Transliteracy and Knowledge Formats.

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Abstract. Information transliteracy in education can be observed through students' activities in project situations, which show a transformation of learning strategies and transfers between informal digital abilities and formal academic skills. A research project, "Translit", is led in France on pupils in scholar and non-scholar activities. We examine the concept of knowledge format. A format is a tangible and intangible knowledge organization model. We propose some examples of such models that seem to be efficient in our observations. These formats open to the design of information through the production of content. They can be a path to reflection on seeking procedures but also critical thinking, not just problem solving but also questions discovery. We propose some criteria in order to build a typology of these knowledge formats based on transliteracy.

Keywords: Information transliteracy, learning scenario, knowledge format.

1 Introduction

Transliteracy is at the crossroad of three main fields: information, media and computer literacies, as well as a metaliteracy. Considering the convergence of three perspectives on information as document, news and data, it invites us to analyze exchange processes between private and public life, consumption and creation, knowledge and communication [1]. Information transliteracy in education can be observed through students' activities in project situations, which point out transformations of learning strategies and transfers between informal digital abilities and formal academic skills. A research project, "Translit", is led in France on pupils in scholar and non-scholar activities. Our team has observed 16-year-old pupils in project-based activities. Our work is situated within the specific context of the French education system, where a teacher librarian is in charge of managing the resource center and information literacy.

Our scientific protocol relies on an ecological approach of capturing pupils' information retrieval and communication practices taking into consideration the social, cognitive and technological environment. We have characterized typical transliterate activities which are cognitively distributed and situated. During our research, we were able to evaluate the pupils' capability to organize their information environment, to coordinate the work among the members of the groups and to master the communication process. There is a direct correlation between these capabilities

and the success of the projects. Young people own an elaborate “art of practice” [2]; they tend to invent ways of doing things which are not orthodox according to what they are taught, but nonetheless efficient and explicable using thoughtful devices.

We propose to look at the concept of knowledge format into the paradigm of transliteracy. A format is a tangible and intangible knowledge organization model, linking "logic of knowledge and dynamic of uses" [3] We examine some examples of these models that seem to be useful in our observations. These formats are open to the design of information through production of content. They can be a path to reflection on seeking procedures but also critical thinking, not just problem solving, but also questions discovery. We propose to examine some criteria in order to build a typology of these knowledge formats based on transliteracy.

2 The Context: from Cognition to Knowledge Format in Transliteracy

Transliteracy is anchored in an anthropological multicultural perspective. It is based on actual and intuitive individuals’ practices, as well as on education and training. It asserts that the individual is integrated into a social process of education that is not abstract but carrying skills, if not knowledge, gained through daily searching, gaming, creating and communicating practices. Sue Thomas [4] defines transliteracy as “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 film, to digital social networks”. Henry Jenkins [5] also points out the centrality of social uses of media technologies and the “transmedia” processes within the “convergence culture”. Porosity between school life and private life, personal history and social practices, is associated with porosity between areas of expertise: information, media, computer literacies mingle in practices that can be deconstructed and connected with different conceptual fields from the epistemological standpoint, and to different actors from the perspective of modes of production and dissemination of academic knowledge.

2.1 The Research Context: An Ecological Approach of Transliteracy

We are interested in situations in which the choice of sources and modalities of information search and production is free for the students, within the limits of spatial, temporal and technical constraints in each institution and teaching situation: supervised personal work and travel in England in high schools, personal projects in vocational schools. In these situations, the choices of groups, topics, issues, are not completely free, but the way to find the needed information to complete the project, as well as modes of communication for the final production, remain to be chosen by the students. Spatial and temporal constraints are more flexible than in a normal class situation, which allows a certain porosity between information systems, and the establishment of an information ecosystem with open interactions between spaces (classroom, computer room, language lab, school library, public library, home) and between individuals (teachers and students, teachers, facilitators and students,

between students, students with non-adults). These ecosystems, often but not always, integrate the use of technical networks within school -when it works-, and social networks (e-mail, Facebook, Google Drive, blogs...). Faced with these open ecosystems, practices that mix academic information (documents given by teachers, textbooks, recommended items), media information (press accessed at home or at the school library, videos found on YouTube), found and exploited via digital devices (search engines, software, word processing or presentation), can be observed.

To consider students' information practices, we have adopted a qualitative ecological approach from ethnomethodology to observe pupils' transliterate practices on one hand, and the training practices of teachers and educators on the other hand. Thus, we have used several techniques of qualitative surveys to complete our investigation. During short term and regular visits and during a school trip including the creation of a travelogue, we sat among groups of 3 to 4 pupils and made direct observation, recorded their exchanges with a digital voice recorder, took notes and memos with an observation grid and made unstructured interviews with the pupils. When we noticed some changes, important or intriguing elements in the state of action, we made the pupils explain the sense and interpretation of what they were doing: when a pupil left the group, when there was a change of activity, when a new negotiation among pupils started, when a teacher came, when they discussed their methods, practices, tools, etc. Thus, we focus on relations as Christine Bruce [6] does in her phenomenographic approach. In short, we followed four high school classes, and one vocational school class, each class being composed of about thirty students, and 10 teachers (3 teacher librarians, and 7 teachers). The set of unstructured interviews with the students and teachers, exchanges between students and between students and teachers, as well as direct observations without intervention, were recorded and transcribed. Finally, we examine the projects' production as a process, regarding the criteria of the primary information's quality, scientific content, and communication.

2.2 The Epistemic Context: Socio-semio Constructivist Approach of Information Creation in Documentation

Transliteracy implies the centrality of complex uses considering social interactions of the users, sense making in a specific social and cultural context, and the convergence of three dimensions: structure (information, document, media and communication), strategy and action (the procedures for handling content) and culture and identity (individual perceptions) [7]. Complexity in the approach of information literacy has already been underlined by authors like Louise Limberg, Olof Sundin and Sanna Talja [8], who describe the relationship between learning practices, information structures and technologies. In this paradigm, learning through forms of social organization of information requires documentation practices, even if they are non-formal or unconscious. According to Manuel Zacklad, *documentarization* is "a work consisting in providing a permanent support attributes that facilitate its movement in space, time and interpretive communities" [9]. This work is particularly relevant for documents that he calls "documents for action", text files collectively annotated, sorted mail messages, annotated images, working papers. They are "perennial, fragmented and

evolving media, facilitating the development of creative transactions despite the distribution of situations of activities within a transaction flow" (Zacklad, 2007: 45). *Documentarization* allows the establishment of a common rationality in the organization of knowledge that goes beyond the individual information systems organized on personal cognitive modes, and sets stability for the action in time. Rationalization appears through the use of a lexicon and common management rules. Through the process of documentarization, a document becomes a sharing object within a community. Its use is then optimized, with individuals holding a greater empowerment. We can thus propose the idea that in a working group, information flows through voluntary exchange systems that require both the establishment of standards of behavior and trust relationships, supported by a communication architecture which is not hierarchical [10]. Knowledge formats can be considered as pillars for this architecture.

Awareness appears when students are induced to think about their own practices in the process of activity, and criticize them according to their social, academic and individual needs, constructing formal from informal knowledge on information, media and computers. It relies on conditions: the existence of intuitive but nonetheless efficient information practices, commonly acquired in social situations, the presence of a teacher (librarian) who induces awareness and control of the practices, and adequate knowledge formats.

3 Building Knowledge from Situations: The Role of Formats

The concept of knowledge format has been popularized by Laurent Thévenot [11] who considers the way people manage commitment through social conventions. Knowledge formats allow people to share information and interpretation, despite inequalities among skills, access to and knowledge of information, and finally to build a common knowledge. They enable the establishment of communicative conditions and provide a framework to facilitate the emergence of transliteracy skills. They are not a standard but a coordination frame giving forms of commonising action into cognition.

3.1 Building Knowledge from Uses in Projects

The distribution of skills and knowledge can be seen in three areas: information gathering, writing and synthesis, communication. In groups, students specialize around these three axes depending on what they are used to do, even if they run over their area of specialization. Within each axis, they develop more specialized skills. In the digital domain, areas of expertise concern data formats (text, image, sound), communication tools, the organization of knowledge. Skills are heterogeneous with attitudes ranging from total rejection of digital tools to almost professional skills, including image and sound, or the creation of websites or blogs. In creative situations, we often notice technical tutoring of students by some experts in the classroom. Concerning the media, even in socially advantaged backgrounds, homogeneous

practices have not been observed: some students show a great maturity in the use of the press (choice of diverse sources, comparison of brackets ...), others are unable to locate the media discourse in the political spectrum. In the field of information, styles and reading practices condition the choice of sources. The working styles are also very heterogeneous: many students prefer paper and tend to look for books or buy them, or reprint articles, others, rarer, more easily read on the screen with the help of images. Reading and writing processes depend on varied multi-media combinations: on-screen reading and writing (taking notes) on paper, reading and writing on the screen or on paper, paper reading and writing on the screen or on the phone. “BYOD” process may be useful to encourage the use of familiar objects and make the students analyze their own uses.

We paid attention to the info-documentary layout as a process generated by school to build a form of autonomy in information retrieval and use. Meanwhile, we have observed that teacher-librarians use the project as a significant learning device. Thus, a work schedule is distributed to students to help them plan tasks and to verbalize the progress of their work. Similarly, to support the information activity, students have instructions for bibliographic referencing. Furthermore, teachers became cognitive mediators for the young researchers: "Reflexivity in the research process is quite important for us”, a teacher librarian says. Observed in one school, teacher-librarians have required that all students make a midterm record of their project. On the occasion of the project installation, trainings are performed, usually on an individual basis, using information concepts and documentation techniques: discovery of the library catalog and databases (group training, followed by individual), notion of source, bibliography, validity / reliability of a website, organizing a plan... In another school, the teacher-librarians have remained set back and let the discipline teachers organize on improvised devices, simply providing teachers and students the facilities to access the information. No forced reflection on "work in progress" was asked. In this case, knowledge and skills regarding information acquired during the project are very short-lived. In vocational schools, the organization of work was done in pairs between teachers and teacher-librarian with a very tight control on students and specific instructions for production.

Work situations and positions of teacher-librarians are variable. Generally, regardless of the environment, they take advantage of the project’s arrangement to implement a policy of training students, even if it is very flexible and rather more "coaching" students. Thus, a teacher-librarian that we observed in our study, started a long discussion with students about the use of social networks to carry out education. They dealt with issues related to data protection, but also to their exchanges and communicative rules adjusted to these tools (netiquette). Projects are an opportunity for students to work on concepts that are not necessarily addressed in the daily work, to reflect on the sources of information and the need to vary them, on the complementarity of information materials, and the validation process.

3.2 Building Knowledge from Others: Logic of Representations and Logic of Common Action

Logic of representations is quite important to understand the cognitive process. We have noticed a gap between students and teachers' mutual representation. Students do not question their own ability to use various devices in order to find and manage information, while some feel completely lost and others do not easily confess that they do not have the needed connection or device at home. Teachers are often afraid of their students' supposed digital natives' abilities, which prevent them from using ICT inside the class. The result of this chain of misunderstanding is that many students have poor technical skills from their personal experience, and do not get more skills at school because they do not have the opportunity to learn to use ICT. The projects give the opportunity to evaluate the gap between students and between representations and reality, and to let the students co-construct their abilities in real communication processes.

To include communication, the teachers rely heavily on distributed and situated cognition tools, such as the logbook, discussed as a tool to support the reflective process, reinforcing the vision of a "person-plus" [12]: "It is important to have a discussion about what we do, to try to understand why there is such a thing, how we do it, not operate haphazardly, it is a tool for structuring thought, really, and the research process therefore" says one teacher. The logbook demonstrates the students' ability to mobilize resources, tools, situations, to deal with obstacles. Mutual enrichment of their practices can then take place. Logbooks show quite a hybridization of practices between monitoring academic prescription (standardized references as prescribed by the teacher) and communicative creativity and support on its common research and communication practices. In the vocational school, this process is complicated, either because non-formal information practices are poorly developed, mainly for entertainment, or because the school format is not mastered by students: the passage from spontaneous information and communication practices to academic knowledge requires significant support from the teacher. Some mechanisms may still be unlocked when one leaves, for example, the students seek information from images, or Wikipedia, which then encourage them to link the found information with their personal observations on the professional field, or with a collective reflection involved in the group through the teachers.

4 Functions and Types of Knowledge Formats

Knowledge formats, designing information architecture through the production of content, can also make students become aware of their information seeking uses, not only procedures but also organization of collective action and critical thinking, not just problem solving but also issues of discovery and creation.

4.1 Forms of Engagement Regimes: Formats to Document Collectivea Action

The knowledge formats enable the set-up of communicative conditions and provide a framework to facilitate the emergence of transliterate skills and awareness. This is the case of the logbook often reduced to a formal and unnecessary requirement. Some teachers have transformed this requirement by describing it as an effective work storage and organization tool. When it exists, the logbook is strictly organized by some students with a system of color codes, and often used to store and manage references to documents and key ideas that are useful in writing. It becomes a true cognitive and didactic training tool. The logbook is a tool for storing, sharing and documentarizing information. In the case of the travelogue, students who could have chosen electronic devices to write their synopsis chose paper and pen as a more creative and communicative organization of work.

A prescriptive blog may also be used as a knowledge format, to guide students in their choice of tools and bibliographic description. Finally, a specific communication format allows students to think of alternative ways of rendering a search and reducing the contradictions they perceive between non-formal multimedia arrangement formats and school prescriptions (written paper, PowerPoint presentation). This is the case for radio and video broadcasting in some media classes' blogs, or maps produced by the class using open data.

The sharing function of some formats interests the collective and calls the use of social networks to achieve the notes rewriting and finally new document writing. Collective writing using tools like wikis or Google has been rarely observed. Sometimes contents are discussed or performed collectively; some students read together by using the cursor to over-read the text, evaluate by comparing it with other documents and classify documents by selecting multiple tags. USB keys often include a shared directory. Sharing is also held on Facebook for whole texts and references to long documents, the E-mail for messages that include only two people, and SMS. The most common combination observed in the groups is the USB-key, notebook and a Facebook group with email. Students use Facebook in a logic of short-term memory and flows, between storage location and collaborative agora or communicational forum: everyone will be filing to share in an ad hoc created group, open only to the members of the working group and some relationships: a student's sister who helped him find a document, a friend who knows a lot about the subject.

4.2 Emphasis on Criticism: Formats to Document Reflection

In the context we have observed, the reading is more or less enriched with a number of annotations: attentional annotations, associative annotations indicating links to other documents or performing clusters, contributory annotations creating new documents from the original document such as abstract rewriting. These operations can be gathered according to the functions they perform for the group's work:

- Evaluation functions to select documents: the records are arranged in groups according to their degree of reliability, a careful shared reading being postponed when doubts exist.

- Analytical function of description and indexing to process documents: translation, writing reviews, summaries, tagging, quotes, links to other documents, illustration. Text markup allows sharing reading and orientation within the document.
- Classification functions with prioritization and storage to find the documents in the context of collective management, through markup techniques and guidance: adding semantic markup (tags), using color codes, highlighting a passage, constitution of folders and subfolders.

4.3 Conditions of Emancipation: Formats to Document Creation

A teacher-librarian in our study explained to the students that the variety of different exploited materials (music, video, voice, movement in space, staging, and dialogue) is interesting and valuable. This discourse encourages students to leverage their regular practice to implement an effective information-communication approach. A discourse that promotes non-formal practices and which, combined with the teachings of info-documentary knowledge, leads students to share the discovery of new and important information while “having fun” with the school work. The remarks of the students, combined with the observation of their final products, reflect the impact of education on information in contextualized areas identified by the teacher and by the students themselves (in their logbooks, students explain that they have worked on the concept of source, or the notion of publishing, including use of databases and open archives). Students who, having the appropriate info-documentary concepts embedded in a reasoned and conscious communication approach, are able to demonstrate a genuine informational creativity, freeing technical chains and purely reproductive methodologies.

The fundamental role of teachers is to guarantee the emancipation of the individual's awareness and knowledge, using essential educational contributions as information professionals [13]. Several studies have underlined the major part played by librarians in the development of information literacy and by the cooperation between librarians and teachers [14], especially when their action is focused on knowledge construction rather than skills. Carol Kuhlthau, Leslie Maniotes, Ann K. Caspari [15] have proposed a model of « guided inquiry » which seizes the information search process and emotional, cognitive and physical aspects of the tasks. This model is focused on information search as a continuous process, while we pay attention to social interactions, changes and transfers among different cognitive, affective and technical spheres.

The emancipatory function appeared in our study all the more essential, since the cultural and cognitive "legacy" of students are unequal, depending on the geographical location and the social composition of the school. In the vocational school, digital tools make the social and cognitive gap wider, and education is essential. It seems to us that mediation is indispensable to ensure everyone the development of information potential, that is to say the ability of individuals to increase their skills, quantitatively or qualitatively on a lifelong basis [16]. Mediation may support collaborative learning strategies through formats rather than assessments that Eero Sormunen, Tuulikki Alamettälä and Jannica Heinström [17] have studied. It is even more fundamental to build a culture of information that relies on a proactive

vision of learning, determining the ability of the individual to adapt to future information and digital environments [18]. Mediation is based on the existence of devices that include minimum learning expectations: an explained project, instructions, absence of any technical obstacle, coaching by teachers who themselves are mobilized on literacy issues and not only on the content of programs. Important cognitive barriers can exist, for example, for students who are experiencing reading, concentration or understanding difficulties. Thus, mediation focuses on uncertainty and complexity, which are substances of media information, horizon to pluralism and open critical thinking. Awareness does not consist in building what is true but in negotiating rules to find and evaluate what is possible.

5 Conclusion

Transliteracy observed in educational and informational systems, features a transformation of learning strategies and porosity between academic skills and "intuitive" competencies, formal and informal. This transformation of constitutive rules of school work and this redistribution of cognitive and social roles, skills and knowledge in building transliterate strategies, highlight the need to support formats of knowledge enhancing the students' information activities. They cannot disinhibit themselves toward technologies without support. As danah boyd has recently underlined "developing wisdom requires active learning » [19]. There may be a contradiction between various cognitive formats as well as between spheres of action and commitment. Students and teachers tend to install strong barriers between private life and cognitive process at school, which limits the range of knowledge formats that can be used at school. Three factors are associated to transliteracy scenarios: individual and collective strategies, instrumental skills with tools and devices, educational support for media and information literacy. Dynamics of technical, social and cognitive mediation remain to be built, possibly using knowledge on intertextuality, architextuality ie awareness of the fundamental semiotic structures of a single text, and hypertextuality [20]. The transliteracy approach to information activity in education allows the emergence of an information maturity associated with the construction of knowledge, according to a "grammar of usage". Awareness and rules creation from DIY crafts, supported in context by forms of pedagogical mediation, help link spontaneous informal practices with official requests and legitimate cultural constructions. In this process of appropriation, transliterate uses find their effectiveness.

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