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The complex process of classifying resources, an essential component of documentation expertise

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In a time of abundance of resources and curriculum reform in France, we propose to analyze the evolution of teachers' practices through their interactions with resources. This contribution focus on an unexplored stage: the process of classifying a new resource selected by the teacher in one's resource system. First, the study is situated in the thread of the documental approach to didactics and develop the concept of documentation expertise rely on Personal Information Management studies. The ability to manage and organize one's resource system is a part of the documentation expertise we want to characterize in this paper. To reach this aim, a case study of three teachers who prepared a new lesson was studied. Lastly, the concept of scheme is used to analyze data, and a component of documentation expertise is highlighted: the ability to build a classification system for resource system.

Keywords: Teachers professional development, Resource system, Documentation expertise, Scheme, Personal Information management, Documental approach to didactics.

Introduction

The available resources constantly increase and a lot of diversified resources are used by teachers (e.g. textbooks, Internet). They spend a lot of time to search and collect curriculum materials. This is especially true for French teachers in secondary school since the 2016 curriculum reform have been in force. This reform introduced big changes to two specific points. Firstly, the organization of the curriculum now follows a 3-year cycle. In each school, subject teams have to decide which content is taught in each grade. Secondly, new topics were introduced as algorithmic in mathematics and technology. French teachers must design new lessons and deal with resources, particularly digital ones, more than ever. For contemporary teachers, the challenge is the efficiency to find resources when they need it without wasting time. So, the ability to organize and manage information and resource system is a critical issue. In this context, we proposed to analyze the evolution of teachers' practices through their interactions with resources.

The contribution focuses on an unexplored stage: the process of classifying a new resource selected by the teachers in their preexisting and already structured resource system. First, we present our theoretical framework, which built around the documental approach to didactics and the personal information management studies. Then the methodological choices of a case study of three teachers who prepared a new lesson were explained. And lastly, the first findings were presented.

Theoretical construct

The theoretical framework mobilized is at the crossroad of different fields: education sciences and information sciences. First we present the concepts of documentation work and resource system, then we focus on the concept of scheme. Lastly, the new concept of the documentation expertise (DE) was introduced.

Documentation work and resource system

The study is situated in the thread of the Documentational Approach to Didactics (DAD) (Gueudet & Trouche, 2012). The starting point is the documentation work, a complex process which takes place anywhere, whenever and encompasses a broad diversity of activity (finding, selecting, classifying, using, modifying...resources). The documentation genesis results in a document, a hybrid entity composed of recombined resources and of a scheme. According to these authors, documentation work is linked with teachers' professional development.

Our PhD work¹ focus on the professional knowledge associated with information management. Personal Information Management (PIM) encompasses three activities (Jones, 2007): (1) finding / refinding information (2) keeping information (i.e. select and store) and (3) organize and structure the personal information system (PSI). "A PSI contains a person's books and paper documents, e-mail messages (on various accounts), e-documents, and other files (on various computers)" (Jones, 2007 p. 462). This definition is close to the definition of the resource system given in the DAD, the concept of resource system clusters all the material resources, paper or digital, which are stored by the teacher. But, for Gueudet and Trouche "the resource system of the teacher constitutes the 'resource' part of her documentation system (i.e. without the scheme part of the documents)" (2012, p. 27). Following this definition, identify and characterize the scheme of classifying one's resources that we propose to do, is a way to clarify scheme part of the documentation system.

From skill to scheme

Definitions of skill are diversified and, for us, don't appear operational to analyze documentation work. We refer to professional didactics (Pastré, Mayen & Vergnaud, 2006) for choosing the concept of scheme than skill, for work analysis. According to Vergnaud (2009), a scheme is an invariant organization of the activity for a given class of situations, comprising goals, rules of action, inferences and operational invariants (i.e. knowledge in action). We retain the distinction of Rabardel (2002) between two kinds of schemes: the first is *instrument-mediated action schemes* (e.g. prepare a new lesson); the second one is *usage schemes*, related to secondary tasks (e.g. select or modify a resource). The usage schemes could be entailed in different instrument-mediated action schemes: "usage schemes constitute specialized modules, which, in coordination with one another and also with other schemes, assimilate and mutually adapt in order to constitute instrument-mediated action schemes" (Rabardel, 2002, p. 83). Usage schemes, like skills, are part of finalized action, they support our analysis to identify the components of documentation expertise.

Documentation expertise

To conclude this part, we introduce the concept of documentation expertise (DE), a work-in-progress concept (Messaoui, 2017; Wang, 2018). Teachers' documentation expertise combines two types of schemes, media-instrumented scheme for the global task (e.g. preparing a new lesson) and usage schemes for the secondary tasks (e.g. classify resources). We supposed that the operational invariants

¹ PhD supervised by Luc Trouche and Béatrice Drot-Delange.

which guide teacher action contain knowledge linked with PIM and knowledge linked with the teaching content. One of the goals of our research is to define the components of the documentation expertise and this paper is also an opportunity to deepen this concept.

Methodological design: a case study of three teachers

To observe and analyze the documentation work, we based our methodology on the four principles of the reflective investigation (Gueudet & Trouche, 2012). New methodological tools were also built.

Reflective investigation

The first principle of the reflective investigation is a reflective follow-up: a lot of processes involved in the documentation work is unconscious, the data collect system leads the teacher to explain and awareness these processes (e.g. resource system maps). The second and third principle are a long-term and anywhere follow-up: a long period is necessary to catch the evolution of the organization of the resource system, that's why our data collect spread over 2 years (the follow-up began just before the curriculum reform and it's still continuing); moreover, the documentation work takes place both at home and at school, even in the virtual spaces (e.g. cloud storage, mail). The last principle is to store a broad collection of data.

Methodological design

For observing the documentation work and its deep links with the professional development, teachers from different subjects have been followed up: one in mathematics, Louise, because of the introduction of algorithmic in the curriculum, and two in English, Amy and Mary, because of their needs for authentic resources. A lot of French teachers manage their resources on a digital form², so, the organization of resource system through the computer classification system adopted by the teacher we observed with the use of software to record the activities on the computer (self-capture screen video). Nevertheless, we also consider paper resources in a complementary point of view. To observe the whole stage of documentation work, we investigated a new lesson plan designed by the teacher and follow up its life cycle for 2 years. We collected data in action (i.e. self-capture screen video when the teacher was preparing a lesson) and explanation of teachers about their activities (i.e. resources-guided tour interview or reflective map). Through our analysis, we also produced inferred map (e.g. figure 1). All the data may be used in further interview to increase the reflective dimension.

First results

In the same situation of preparing a lesson, we identified common features for the usage scheme *classify one's resources* between the three teachers. Firstly, the main goal is always to enable access quickly and easily to the resources. Secondly, rules of action depend on teachers but the classification is organized by three criteria: chronology, teaching level, and types of activities (figure 1), which are a reflection of teaching activities.

² According to the Profetic 2016 survey (<http://eduscol.education.fr/cid107958/profetic-2016.html>), 80% of French teachers are using digital to set up classroom activity sequences

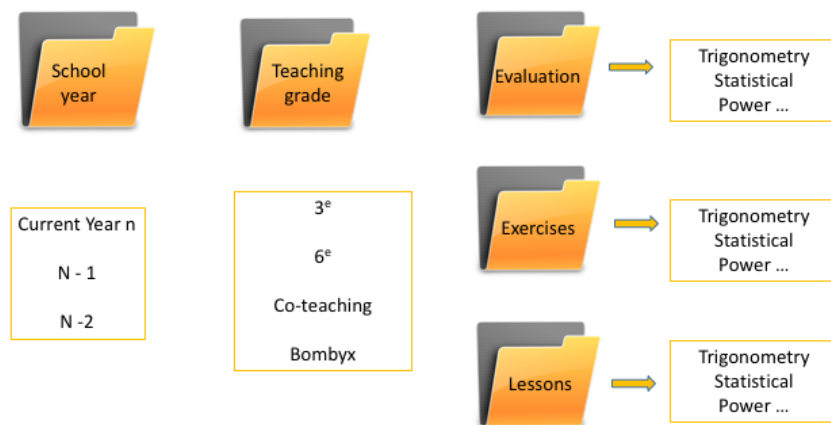


Figure 1: Inferred map of the classification system of Louise's digital resources

We inferred operational invariants that we cluster in two categories: teaching content and information management. Classify resources by types of activities suppose didactic knowledge to attribute a type of activity to a resource. The teaching level refers to knowledge of the organization both of school and of the curriculum. Chronology reveals knowledge of the yearly progression of the courses and the annual routines. These operational invariants are based on teaching content and school organization. We also identified operational invariants linked to information and digital literacy. First, knowledge about the proprieties of digital objects (e.g. create a file, drag and drop a folder), then creating a documentary language with key words to name the file and building hierarchical relation between classification criteria.

To conclude, the expertise in classifying resources depends on information management; however, our results show that this activity is interwoven with the teaching activity. Even if the resource system is more than the digital resources organization, through our analysis of the scheme classify one's resources, we can highlight a component of documentation expertise: the ability to build a classification system for resource system.

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