the need for opportunities to practice being a researcher is expressed, are often followed by assertions about the Nordcode network. A prominent feature in the empirical material is thus accounts of the Nordcode network as a place with a good and friendly atmosphere; a place which, for example, can be connected to the central activity of discussing:

> [The network has provided] a safety framework within which one has been allowed to try out one's research ideas. In that way one can get challenged within a frame of safety (P4).

Since the participants are dispersed over four countries and seven universities, there are for obvious reasons long stretches of time when they cannot engage in face-to-face discussions, but information seeking and orientation does not therefore come to a pause. For example, e-mail lists do also offer opportunities for discussion even if, most of the time, it seems to be a matter of peripheral participation:

> You have to attend to the research field, [even if] you can't go in to each discussion, […] you must look at subjects and see what discussions that are going on [Thereby] one can get an impression of what it is that is being discussed. So maybe it has influenced some of the themes in my thesis (P4).

Engaging in activities together with peers is obviously an important part of the enactment of IL among the PhD students in Nordcode. To participate in seminars and conferences, to discuss ones work and thereby become intellectually challenged seem to be crucial. It should also be noted that there are hardly any traces in the empirical material that indicate activities of extensive information seeking-activities in interaction with bibliographic databases.

Agency

The conceptualization of practices as happening or taking place implies the notion of agency being distributed over, for example, people, i.e. individuals and groups, and material objects. This is a standpoint that disputes the widespread conception of individuals being merely cognitive agents acting in accordance with rational choice (e.g. Shove *et al.*, 2012). Even though all of the participants in this study were recruited in their capacity of doctoral students, they are also, simultaneously, members of other practice communities, as can be seen in the following quote:

> You have a lot of stuff that you for one reason or another must read, you may take a course or you are reviewing a paper for a conference, or you comment on a colleague's paper, or you have students on an advanced level working on something that is near your own subject and they have found a lot of interesting stuff […] (P5).

The participant is talking about how (s)he frequently tends to bump into information as a result of being engaged in various interlinked activities in which agency clearly seems to be distributed over a range of actors: a teacher in a course, the editorial board of a conference, supervised students (in extension, also the students' study plan, which dictates what they are supposed to work on). Being capable of subsuming under this practice is part of the enactment of IL. Another aspect that can be related to that of agency has to do with the ways that the work of a PhD student is organized. It is fairly common among these students that they are part of research groups, which contribute to shaping the information practices of their participants:

> I have been forced to adapt both regarding the content of the research, what we do research on, which means that I search for another kind of information than I would have done if I had been working on my own, and regarding the conferences I attend and the way I write, so it is a matter of conformation [to the group], one could say (P1).

Apart from these specific instances, expressed through the above quotes, from which we learn that the students are caught up in bundles of activities where other people inevitably contribute to the enactment of IL, there are also instances of how material objects can, for example, coordinate and align activities. Even though it should not be argued that material objects are animated, they tend to interfere in practices, which is especially apparent in connection to breakdowns or when they limit opportunities of action in practice, like in the subsequent quote:

> I used to be a PhD student in [nn] and then I changed to [nn] university last year but, however, I live in [nn] so my office is 150 kilometres away, two hours train ride, so I go to [nn] once or twice a week, some [weeks] I don't go at all but usually like once a week, otherwise I work from home […] (P9).

Seen against the previous section, in which it was concluded that participation with peers constitute an important element of the enactment of IL, the above quote clearly illustrates how the location, and the geographical condition in which the student act, interferes and thereby contributes to regulate the information practice.

Materiality

Even though all of the guiding principles that have steered the analysis should be seen as closely interrelated, the principles of agency and materiality are specifically closely united since material objects are perceived as agential. In the subsequent result presentation, however, the intention is to highlight the prominent position of material objects regardless of their potential degree of agency. In the empirical material, materiality is to a great extent connected to locations and places, for example, as in the following quote:

> As a PhD student you take method courses, courses in theory of science and philosophy, you attend seminars where people talk about research, but there is no one who tells you that if you want to become a successful researcher, you need to spend time in the copying-machine room and drink coffee there (P1).

What is stated in the quote actually highlights two important material aspects in the enactment of IL. One is that the practice of being a PhD student is infused with breaks during which one is expected to engage in the activity of coffee drinking. Even though it is not a particularly significant observation, the instance of coffee breaks functions well as an illustration of something that is done in practice without much reflection. From an analytical perspective, it can, however, be stated that the copying- machine functions as a coordinator of activities which is of particular importance in a community of practice, such as the one explored here, where the activity of discussing is deemed important. The other observation that can be made with reference to the preceding quote is that in the workplace where this particular student is, the copying-machine room seems to be functioning as a coordinating object that needs to be taken into consideration when exploring the enactment of IL.

This line of reasoning, where materiality is in focus, can also be related to statements about the role of Nordcode, the students' research network:

> I have happened to end up in a specific place, a geographical location, but the knowledge does not necessarily reside here, so then it is of great importance to find these kinds of fora [like Nordcode] (P1).

Even though Nordcode constitutes a network dispersed over a number of countries and universities, in the eye of the students it seems to represent a place, which is compared to their respective workplaces, and, which sometimes, as in the above example, are seen as lacking elements that are important for the enactment of IL.

The material surroundings are providing opportunities for information seeking in various ways, for example, through arrangements such as digital and traditional libraries, through which students make use of services such as the opportunity to subscribe to digitally delivered tables of contents. There are also examples of how mobile devices contribute to extend the opportunities for information seeking and use:

> You always have it with you somehow […] wherever I am, especially when you have a smart phone, then you can read through that if there is something that you are really curious about (P6).

The opportunity highlighted in the above excerpt may also, by some, be seen as a problem since it can cause information overload. However, irrespective of it being seen as a problem or an opportunity, in this example, the phone clearly appears as an object that contributes to shape practice.

In the empirical material, the much discussed issue of attending to one's field and its literature can also be related to the issue of materiality. In the subsequent quote, the participant is talking about the ways in which (s)he monitor some of the relevant journals in the field:

> It is actually on a totally random basis that I go in there [in the bibliographic database] to look at articles, and if I remember to do that, it's mainly because someone has mentioned that there is a new and good article there; but it is mainly these four [journals]. They are important to me because they are considered important here; it might be so that I miss more relevant journals since they don't belong to the walls of this building in which I am acting […] (P2).

The quote reflects the issue of being part of a community of practice and how this community is based in a specific place. Journals are seen as belonging "to the walls of this building."

In summary, regarding materiality, it can be stated that the ability to handle tools for information seeking and use and to be capable of assessing and reading the material surroundings, so that it becomes possible to discern where the important places for discussions and dialogue are located, are salient features of the enactment of IL.

Power

Practices are always in a state of tension regarding what can be done and who can do what. In this respect practices can be perceived as constellations of power that allow people to do certain things but not others. As indicated in the previous results sections, the enactment of IL is a matter of the involved people's ability to cope with the communicative means, objects, and processes that mediate participation with others. The students are enmeshed in the specific governmentality that characterizes the academic practice in which they are active, which, for example, means that at the same time as conferences are perceived as important learning opportunities, due to a lack of funding they are not always possible to attend. Economic conditions contribute, in different ways, to the shaping of what can be done in practice. Economy, in turn, also somewhat dictates the activities of publishing, as can be seen in the following quote:

> […] there is a lot of discussion about rating the journals and that would at least affect you as a researcher in the future, if you want to get funding you have to get published in journals with good ratings (P7).

In the practice explored here, there are recurrent statements, which refer to the interdisciplinary nature of the field, about the difficulties in finding journals to publish in that match the students' research interests. The above excerpt indicates that this difficulty is not only a matter of matching journal profile with research interests, but also of finding the acclaimed and high-ranked journals.

Another instance that can be related to power has to do with what can be described as the prevailing hegemonic academic discourse in practice. In the empirical material, different strategies for somehow escaping this are ventilated. The participant in the subsequent quote gives an account of how (s)he has formed a group of PhD students in her workplace in which research work is discussed:

> [Y]ou don't have to say exactly the right things or be afraid of appearing as if you are ignorant or receive critique for little seeds of thought that actually can grow if you dare give it a chance. If you know where you have each other you can speak freely and arouse associations. It doesn't work otherwise (P8).

The mentioning of the importance of being able to speak freely can also be associated with statements about hierarchical orders. In the following quote, the participant is reasoning about the Nordcode network and the supportive atmosphere that (s)he says characterizes the network:

> You feel that someone cares about what you do and wants to help in improving your work, and it is not about hierarchies, because the academic world is very hierarchical, and you are not afraid of asking silly questions or to explore your wildest ideas (P2).

The excerpt indicates a clash between an expressed need of exploring ideas and the constricting hierarchical "academic world". The Nordcode network is generally perceived as providing good opportunities for fruitful discussions about research. There are several statements that aspire to explain why this is, of which some can be seen as touching upon aspects of power. Once again we are returning to the issue of economy (and ownership), but also to the issue of politics:

> There hasn't been an owner of the network and most of the people that are engaged in the steering group do their work on an idealistic basis so there is no politics in it (P3).

The notion of "an idealistic basis" is reverberating throughout the empirical material in connection to statements about Nordcode, which appears as "a safety framework" (P4) in which people take care of each other with no hidden agenda. The more general notion of "the university" in the meaning of academia, on the other hand, comes out in a different light:

> Somewhat stubborn I still try to maintain this image of the university and its function and purpose according to which information is free and the open conversation is going on, and the critical discussion, and the specific function in society, as a deliberating power […] but I have understood that to a great extent it does not work like that but I refuse to become an opportunist even though I understand that a lot is about individual advancement (P1).

The above statement emphasizes the students' need of developing an understanding for the ways in which one needs to act in order to not only navigate and manoeuvre but also to withstand what is perceived as the individualistic and two-faced world of academia.

In sum, it can be argued that the governmentality characterizing the explored practices of the interdisciplinary PhD students include aspects of power, which concern economy, hierarchical order, hidden agendas, and a hegemonic discourse.

Knowledge

The issue of knowledge, which in this paper is conceived as being able to act together with others and – in general terms – knowing what to do, is permeating all parts of the empirical material. The matter of knowing is also intrinsic to information literacy, but whereas the issue of knowledge in the previous result sections were relegated to the background, this section aspires to analytically foreground the question of what it means to be knowledgeable with regards to information in the investigated practice of interdisciplinary PhD students.

Even though the following quote is short, it encapsulates a number of aspects of what is needed to know as a PhD student:

> I was absolutely new as a PhD student, so I didn't know who to talk to, I didn't know what was done before, which you can find out if you know what you are looking for, but you don't know that in the beginning (P1).

At the very beginning of the study program, the student in the above excerpt had not yet developed the ability to orientate in the research practice and the connected literature, and since (s)he did not know what (s)he was expected to know, nor could (s)he figure out who to ask for assistance. Expressions of this sense of not really knowing what one is supposed to do and concentrate on is prevailing in the empirical material, also among those participants who have come further into the study program:

> Sometimes I can long for a context where you do research on the third caudal vertebra of a rat, together with the greatest rat tail-professor […] then you know what you are supposed to do and you know what material and what information that is relevant, what you are supposed to delve into and what you can put aside (P2).

The ideal scenario appearing in the above quote stands in stark contrast to the dominating view in the empirical material of the field that the students are active in:

> [Design research] is very fractioned, divided into a number of different schools and orientations and it feels as if it is torn somehow […] in its ambition to find a common orientation, a common idea about what it is supposed to be about and what is important and so on (P10).

This fragmented character of the field, which brings about challenges such as a scattered literature, is not only a difficulty in itself. It also gives rise to specific demands regarding the positioning of ones work:

> There was an implicit demand […] to frame the thesis in the "right" discipline, you know, this is how we do it, you know, like a template […] and that this [framing] becomes more important than the actual research question (P8).

In a field that is so heterogeneous and where there are a multitude of possible research topics and information sources, there seems to be a need for developed strategies regarding how to assess and evaluate information and people. A prominent feature in such strategies is to develop the competency of recognizing cognitive authorities (cf. Wilson, 1983), which is a strenuous task that takes time to learn:

> It takes long, well, in the beginning it felt as if one was citing in all directions and it is actually no one who has told me that you should perhaps stay away from this or that […] I have had to do that work myself (P10).

Even though it does not appear in the above quote how, exactly, this strategy, or competence, is learnt, there are passages in the empirical material which indicate how this can happen:

> It is kind of an unconscious process somehow, you make a lot of choices, but it could, for example, be that if someone is extremely quantitative in his or her approach, then it is far away, I mean, then it is probably very difficult to integrate what this person has to say in one's own dissertation […] (P10).

Despite the fact that this competence of evaluation is presented as an unconscious process, we do get a hint toward the middle of the above quote where the student implies that the process of evaluation is related to, for example, the methodological approach applied in the work which is to be evaluated. Other examples appearing in the empirical material regards establishing "a common vocabulary" (P1) with the text under evaluation, but such a stance highlights yet another aspect of what one needs to know, namely to develop this vocabulary, which is not an obvious task: "just through selecting a specific term you somehow chose your orientation, which is a challenge" (P10). Even though a great deal of knowledge, according to the statements in the empirical material, seems to be developed unconsciously, there are also instances where the tools that are used in connection with, for example, evaluation of information are highlighted. One such tool is the library: "Somehow it feels a bit more comfortable when you find information through the library [because it adds to the credibility]" (P6). Another tool is provided through the system of citations: "someone who has written a lot and who is much cited […] it simply feels credible, you sense that they know what they are talking about" (P6).

To restate briefly, the central features regarding the knowledge needed in relation to information concern navigating a fragmented research field and assessing its cognitive authorities. The issue of positioning oneself, which is done, for example, through applying a suitable vocabulary and tuning into the right conceptual discourse, are also important aspects of the knowledge needed for the enactment of IL in the investigated practice.

Concluding discussion

With reference to the results, it can be claimed that the enactment of IL in the practice under study is a collectively sustained project that unfolds in dialogue with others and trough interaction with material objects. More specifically, this project comprises, for example, activities such as participation in seminars and conferences, which offer opportunities for discussions about work in progress. The enactment is, moreover, situated in socio-material practices shaped by historically developed conceptions of what it means to be a design researcher; conceptions that the students are supposed to learn how to "wind up". Involved in this project, the students face challenges in relation to positioning themselves in a fragmented interdisciplinary field, and in relation to a hegemonic academic discourse as well as hidden agendas in the university system.

To explicitly address the research question about how IL is enacted in the practice under study, it can be stated that the PhD students in this interdisciplinary network seem to be more or less constantly engaged in the enactment of IL. This learning in practice takes place in dialogue with others who can be both co-located (e.g. fellow students, supervisors, and conference attendees) and distantly located, for example, contributors to e-mail lists and the literature. By answering the first research question, the second question is also partly addressed, namely regarding in what ways IL relates to people and material objects. The enactment of IL occurs through discussions about work in progress, through processes of evaluation and assessment of texts and authors, and through mundane everyday activities such as participating in meetings, which offer insights into how to navigate, in the broadest sense, the world of academia. A crucial part of learning IL, which in practice is inseparable from interaction with others, is to pay attention to physical surroundings and material objects. Knowing IL in practice hence entails, for example, the ability to being in the right place and the use of suitable tools for information seeking and use.

For prospective PhD students in interdisciplinary fields as well as for their supervisors, and also for librarians who are supposed to serve these groups, the conceptualization of IL as it emerges in the present study is worth taking into consideration. The results at hand deviate from previous research, which indicate that students tend to begin their research on the web and primarily consult supervisors before other people (e.g. Catalano, 2013). Being a student in a field such as design, where the literature is scattered (see Chubin, 1976) and where research subjects are dispersed (see Crane, 1972), enjoins a multitude of ways in which IL can be enacted. This is an assertion that supports Bates (1996) conclusion that depending on the degree of bibliographic coherence in a field, "there may be dramatic differences in the kinds of strategies needed" (p. 158) for the enactment of IL. On the basis of the present study, it is reasonable to assume that since the students are active in an interdisciplinary field, their information seeking practices are shaped in such a way, that they concentrate on obtaining information through peers rather than through formal interaction with bibliographic databases.

In their review of different conceptualizations of IL, Limberg *et al.* (2012) concluded that phenomenography, socio-cultural theory and discourse analysis all conceptualize IL as "embedded in and shaped by as well as shaping the context in which it is embedded" (p. 93). The study at hand, focussing on activities, power, materiality, agency, and knowledge in concert, does not dispute such a view on IL, but through its practice-based approach, an extended and deepened understanding of the enactment of IL has been accomplished.

Note

1. All quotes are reported anonymously and the participants are numbered from P1 to P10.

References

ACRL (2015), "Association of college and research libraries", Framework for Information Literacy for Higher Education, available at: www.ala.org/acrl/standards/ilframework (accessed October 20, 2015).

Bærenholdt, J.O., Büscher, M., Damm Scheuer, J. and Simonsen, J. (Eds) (2010), "Perspectives on design research", *Design Research: Synergies from Interdisciplinary Perspectives*, Routledge, New York, NY, pp. 1-15.

Bandura, A. (1986), *Social Foundations of Thought and Action: A Social Cognitive Theory*, Prentice-Hall, Englewood Cliffs, NJ.

Barad, K.M. (2003), "Posthumanist performativity: toward an understanding of how matter comes to matter", *Signs: Journal of Women and Culture in Society*, Vol. 28 No. 3, pp. 801-831.

Bates, M. (1996), "Learning about the information seeking of interdisciplinary scholars and students", *Library Trends*, Vol. 45 No. 2, pp. 155-164.

Bazerman, C. (1997), "Discursively structured activities", *Mind, Culture, and Activity*, Vol. 4 No. 4, pp. 296-308.

Boradkar, P. (2010), "Design as problem solving", in Frodeman, R. (Ed.), *The Oxford Handbook of Interdisciplinarity*, Oxford University Press, Oxford, pp. 273-287.

Bøyum, I. and Aabø, S. (2015), "The information practices of business PhD students", *New Library World*, Vol. 116 Nos 3-4, pp. 187-200.

Brown, C.M. (2005), "Where do molecular biology graduate students find information?", *Science and Technology Libraries*, Vol. 25 No. 3, pp. 89-104.

Bruce, C. (1997), *The Seven Faces of Information Literacy*, Auslib Press, Adelaide.

Buchanan, R. (2001), "Design research and the new learning", *Design Issues*, Vol. 17 No. 4, pp. 3-23.

Carpenter, J. (2012), "Researchers of tomorrow: the research behaviour of generation Y doctoral students", *Information Services & Use*, Vol. 32 Nos 1-2, pp. 3-17.

Case, D.O. (2012), *Looking for Information: A Survey of Research on Information Seeking, Needs, and Behavior*, 3rd ed., Emerald, Bingley.

Catalano, A. (2013), "Patterns of graduate students' information seeking behaviour: a meta-synthesis of the literature", *Journal of Documentation*, Vol. 69 No. 2, pp. 243-274.

Chakrabarti, A. (2011), "Towards a taxonomy of design research areas", in Birhofer, H. (Ed.), *The Future of Design Methodology*, Springer, Dordrecht, pp. 249-259.

Chubin, D.E. (1976), "The conceptualization of scientific specialties", *The Sociological Quarterly*, Vol. 17 No. 4, pp. 448-476.

Corbin, J. and Strauss, A. (2008), *Basics of Qualitative Research: Techniques and Procedures for Developing Grounded Theory*, 3rd ed., SAGE Publications, Thousand Oaks, CA.

Cox, A. (2013), "Information in social practice: a practice approach to understanding information activities in personal photography", *Journal of Information Science*, Vol. 39 No. 1, pp. 61-72.

Crane, D. (1972), *Invisible Colleges: Diffusion of Knowledge in Scientific Communities*, The University of Chicago Press, Chicago, IL and London.

Cross, N. (2007[2006]), *Designerly Ways of Knowing*, Birkhäuser, Basel.

Delgadillo, R. and Lynch, B.P. (1999), "Future historians: their quest for information", *College and Research Libraries*, Vol. 60 No. 3, pp. 245-259.

Eckerdal, J.R. (2011), "To jointly negotiate a personal decision: a qualitative study on information literacy practices in midwifery counselling about contraceptives at youth centres in Southern Sweden", *Information Research*, Vol. 16 No. 1, available at: http://InformationR.net/ir/16-1/paper466.html (accessed May 15, 2015).

Feldman, M.S. and Orlikowski, W.J. (2011), "Theorizing practice and practicing theory", *Organization Science*, Vol. 22 No. 5, pp. 1240-1253.

Fleming-May, R. and Yuro, L. (2009), "From student to scholar: the academic library and social sciences PhD students' transformation", *Portal: Libraries and the Academy*, Vol. 9 No. 2, pp. 199-221.

Foucault, M. (1991), "Governmentality", in Foucault, M., Burchell, G., Gordon, C. and Miller, P. (Eds), *The Foucault Effect: Studies in Governmentality: With Two Lectures by and an Interview with Michel Foucault*, University of Chicago Press, Chicago, IL, pp. 87-104.

Francke, H., Sundin, O. and Limberg, L. (2011), "Debating credibility: the shaping of information literacies in upper secondary school", *Journal of Documentation*, Vol. 67 No. 4, pp. 675-694.

Friedman, K. (2003), "Theory construction in design research: criteria: approaches, and methods", *Design Studies*, Vol. 24 No. 6, pp. 507-522.

Frodeman, R. (2010), "Introduction", in Frodeman, R. (Ed.), *The Oxford Handbook of Interdisciplinarity*, Oxford University Press, Oxford, pp. xxiv-xxxviii.

George, C., Bright, A., Hurlbert, T., Linke, E.C. St., Clair, G. and Stein, J. (2006), "Scholarly use of information: graduate students' information seeking behaviour", *Information Research*, Vol. 11 No. 4, available at: http://InformationR.net/ir/11-4/paper272.html (accessed May 15, 2015).

Gherardi, S. (2006), *Organizational Knowledge: The Texture of Workplace Learning*, Blackwell, Malden, MA.

Gherardi, S. (2009), "Introduction: the critical power of the 'practice lens'", *Management Learning*, Vol. 40 No. 2, pp. 115-128.

Gullbekk, E., Rullestad, T., Torras, I. and Calvo, M.-C. (2013), *PhD Candidates and the Research Process: The Library's Contribution*, Universitetsbiblioteket i Oslo, Oslo.

Haider, J. (2012), "Interrupting practices that want to matter: the making, shaping and reproduction of environmental information online", *Journal of Documentation*, Vol. 68 No. 5, pp. 639-658.

Hjørland, B. and Albrechtsen, H. (1995), "Toward a new horizon in information science: domain-analysis", *Journal of the American Society for Information Science*, Vol. 46 No. 6, pp. 400-425.

Huizing, A. and Cavanagh, M. (2011), "Planting contemporary practice theory in the garden of information science", *Information Research*, Vol. 16 No. 4, available at: www.informationr.net/ir/16-4/paper497.html (accessed October 20, 2015).

Jamali, H.R. and Nicholas, D. (2010), "Interdisciplinarity and the information-seeking behaviour of scientists", *Information Processing & Management*, Vol. 46 No. 2, pp. 233-243.

Kapitzke, C. (2003), "Information literacy: a positivist epistemology and a politics of outformation", *Educational Theory*, Vol. 53 No. 1, pp. 37-53.

Klein, J.T. (2010), "A taxonomy of interdisciplinarity", in Frodeman, R. (Ed.), *The Oxford Handbook of Interdisciplinarity*, Oxford University Press, Oxford, pp. 15-30.

Knorr Cetina, K. (1997), "Sociality with objects: social relations in postsocial knowledge societies", *Theory, Culture & Society*, Vol. 14 No. 4, pp. 1-30.

Kvale, S. and Brinkmann, S. (2009), *InterViews: Learning the Craft of Qualitative Research Interviewing*, 2nd. ed., Sage Publications, Los Angeles, CA.

Larivière, V., Sugimoto, C.R. and Bergeron, P. (2013), "In their own image? A comparison of doctoral students' and faculty members' referencing behaviour", *Journal of the American Society for Information Science and Technology*, Vol. 64 No. 5, pp. 1045-1054.

Lee, J., Anderson, A. and Burnett, G. (2014), "Peer relationships and information sharing between LIS doctoral students", *Proceedings of the 77th ASIS&T Annual Meeting*, Vol. 51 No. 1, pp. 1-4.

Limberg, L. (1999), "Experiencing information seeking and learning: a study of the interaction between two phenomena", *Information Research*, Vol. 5 No. 1, available at: http://informationr.net/ir/5-1/paper68.html (accessed May 15, 2015).

Limberg, L., Sundin, O. and Talja, S. (2012), "Three theoretical perspectives on information literacy", *Human IT*, Vol. 11 No. 2, pp. 93-130.

Lloyd, A. (2007), "Learning to put out the red stuff: becoming information literate through discursive practice", *Library Quarterly*, Vol. 77 No. 2, pp. 181-198.

Lloyd, A. (2010), "Corporeality and practice theory: exploring emerging research agendas for information literacy", *Information Research*, Vol. 15 No. 3, available at: www.informationr.net/ir/15-3/colis7/colis704.html (accessed May 15, 2015).

Lloyd, A. (2011), "Trapped between a rock and a hard place: what counts as information literacy in the workplace and how is it conceptualized?", *Library Trends*, Vol. 60 No. 2, pp. 277-296.

Lloyd, A., Kennan, M., Thompson, K. and Qayyum, A. (2013), "Connecting with new information landscapes: information practices of refugees", *Journal of Documentation*, Vol. 69 No. 1, pp. 121-144.

Mehrad, J. and Rahimi, F. (2009), "Online search skills of Shiraz University post graduate students: a survey", *International Journal of Information Science and Technology*, Vol. 7 No. 1, pp. 1-13.

Nicolini, D. (2012), *Practice Theory, Work, and Organization: An Introduction*, Oxford University Press, Oxford.

O'Farrell, M. and Bates, J. (2009), "Student information behaviours during group projects: a study of US students in university college Dublin, Ireland", *Aslib Proceedings*, Vol. 61 No. 3, pp. 302-315.

Pawley, C. (2003), "Information literacy: a contradictory coupling", *Library Quarterly*, Vol. 73 No. 4, pp. 422-452.

Pilerot, O. (2014), *Design Researchers' Information Sharing: The Enactment of a Discipline*, Valfrid, Borås.

Pilerot, O. (n.d.), "Connections between research and practice in the information literacy narrative: a mapping of the literature and some propositions", *Journal of Librarianship and Information Science*. doi: 10.1177/0961000614559140.

Pilerot, O. and Limberg, L. (2011), "Information sharing as a means to reach collective understanding: a study of design scholars' information practices", *Journal of Documentation*, Vol. 67 No. 2, pp. 312-333.

Pilerot, O. and Lindberg, J. (2011), "The concept of information literacy in policy-making texts: an imperialistic project?", *Library Trends*, Vol. 60 No. 2, pp. 338-360.

Reckwitz, A. (2002), "Toward a theory of social practices: a development in culturalist theorizing", *European Journal of Social Theory*, Vol. 5 No. 2, pp. 243-263.

Research Information Network (2011), "The role of research supervisors in information literacy", available at: www.rin.ac.uk/our-work/researcher-development-and-skills/informationhandling-training-researchers/research-superv (accessed May 15, 2015).

Rivera, G. and Cox, A. (2014), "An evaluation of the practice based approach to understanding the adoption and use of information systems", *Journal of Documentation*, Vol. 70 No. 5, pp. 878-901.

Salter, L. and Hearn, A. (Eds) (1997), *Outside the Lines: Issues in Interdisciplinary Research*, McGill-Queen's University Press, Montreal.

Schatzki, T.R. (2002), *The Site of the Social: A Philosophical Account of the Constitution of Social Life and Change*, Pennsylvania State University Press, University Park, PA.

Schatzki, T.R. (2005), "Peripheral vision: the sites of organizations", *Organization Studies*, Vol. 26 No. 3, pp. 465-484.

Schatzki, T.R. (2012), "A primer on practices: theory and research", in Higgs, J. (Ed.), *Practice-Based Education: Perspectives and Strategies*, Sense Publishers, Rotterdam, pp. 13-26.

Schatzki, T.R., Knorr-Cetina, K. and Savigny, E.v. (Eds) (2001), *The Practice Turn in Contemporary Theory*, Routledge, London.

Shove, E., Pantzar, M. and Watson, M. (2012), *The Dynamics of Social Practice: Everyday Life and How it Changes*, SAGE Publications, Thousand Oaks, CA.

Steinerová, J. (2008), "Seeking relevance in academic information use", *Information Research*, Vol. 13 No. 4, available at: http://InformationR.net/ir/13-4/paper380.html (accessed May 15, 2015).

Suchman, L. (2005), "Affiliative objects", *Organization*, Vol. 12 No. 3, pp. 379-399.

Sugimoto, C.R. (2012), "Are you my mentor? Identifying mentors and their roles in LIS doctoral education", *Journal of Education for Library and Information Science*, Vol. 53 No. 1, pp. 2-19.

Sundin, O. (2009), "Negotiations on information-seeking expertise: a study of web-based tutorials for information literacy", *Journal of Documentation*, Vol. 64 No. 1, pp. 24-44.

Talja, S. (2010), "Jean Lave's practice theory", in Leckie, G.J., Given, L.M. and Buschman, J.E. (Eds), *Critical Theory for Library and Information Science: Exploring the Social from Across the Disciplines*, Libraries Unlimited, Westport, CT, pp. 205-220.

Talja, S. and Maula, H. (2003), "Reasons for the use and non-use of electronic journals and databases: a domain analytic study in four scholarly disciplines", *Journal of Documentation*, Vol. 59 No. 6, pp. 673-691.

Vezzosi, M. (2009), "Doctoral students' information behaviour: an exploratory study at the university of Parma (Italy)", *New Library World*, Vol. 110 Nos 1-2, pp. 65-80.

Wenger, E. (1998), *Communities of Practice: Learning, Meaning, and Identity*, Cambridge University Press, Cambridge.

Whitley, R. (2000), *The Intellectual and Social Organization of the Sciences*, 2nd ed., Oxford University Press, Oxford.

Whitworth, A. (2014), *Radical Information Literacy: Reclaiming the Political Heart of the IL Movement*, Chandos Publishing, London.

Wiliamson, K., Bernath, V., Wright, S. and Sullivan, J. (2007), "Research students in the electronic age: impacts of changing information behaviour on information literacy needs", *Communications in Information Literacy*, Vol. 1 No. 2, pp. 47-63, available at: www.comminfolit.org/index.php?journal=cil&page=article&op=viewArticle&path[]=Fall2007AR1&path[]=48 (accessed May 15, 2015).

Wilson, P. (1983), *Second-Hand Knowledge: An Inquiry into Cognitive Authority*, Greenwood Press, Westport, CT.

Yates, C., Stoodley, I., Partridge, H., Bruce, C., Cooper, H., Day, G. and Edwards, S.L. (2012), "Exploring health information use by older Australians within everyday life", *Library Trends*, Vol. 60 No. 3, pp. 460-478.

Zhang, Y. and Wildemuth, B.M. (2009), "Qualitative analysis of content", in Wildemuth, B. (Ed.), *Applications of Social Research Methods to Questions in Information and Library Science*, Libraries Unlimited, Westport, CT, pp. 308-319.

Corresponding author
Ola Pilerot can be contacted at: ola.pilerot@hb.se