Distance learning as a central issue for the learning and professionalization process of professeurs documentalistes: The French synthesis of transliteracy

Anne Cordier
Université de Rouen, France

Anne Lehmans
Université de Bordeaux, France

The initial and continuing academic programs for teacher librarians in France have to face major changes in their content and organization. A new social request for distance learning courses crosses a changing conceptual, epistemic and technological content that demands the implementation of adapted academic policies. The creation of distance learning curricula in universities is based on three factors:

- *A new perspective on information culture which includes cross-cultural and critical knowledge about information, media and computer science. This "transliteracy" dimension is congruent to the logic of distance learning.*
- *The emphasis in use and reflection on information and communication tools that are common to existing curricula and distance learning courses.*
- *The necessity of alternative training strategies for the universities which includes experimentation of information technologies as learning tools, objects and subjects.*

Introduction

France chose to create a specific function, the *Professeur-documentaliste* or teacher librarian, who has the academic and professional status of a teacher but does not teach a scholarly discipline. This special teacher has to master documentation techniques, information science and pedagogic skills. The *professeurs documentalistes* consider themselves teachers above all, being trained as such, and have had to create their own curriculum inside the school institution without any real program, regarding the importance of information literacy and culture at school. Until 2009, their training was delivered by the IUFM, (University institutes for school teachers training) over two years, the first year being dedicated to the competition exam with a program based on information and education science, and documentation techniques, the second year, for those who succeeded, to professionalization, part time in a school, part time at the university. Since 2009, the academic curriculum of all the teachers has changed in France. A master's degree is necessary, and the training is centered on academic, didactic and theoretical knowledge. The IUFM have been integrated into universities. This change has led many professionals to try to complete their curriculum when they do not own a master's degree, on one hand, and others to start working

before getting a master's degree. This has created a new demand for educational opportunities in distance learning, while the reform of French universities encourages them to broaden their offer.

Distance learning can be defined by the separation of teacher and learner in space and/or time, the use of media and communication tools, the self-control of learning pace and content by the learner (CDLP, 2011). It allows current students who cannot attend the courses or working professionals to pursue learning or training process. Without trying to define precisely distance learning here, we can notice that it can be considered by the institutional point of view, which depends on political and economic choices, and by the pedagogical point of view, which implies a reflection on the link between information system and teaching and training system. Distance learning, especially when using digital technologies (E-learning), relies on a complex "knowledge ecology" (Morandi, 2010) which mixes education *with* and education *on* information. Traditional distance learning using mail has existed for a long time in France by the CNED (National center for distance education) without innovating practices. E-learning offer in initial Master degree or continuing education programs is new and still quite rare among French universities for the *professeur documentalist's* curriculum. Very few of them offer real self-sufficient, web technologies based distance learning courses. According to Henri Isaac (2008), in a report *L'université numérique* (The Digital University) published in 2008 and commissioned by the Minister for Higher Education and Research, there is a digital gap in France which is due to systemic and human shortcomings. Since 2008, some progresses have been observed.

We propose to consider that distance learning can be a constructive opportunity into the training process of the professionals in information and school libraries. Our focus on the French case is not culturally self-centered but taken as an illustration of the relationship between knowledge on information (education on information) and distance learning (education with information). We assume that distance learning is largely based on information and communication technologies and processes, especially in the web-based teaching environments, which are the heart of nowadays *professeur documentaliste's* professional environment, knowledge and skills. We use research results and actual experiences in order to demonstrate the assessment that distance can be an asset in the professional learning and training process.

The paper is articulated around 3 propositions:
- The training course of the *professeur documentaliste* relies on an epistemic and conceptual framework based on transliteracy, a new perspective on information culture which includes cross-cultural and critical knowledge about information, media and computer science. This "trans" cognitive dimension is congruent to the techno-logic dimension of distance learning.
- The existing *professeur documentaliste*'s curriculum emphasizes use and reflection on information and communication tools that are common in distance learning courses.
- This crossing of needs and logics appeals the creation of new courses in universities as imperative goals and alternative strategies for the immediate future. Some universities have already started to work on distance learning courses which include the experimentation of information technologies as learning tools, objects and subjects. We will describe one of these experimentations.

Epistemological and conceptual framework for the *professeur documentaliste* training: the paradigm of transliteracy

The position of teacher librarians in France is quite complex, taking into account the fact that their function is at the crossroad of librarianship, documentation and teaching. In the same time, policies have recently pointed out the need for information literacy in the digital era, and the necessity for school to train pupils not only to information skills but also criticism and knowledge on information, media and digital technologies. The construction of a solid culture on information is overtaking the design of distance learning courses for *professeur documentalistes'* professionalization.

A new perspective for the information culture

The training of the *professeurs documentalistes* has to combine:
- reflection on the cognitive role of information into the learning process,
- ability to implement an adapted documentation policy in a school library,

- competency to manage information and knowledge into school.

Teaching objectives include:
- information literacy as competencies in:
  - using information for school needs,
  - books reading,
- media literacy, development of the critical skills necessary to become an active citizen in a democracy,
- cultural openness to art, literature and science,
- mastering of language and communication,
- use of information technologies.

Most of the master degree courses for school librarians are led by IUFM, which are centered on education, while some few universities have seized or rebuilt their academic offer outside, usually from an information science department.

Thereby, the founding culture of the *professeur documentaliste* is plural, hybrid and multidisciplinary, and his identity has been progressively built on a process based on self-constructed expertise on information (Gardiès, 2011), which had to meet political requirements and scientific constructions. A debate still exists among academic teams, Ministry of education and in the *Association des professeurs-documentalistes*, (the FADBEN: federation of associations of *professeurs documentalistes*) to precisely define the role and mission of the *professeur documentaliste*, to find a balance between the educational part and the technical part of its role, the identity of a school librarian or an information specialist and manager in the school.

Anyway, before being a teaching, training and mentoring object, information culture is a learning object for the future *professeur documentaliste*, who has to become expert in information as knowledge and as techniques. Along their academic curricula, students in Master degree programs have to face learning situations using information and communication skills. In this process, the internet has switched from a broadcasting media to a commutation media, giving a central importance to communication (Delamotte, 2012). Students have to decenter themselves, to be able to analyze and deconstruct their own practices and reception to think other people's uses, beliefs, discourses, intentions and behaviors. The transliteracy paradigm is a proper framework to connect the information carrier (the text) and the existing, potential or imagined receptor. Here is why transliteracy, in its first American and English sense, is *the ability to read, write and interact across a range of platforms, tools and media from signing and orality through handwriting, print, TV, radio and films, to digital social networks* (Thomas, 2007). It is focused on the universe of reading through the "big bang" of the web with new media, materials, sensitive experience, social organizations, cognitive operation and formal characteristics (Liu, 2012). Transliteracy is wider than information literacy which was defined by the American library association as *(the ability) to recognize when information is needed and (...) to locate, evaluate, and use effectively the needed information* (ALA, 1989). However, in France, transliteracy has been changed into an epistemic and conceptual framework more than a pragmatic reflection on competencies, abilities and skills required to deal with information in the digital era (INA, 2011). Compared to Jenkins' work, for example, the focus is made on conceptual questions and their transformation into educational goals. The learner has to master not only skills, but also critical knowledge on information providing him with the power to understand, criticize and choose to use or not information. Transliteracy articulates three fields: media, computer, and information-documentation. The Limin'R project (Littératies Informatique, Médias, Information –Recherche) for example, directed by Divina Frau-Meigs (Sorbonne Nouvelle), Éric Bruillard (ENS Cachan) and Éric Delamotte (Université de Rouen) is working on the definition of an integrated approach to the culture of information through the use of common measuring tools, concepts, and cartography. The ISCC-CNRS Trans-I project (Translittéracie informationnelle, coordinated by Vincent Liquète, IMS-Université Bordeaux 4-IUFM d'Aquitaine) also intends to define a new "grammar of information" through the observation of professional situations. According to Vincent Liquète (2011), the "trans" prefix means in the same time transversal (across different fields of knowledge), and transformation, from uses and practices to knowledge.

A « trans » perspective which fits the logic of distance learning

This crossing perspective is particularly adequate to the *professeur documentaliste* needs which are not focused on a main discipline or object, as we already noticed. It is also useful to understand the distance learning process, based on the transformation of information into knowledge for an autonomous learner. Vincent Liquète, in a recent work, modelizes the construction of professional information culture taking into account three levels: the individual level of the actor and his information practices and representations, the community level of social interactions between people and groups, and the ecological level of performative interaction between information environment and individual activity. This model emphasizes the interdependence of information systems, social exchanges and individual information culture, especially in the education and knowledge building oriented systems. The technological aspects of these systems cannot work without people who have not only the ability but also the desire and understanding to use them, interacting in social groups where this use is shared. In that sense, the professional training of information specialists has to build this open information culture. Furthermore, transliteracy distinguishes three levels: the semiotic/language level (denominating media and information objects), the technological/media level (making information efficient through techniques and rewriting), and the social/enunciative level (understanding the information exchange) (Liquète, 2011).

Distance learning requires the building and the use of a personal knowledge management system aiding to find, select, organize, communicate information through activities such as problem solving, learning, project planning, and decision making in order to build knowledge and professional skills (Gupta et al., 2000). Knowledge Management theories demonstrate that knowledge management systems relevance depend on technical, social and individual factors. Matthew Jelavic (2011) modelizes the Knowledge Management Epistemological Synthesis drawing a line between cognitivist epistemology based on technical functionalism, connectionist epistemology based on social relations and autopoietic epistemology based on individual philosophy and infoculture. In this model, *three layers of interaction are defined : (1) infrastructure: hardware/software that enables communications, Socio-Technical Knowledge Management and Epistemological Paradigms between nodes or members of the network, (2) infostructure: formal rules governing the exchange between actors in the network through metaphors and common language, and (3) infoculture: background knowledge, embedded in social relations surrounding work group processes, that defines the cultural constraints on knowledge and information sharing. These three layers of interaction are analogous to the three epistemological paradigms of (1) cognitivism, (2) connectionism and, (3) autopoiesis, developed by Marr et al. (2003).*

Distance learning systems are based on sharing and experiencing in order to develop competencies as abilities to accomodate to new situations with non-stereotyped and non-negotiated means (Rey et al., 2003). They demand the ability to use, analyze and understand the infrastructure, infostructure and infoculture. Transliteracy competencies are central in this process, giving learners the tools for: Information understanding (attitudes, values, perceptions), Information knowledge, Information application and Information potential (Yoon, 2008). Information potential, the ability to quantitatively and qualitatively increase the individual skills, seems to be most important in a proactive consideration of learning process, underlying the individual's adaptability to forthcoming information and digital environments. Using intellectual technologies, distance learning encourages learners to organize their social exchanges and manage their information and thought. Content dissemination induces information sharing, collaborative construction, use of cognitive competencies: decentration, reflexivity, understanding of communication intentions.

Distance learning tools enhancing professional skills: creating an environment based on collective construction of learning, and proactive personal involvement

Some existing academic practices that we have observed or experienced already use distance learning tools in order to develop specific knowledge and skills about information using participation, networking and creation.

Information and collaborative construction in controlled E-learning environments

Collaborative work is at the heart of the professional practices of the *professeurs documentalistes*. Their pedagogic and technical action is almost always linked to that of other teachers or professionals. In that sense, their training is based on collaboration among students. Wenger (1998) shows that community of practice allows development of professional skills and innovation. In Bordeaux IUFM, we have tried to enhance collaborative learning practices through the use of several tools. We have evaluated the effect of these practices through a longitudinal study over 5 years. We have observed two types of students: students who are engaged into a master degree whose learning process is largely based on face to face pedagogy but who have to make long term stays in professional environments and get used to distance learning technologies, and students who are engaged in a continuing training, who work and cannot spend a long time in face to face interactions. We have evaluated the number and quality of interactions and common works. Common works usually consist in creating teaching tools and training sequences for pupils in order for them to become information literate.

For both types of students, a community of learning appears when they are demanded to use a shared repertoire through a virtual office where teacher and learners share documents, edition and communications tools, making the training process hybrid. The aim of the community is not only to succeed in finding solutions to professional problems, but also to build a corpus of common academic knowledge on information. Hugues Choplin (2007) distinguishes 4 types of collectives depending on their degree of collaboration and community of goals: network, support or learning network, community of practice, learning community. According to him, professionalization and innovation are central in the learning community which is creating a legitimation process. In our case, the students who have been using distance learning tools at the very beginning of their curriculum, even not engaged in a distance learning program, are used to cooperate in collaborative groups, either on small projects demanding short time collaboration or on a long term learning construction project based on a long time cooperation and the practice of sharing information and working together. For example, when they have been separated in different stays, and go back to university, they are demanded to share information and experience, and build a cartography of good practices, imagine research projects…They have to reach a consensus on what good practices are, even if they do not meet very long. This consensus relies on their ability to describe practices in shared information spaces and to discuss them, in order to build efficient collective learning tools and innovation. Doing so, they can share their experiences in a short time, and do not have to experiment themselves all the situations they will be engaged in during their future professional life. They can become innovative in the way they find responses to professional problems together, searching reliable information by themselves and not only under the direction of the teacher. Innovation here is based on collaboration in distance learning. The pedagogic action of the professor is multiple: not only transmission, but also animation and tutorship.

Information sharing and knowledge construction through non academic social networks

Another example of collaboration is the use of social networks to search and share information among students. Digital social network have the advantage to open the community to the outside world. This advantage is also a risk because the teachers do not master communication actors and processes. The study that we made in Bordeaux on the use of Twitter by first year of master's degree students shows that digital social networks, when used and analyzed by the students, tend to improve their motivation and skills for information scanning, monitoring and sharing. The use of web 2.0 technologies and networks combined with metacognitive tools such as mind-mapping make creativity and connectivity useful supports for the learning process of academic knowledge into the field of information science. A strategic sharing process takes place into the community of knowledge which is supported by the project. When they enter the master, these students are not experts in information retrieval and come from different curricula. They have to build skills and knowledge in information, using different tools designed for researching and disseminating information: curation (Netvibes, Pearltrees, Scoop-it), social bookmarking (Delicious), communication (Twitter, blog)...

　　　We have tried to evaluate the way which students appropriate and assimilate abilities and cognitive methods for building knowledge on information observing their behavior over two years, from the creation of Twitter accounts to the creation of a blog specialized in information and documentation. The inquiry shows that networking experience improves the ability to find, collect, analyze, understand and manage information. Students use social networks to search, evaluate and share information on specific topics for their thesis. They are not only diffusers but also managers and creators of knowledge. We observe a significant progress in the quality of their production. Their blog improves their writing and communicating skills, making them behave as professionals. For the students, we can value a link between effective use of social networks, quality of cooperation and knowledge construction. For the professors, the supervision work is more intensive than in traditional courses and the exchanges are more creative with students.

These examples show that a proactive, collaborative and engaged training and working environment is efficient, and adapted at the same time to adults who have no other choice than distance learning and usual students who are more adapted to learning options that are critical, collaborative, creative, and future-oriented. These learning situations use language (reading, writing), interaction, experimentation and reflections. The combination of these elements is necessary to build an effective learning ecosystem.

The encounter of a new demand for distance learning and existing pedagogic practices as a framework for a creative professionalization process for *professeurs documentalistes*

A new demand for distance learning and existing practices may shape an interesting framework for the forthcoming academic curricula for school librarians, using distance as a mediating process and allowing students to endorse the cultural, educational and societal roles of librarians and information professionals.

Identification of a knowledge reference framework based on transliteracy and collaboration

We saw that transliteracy is a central concept to conceive the scientific and technological content of the training of *professeurs documentalistes.* This content has to be crossed with access processes. It is based on knowledge on information, communication, computer and media. Vincent Liquète distinguishes 3 types of knowledge: technical-operational, situated and documentary. Technical operational knowledge on information supposes fluency in the use of tools (documentary silos, learning platforms, virtual offices...) but also reflection on their economic, political, ideological, legal, technical and even scientific substratum. Situated knowledge on information supposes ability to use information in a pedagogic relationship and capacity to analyze the way they format the representation of reality, on a semiotic and ergonomic sense (creation of lessons for pupils, communication products, multimedia learning objects...). Documentary knowledge supposes capacity to implement a "pedagogy of resource" and to analyze the documents with a critical eye

which is largely based on a creative and editing process (retrieving, organizing, indexing, archiving).

These types of knowledge can be considered as complete when the learner has drawn the path between tacit knowledge (based on sense, experience, intuition, implicit rules...) and explicit knowledge which has a "universal character" (Nonaka, Von Krogh, 2009). This conversion from tacit to explicit knowledge is socially built through interactions with teachers, other learners, and possibly outsiders. Interactions are facilitated either by real meetings into classes, or by the use of controlled artifacts which allow designed communication such as virtual office, forums, visio-conferences or distance learning platforms, or by the use of social networks through web 2.0 tools, as we saw. We assume that distance learning combined with the necessity to build knowledge on information may facilitate the paradigmatic change that Paavola and Hakkarainen (2009) point out from individual subject to learning community to the upper level of collaborative knowledge building through the "authentic use of objects" in a trialogical process. Distance learning creates the opportunity to formalize the conversion of knowledge on information through interactions because it has integrated several mutations pointed out by Jacques Perriault (2007): the integration of teachers and learners into an information system, the production of knowledge by the learner, the use of communication devices, the occurrence of new competencies among which cognitive competencies, multi-tasking, digital literacy, normalization competency. Jacques Perriault underlines the growing impact of organization and management in this changing learning environment.

Distance training as a mediating process to build

Distance learning changes the pedagogic relation and learning process and can be considered as a chance to grasp for the training of *professeurs documentalistes*. Nonetheless, existing studies have shown that in the case of hybrid devices, distance learning tools are less used, less efficient and less appreciated by the learners than real meetings for the analysis of practices workshops or classical courses. Cécile Gardiès and Jean-François Marcel (2012, forthcoming), who have observed the knowledge sharing process into the organization of the professionalization for *professeurs documentalistes* specialized in agriculture education, show that distance learning tools are not used to build didactic knowledge on professional tasks, but more useful to build professional identity. Our own observation of students in Bordeaux led us to conclude that distance learning tools as well as informal social networks may be useful for knowledge sharing but at the strict condition that the tools are appropriated by the learners and collectively given meaning by the group through deep social interactions which are facilitated by learning objects creation projects. For Geneviève Jacquinot-Delaunay (2010), distance learning makes presence or "distant presence" essential. Thus, Georges-Louis Baron and Eric Bruillard (2006), who have studied collaborative distant learning devices such as forums, conclude that a long way has to be made before these devices allow a real collaborative knowledge construction. They submit few suggestions: make the learning devices more familiar to students, create new forms of instrumentations, organize documents depositories as support for collective memory and community identity, have all the actors cooperate.

Two different processes are central in distance learning projects: mediation and mediatization. The mediation process is aimed to link knowledge and learner through information content allowing didactization. Vincent Liquète (2010) distinguishes three actions of mediation: by the processing of documents, by documentary production, and by documentary communication. These actions are effective in a constructive learning paradigm. Mediation is underwritten by teachers but also mentors and tutors who play an important role in the individualization and appropriation process, making the link between institution, learning group, working group, scientific community and the individual. As in digital humanities, mediation allows the creation of relationship between individual and collective intelligence through technological tools and media (Jenkins, 2006). Mediation in this paradigm is central, and should be distinguished from mediatisation which is a process using information, edition and knowledge organization technologies in order to make the knowledge accessible to learner. Unfortunately, mediatization is easier and cheaper to implement, especially through learning documents editing and publishing applications such as Scenari or learning management systems like Moodle. However, the use of such tools is quite common but vain without the necessary political and economic effort that has to

be made to organize a real distant learning community with cooperation between teachers and engineers, teachers and learners, document providers and document creators.

Conclusion

The *professeurs documentalistes* to be have to master teaching, documentation, media and digital tools. They are interesting specimens and deserve attention, because information and knowledge organization is together a central epistemological object for their own development and a learning practice. Transliteracy paradigm shapes a synthesis for the problematic reflection on distant learning. The creation of a new distant learning curriculum between several universities through the leadership of Rouen University will offer the opportunity to apply and experiment learning methods, scientific contents, mediation processes, mediatization tools and knowledge management models. This process is long and complex and has to face the lack of political willingness to implement innovative methods and projects implying new economic models which take into account the fact that learning is not only receiving information from a teacher or through a technological device, but also a collective process articulated to documents and media, and a collaborative process which enhances creation through social interactions.

References

American Library Association (1989). Presidential Commission on Information Literacy: Final report. Chicago: ALA.

Bennett, J. & Peachey, A. (2007). Mashing The MUVE - A Mashup Model for Collaborative Learning in Multi-User Virtual Environments, Conference ICL 2007, September 26 -28, 2007, Villach, Austria, Retrieved April 10, 2012 from: http://telearn.archives-ouvertes.fr/hal-00197262.

Bruillard, E. & Baron, G.-L. (2009). Travail et apprentissage collaboratifs à distance dans l'enseignement supérieur : opinions, réalités, perspectives. Quaderni, 69, 105-114.

CDLP (California Distance Learning Project) (2011). What is distance learning ? Retrieved March 10, 2012, from http://www.cdlponline.org/index.cfm?fuseaction=whatis.

Chomienne, E. & Lehmans, A. (2012). Réseaux sociaux et apprentissages collaboratifs à l'université. Colloque international de l'université à l'ère du numérique 2012, Lyon: France. http://hal.archives-ouvertes.fr/docs/00/68/85/62/PDF/ciuen2012EChomienne-ALehmans.pdf

Choplin, H. (2007). Les communautés d'apprentissage dans la recherche-innovation, in Transformation des regards sur la recherche en technologie de l'éducation. Bruxelles : De Boeck, 53-63.

Cordier, A. (2011) Formaliser l'activité de recherche d'information : les modèles et modélisations à l'épreuve des pratiques effectives. Actes du Colloque MUSSI 2011 : Médiations et hybridations, construction sociale des savoirs et de l'information, Toulouse, 14-16 Juin 2011 - Colloque International du réseau MUSSI (réseau franco-brésilien), http://archivesic.ccsd.cnrs.fr/docs/00/64/29/53/PDF/CORDIER_Formaliser_l_activite_de_recherche_d_information.pdf.

Davenport, E. (2001). Knowledge management issues for online organizations: "communities of practice" as an exploratory framework. Journal of Documentation, 57(1), 61-75.

Delamotte, E. (2012). Pratiques informationnelles et échanges économiques. E-dossier de l'INA, http://www.ina-sup.com/ressources/dossiers-de-laudiovisuel/les-e-dossiers-de-laudiovisuel/pratiques-informationnelles-et-ec.

Gupta, B., Iyer, L. S., & Aronson, J. E. (2000). Knowledge management: Practices and challenges. Industrial Management & Data Systems, 100 (1), 17-21.

Isaac, H. (2008). L'université numérique : Rapport à Madame Valérie Pécresse, Ministre de l'enseignement supérieur et de la recherché. France, from http://media.education.gouv.fr/file/2008/08/3/universitenumerique_22083.pdf.

INA (2011). L'éducation aux cultures de l'information. E-Dossiers de l'audiovisuel : http://www.ina-sup.com/ressources/dossiers-de-laudiovisuel/les-e-dossiers-de-laudiovisuel/e-dossier-leducation-aux-cultures.

Jacquinot-Delaunay, G. (2010). Entre présence et distance : la formation à distance comme principe de provocation. Distances et savoirs, 2010/2 (8), 153-165.

Jelavic, M. (2011). Socio-technical knowledge management and epistemological paradigms: Theoretical connections at the individual and organizational level. Interdisciplinary Journal of Information, Knowledge, and Management, 6(1), 1–16.

Jenkins, H. (2006). Convergence Culture. Where Old and New Media Collide. New York: New York University Press.

Lave, J. & Wenger, E (1991). Situated learning: legitimate peripheral participation. New York: Cambridge University Press.

Marr, B., Gupta, O., Pike, S., & Roos, G. (2003). Intellectual capital and knowledge management effectiveness. Management Decision, 41(8), 771-781.

Liquète, V., Fabre, I. & Gardiès, C. (2010) Faut-il reconsidérer la médiation documentaire ? In Caune, J. (coord.), "La (les) médiation(s) en SIC", Les Enjeux de l'Information et de la Communication, http://w3.ugrenoble3.fr/les_enjeux/pageshtml/art2010-dossier.php.

Liquète, V. (2011). The numerical knowledge of reference in E-learning: the example of the students in a master's of documentation program. International Conference on E-Learning in the Workplace 2011, David Guralnick (dir.), Columbia university, New-York city (USA), June 8-10, http://hal.archives-ouvertes.fr/hal-00670588.

Liquète, V. (2011). Approche translittéracique de l'information : les usages des jeunes pour comprendre les processus mentaux lies à la manipulation informations. Communication au colloque Documents numériques et cognition, Nancy 2, http://hal.archives-ouvertes.fr/hal-00670642/.

Liquète, V. & Lehmans, A. (2011) Savoirs et pratiques de référence dans la formation des professeurs documentalistes in Fabre, I. (Ed.). Le professeur documentaliste : un tiers métier ?, Dijon: Educagri, 111-129.

Liquète, V. (2012) Des pratiques d'information à la construction de connaissances en contexte : de l'analyse à la modélisation SEPICRI, Dossier pour l'HDR, University of Rouen. http://tel.archives-ouvertes.fr/docs/00/67/07/00/PDF/Vol1HDRLIQUETE.pdf

Morandi, F. (2010). Information et enseignement : les « savoirs » du numérique In Chapron, F., Delamotte, E. (coord.). L'éducation à la culture informationnelle. Villeurbanne (France): Presses de l'ENSSIB, 159-168.

Nicholas, D. et al. (2009). Student digital information-seeking behavior in context. Journal of Documentation, 65 (1), 106 – 132.

Nonaka, I. & Von Krogh, G. (2009), Tacit Knowledge and Knowledge Conversion: controversy and Advancement in organizational knowledge creation theory. Organization Science, 20 (3), 635-652.

Paquelin, D. (2009). L'appropriation des dispositifs numériques de formation. Du prescrit aux usages, Paris: L'Harmattan.

Paavola, S. & Hakkarainen, K. (2009). From meaning making to joint construction of knowledge practices and artifacts – A trialogical approach to CSCL. In C. O'Malley, D. Suthers, P. Reimann, & A. Dimitracopoulou (Eds.), Computer Supported Collaborative Learning Practices: CSCL2009 Conference Proceedings. (pp. 83-92). Rhodes, Creek: International Society of the Learning Sciences (ISLS)

Peraya, D. (1998). Théories de la communication et technologies de l'information et de la communication. Un apport réciproque, In Revue européenne des sciences sociales, Mémoire et savoir à l'ère informatique, XIVe Colloque annuel du Groupe d'Etude « Pratiques Sociales et Théories », XXXVI, 111, 171-188.

Perriault, J. (2007). Préface In Arnaud, M. (dir.) Pédagogie en ligne. Méthodes et outils. Paris: Eudcaweb, 7-9.

Pinte, J-P. (2010). Vers des réseaux sociaux d'apprentissage en éducation, Les Cahiers Dynamiques 2/2010 (47), 82-86.

Proulx, S. (2009). Form of User's Contribution in Online Environments: Mechanisms of Mutual Recognition between Contributors. Meeting The Good, The Bad and The Challenging -The user and the future of information and communication technologies. Copenhagen, Denmark. May. 13-15.

Rey, B., Carette, V., Defrance, A., & Kahn, S. (2003). Les compétences à l'école : apprentissage et évaluation. Bruxelles: De Boeck.

Thomas, S. & al. (2007). Transliteracy: Crossing divides. First Monday, 12 (12), from http://www.uic.edu/htbin/cgiwrap/bin/ojs/index.php/fm/article/view/2060/1908.

Wenger, E. (1998). Communities of practice. Learning, meaning and identity. Cambridge (UK): Cambridge University Press.

Yoon, C.G. (2008). A structural model of end-user computing competency and user performance. Knowledge-Based Systems, 21(5), 415-420.

Author Notes

Anne Cordier holds a PhD in Information and Communication Science. *Professeur documentaliste* since 2003. She teaches courses on information science at the IUFM Haute-Normandie-University of Rouen since 2011 and is involved into research projects on information literacy and epistemology of documentation. Her work focuses on the imaginary on finding information on the Internet, information practices, especially of young students, and information literacy. She adopts an "eco-position" to analyze the information retrieval on the Internet which allows to consider the

research and training practices, taking into account the constraints carried by the identified spaces of action.

Anne Lehmans studied Law and Political Science at University Montesquieu-Bordeaux 4, France. She has examined cultural perceptions between Japan, France and the US for her PhD in Political Science and worked on a post-doc at the University of Charlottesville in Virginia (USA) on media and transcultural relations. She teaches and coordinates courses on information literacy and information science at the IUFM (teacher training courses)-University Montesquieu-Bordeaux 4 since 2002 and is involved into several research and library projects. Her most recent contributions are on teacher librarian training, professional communities of practice and information literacy, collaborative learning tools at the university.

.