

UNDERSTANDING TEACHER ACTIVITY WITH EDUCATIONAL RESOURCES. SELECTION, CREATION, MODIFICATION, USE, DISCUSSION AND SHARING

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INTRODUCTION

The research work carried out within the framework of IARTEM, devoted to school textbooks and educational media, initially focused on what concerns the book as an object: its content, its modes of production, its modes of selection (approval commissions or teachers' choices), its readability, representations of minorities, underlying ideologies, discourse, images, etc... The seminal book of E.B. Johnsen (1993) covers most of these issues. See also Knudsen and Selander (in this volume), and Rodriguez and Tânia Braga Garcia (in this volume).

In this chapter, we propose a very different perspective, not oriented towards books or digital resources, but towards teachers. We consider educational resources to be at the very heart of the teacher's work.

We believe that questioning the relationship that each teacher has with educational resources is central and that it is an important direction for the research to be conducted in the fore coming years within IARTEM.

In this text, we will begin by setting the context for the increased importance of online educational resources in relation to teachers' work. We will then give some reference points on the theoretical and methodological frameworks adopted in the ReVEA research project and in other related projects. Finally, we will present the main results obtained and propose some perspectives.

CONTEXT

We are doubtless in a context of change, in several respects.

The most obvious change concerns the transition from paper to digital, with a lot of different hybridizations. We observe the spreading of digitized infrastructure and the explosion of individual use of digital objects (the Internet of things).

It is not only a question of instrumental change. Social and even societal transformations are taking place: Google is a sort of modern oracle that could bring an answer to any question; social networks; smartphones... generate new relationships with knowledge. We observe changes in truth regimes and the recognition that there is no longer a single discourse to transmit in schools, but contrasting points of view, in a sort of post-modern vision of the world.

Concerning schools in developed countries, an inexpensive and reliable infrastructure is in progress, offering new possibilities, notably with digital resources. While the textbook occupied a central place (which it still often occupies), it is supplemented by multiple other resources, notably retrievable via Internet. The situation of educational resources goes from scarcity to abundance.

Traditionally, a teacher has to respect national prescriptions, select educational resources (official textbook if available or legitimate resources), adapt them finely to the group he or she has to manage. Sometimes, he or she shares resources with peers and benefits from educational resources created by colleagues. He or she clearly is between end-of-pipe adaptation and collective design.

In this new context, teachers bear an increasing responsibility concerning educational resources, because of less external authority and less or no validation or legitimization. For example, with the Internet offer, some countries, such as Norway, have decided to cancel approval commissions and trust teachers.

The importance of resources in education is also increasing: new subjects, new knowledge, multiple views... New pressure, from students and parents, expecting visible quality of documents (presentation and readability), up to date data... and also new kind of resources, *reactive* (or interactive) resources, support of diversified activities.

With Internet, some have thought that teachers' preparation time would be reduced, since they would find many resources ready for use. Yet, there has been a significant increase in preparation time.

So understanding teacher's work is really a key issue. That is what we have done in the ReVEA project (and other connected projects led by the French Ministry of Education), devoted to better understanding a phenomenon in evolution and unfamiliar processes, aiming at answering the question: how and why teachers select, modify, revise, share, and discuss educational resources.

THEORETICAL AND METHODOLOGICAL FRAMEWORKS



ReVEA, in French “ressources vivantes pour l’enseignement et l’apprentissage” means “lively resources for teaching and learning”. The project is connected with educational resources but mainly with teachers individual and collective activities. Resources are alive through the communities that support and sustain them.

We articulate several research frameworks. First of all, didactic frameworks have been used

- Instruments / actors / systems (Baron and Bruillard)
- Curricular investigation (Martinand)
- Documentary approach to didactics (Gueudet and Trouche)
- General didactic approaches

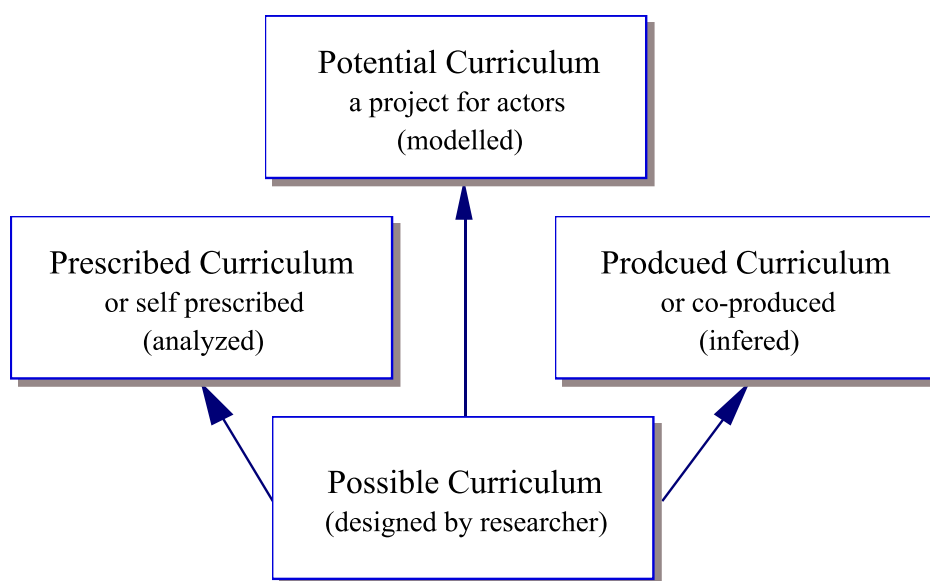


Figure 1 Curricular investigation, components of researcher view (Martinand)

The curricular investigation approach (figure 1) is particularly suited for our context. Hansen (in this volume), speaks about learning material with *potential* effect. It can be linked to the notion of potential curriculum (what teachers can do) in the curricular approach.

As we mainly focus on an activity, a major reference is activity theory. The Leontiev approach is particularly adapted. Distinguishing three levels, activity/ motive (why), action/ goal (how) and operation/ condition (process/ affordances), this approach makes it possible to investigate with a broad perspective.

The activity/ motive level requires interviews, personal journal and logbooks (observation is not possible). The action/ goal has been investigated through repeated interviews, observation and some specific experiments (asking teachers to prepare a lesson). The operation/ condition level is treated via observations. We have also used a specific record and think-aloud protocol (screen capture for a specific task, and sound, recording teacher commentaries during his activity).

We also had to deal with some technical issues: the organization of digital resources (which storage spaces; how are they organized?), which system (technical

and organizational) is used to find resources in this space, which life cycle characteristics of digital resources (deleting, archiving): pattern, criterion, temporality, which management of successive versions?

Furthermore, we analyzed the ecosystem of educational resource production and dissemination: publishers, ed tech, ministries and communities, teachers' associations; questions of law and ownership over educational resources, and public policies.

During the ReVEA project and other related projects, we conducted nearly 100 interviews. These constitute our major source of data.

MAIN RESULTS

Teachers' work on educational resources has been analysed around three main attractors: the teacher's personal characteristics and how they have been constructed over time; the processes associated with this construction and the corresponding productions; and the places and systems in which the activity is deployed.

Each teacher has to articulate personal values, experience and teaching knowledge, with characteristics of its working environment (local and global, infrastructure...), constraints, norms and potentialities. One key point is the history of professional and disciplinary identity building.

A very personal and human activity

Investigations revealed a great diversity of ways of doing (*manières de faire*) of teachers. The work on educational resources really is a core activity, at the heart of the teaching profession, very or even strictly, personal. The resources produced, selected, and modified reflect in a way the teacher's professional and even personal identity.

First of all, there is a great diversity of practices with their often very personal, even intimate character.

Teachers cannot be reduced to the simple status of a relay between resource producers and learners. They have values and preferences. They look for the resources they deem best suited for their pupils, according to what they want to do in the classroom, even if this means circumventing legislation on copyright and intellectual property rights. They choose what interests them and correspond to their interests even if it is outside the scope of the discipline they teach (for example, art history for a physicist or scuba diving for a technology teacher). It is still necessary to be able to judge precisely the methods of intervention of teachers, the intellectual and material resources they mobilize, the ins and outs of the initiatives they take.

This result has theoretical and methodological implications. If one wants to understand teacher's behavior, using questionnaires is not a good approach. Each choice may have a lot of explanations.

Some oppositions are relevant: novice/ expert; the idea of hacker (proactive in research and bypassing possible obstacles) and tuners; oriented towards their subject or their students. Taking into account their relation to professional literature, theories and constructed beliefs (experience), personal values, passions, interests (aesthetic quality) ... is necessary.

The relationship with educational resources is in fact a personal construction within a system, according to encounters and professional experiences.

Time scales issues

When teachers work with educational resources, three temporalities intervene centrally: (1) the watch, a continuous process throughout the career; (2) the planning and general organization of courses, annually or several times a year; and (3) the preparation of lessons or courses that occurs several times a week.

The first one corresponds to a continuous process of documentation, reading books, magazines, watching movies, TV, collecting objects... A teacher, as a researcher, is a teacher almost all the time. The specific moments of preparation (2 and 3) can be observed. They require the use of computers, search engines...

A fourth temporality, which is very short, is that of the training action itself, i.e. the actual implementation with pupils, during which the teacher may be led to modify resources, to summon others, etc... But we haven't studied it.

Another temporality corresponds to the professional career and personal life elapsed since the initial training. This is the time of identity building, in which we can isolate the initial formation, the first years of exercise (from the novice to the experienced) and then the hazards of the professional career.

4 crucial processes: inheritance (transmission), participation, collection, trust network

Based on the analysis of several series of interviews with high school and college teachers from different disciplines, four central processes were identified (Bruillard, 2015).

The first, called transmission or inheritance, corresponds to one or more biographical episodes: teachers recover resources either during their training, mainly in the preparation for teacher recruitment competitive exams, or when they take their first post. Other teachers give them all or part of their preparations, either in paper form or in digital form, for example via a USB key. It is not only resources

that are transmitted in this way, but also ways of doing things, methods, etc...In the professional fields, it is necessary to add the resources transmitted by the professional circles, whether it is on request, during the visits of the tutors in company, or directly by the pupils themselves.

The second, less asymmetrical, is participation, whether peripheral or full and whole, in collective work, within institutions or larger collectives.

The other two processes correspond to continuous constructions during the career. It is the collection first. On the one hand, the resources they have received (by transmission or inheritance), modified, built (participation or personal creation), used in previous years for their teachings are organized in their personal spaces. On the other hand, they hoard general resources, in order to use them as much as necessary in their teaching: online video mailing lists for English teachers, rocks for geologists, machines for technologists, and so on. Successive inheritances can be stored in collections or left in bulk.

Secondly, teachers build a network of trust: people who advise them or can provide resources and who can be contacted directly or who have a site or a blog or an accessible warehouse, known sites that have resources that we trust (the site of a natural history museum, the site of a particular academy for a particular discipline, YouTube for videos, the site of the Ministry, even foreign sites, school textbooks, etc...). From experience, the teacher knows that he has a good chance of finding what he is looking for, and has confidence in the quality of what will be offered.

These processes (transmission, participation, collection and building of the trust network) structure the teachers' work over the long term, and produce results (collections, a network) that are available when preparing a course or lesson. And it is indeed this more punctual temporality that draws our attention here in priority, namely the individual work of the teacher for the preparation of courses.

More recently, we have explored cases concerning STS (Sections de Techniciens Supérieurs), post baccalaureate technical training, beyond secondary education. There is generally no manual and the link with professionals requires the establishment of a network of trust including different professionals. Quentin and Bruillard (2017) studied the practices of Bank teachers. The study confirms most of the results obtained within the framework of ReVEA and secondary school teachers and adds some specificities. Thus, information monitoring is a necessary activity, which is time-consuming and financed partly from personal funds (teachers buy professional journals in particular). The search, sorting, appropriation and archiving of resources are carried out according to a process that stabilizes over time. The rights attached to resources are rarely taken into account and the institutional platform for sharing and pooling resources is little used.

Connection with paper resources

As quoted in Bruillard (2007), following the ecotone metaphor of Horsley (2001), we can make the hypothesis of a hybridization of book and numerical technology, and between paper and digital.

‘Biologists use the term ‘ecotone’ to describe an area where two adjacent ecosystems overlap – for example where a forest gradually turns into grassland. The ecotone has an ecology of its own. It can support forms of life not found in either of the adjacent systems. Today, there exists the educational equivalent of an ecotone between traditional learning environments and the emergence of new learning environments designed around student centred interaction and the internet and technology based learning tools.’ (Horsley, 2001, p.38)

Our studies confirm that teachers’ practices mix paper and digital technologies. The number of photocopies is increasing. As explained by Cuban, it is the way for teachers to have control upon documents they distribute to their students. One key explanation according to Khaneboubi is connected to writing skills. On the one hand, teachers will give copies with blanks to fill in order to make students write. On the other hand, giving paper copies is a way of overcoming their lack of writing skills.

So, it is not productive to focus on opposition between paper and digital as we can observe an important continuity of practices. Figure 2 summarizes the various processes detailed above as well as some of the questions raised by the transition from paper to digital.

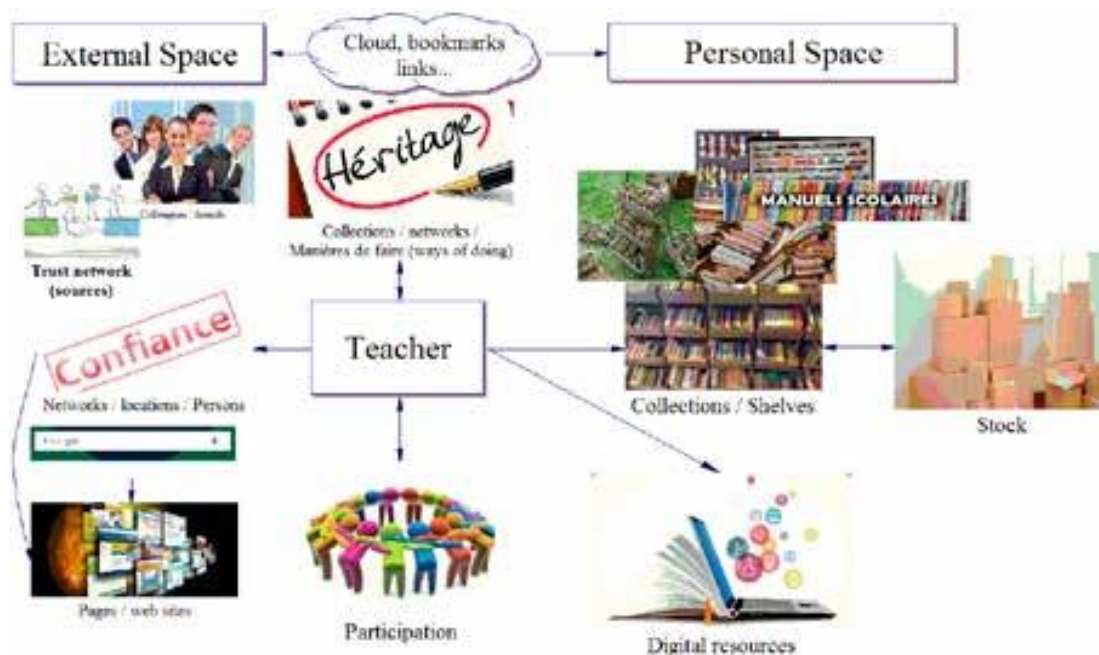


Figure 2. Processes about educational resources

The notion of shelf appears to be important. With papers and books, teachers can organize shelves to have a direct view of their educational resources. With computers, you can store a lot of digital resources, but it is not so easy to retrieve them when you need them. It is a well-known problem in PIM (personal information management), see Dikema and Olson (2014) and Loffreda (2017).

PERSPECTIVES

Our main aim is to advocate the interest of research approaches devoted to teachers' activities around educational resources, including both biographical studies (people's careers) and observations on the techniques used (research, archiving, organisation of resources, etc...).

A recent evolution corresponds to the multiplication of platforms, and in particular resource platforms, including services such as the addition of tests and the automatic collection of data on students.

Indeed, in France, there is a shift from paper textbooks, freely chosen by teachers and not labelled by the authorities, to directly financed products/services constituting a complementary offer, without the State being able to judge the very contents, only the adequacy of the object and the services provided to what is described in a kind of specifications, with strong pressure for teachers to adopt other forms of work. In fact, it is a question of how this supply of resources could be accompanied by other arrangements with a strong emphasis on teachers.

This kind of offer (platforms allowing to design scenarios including educational resources) relies upon an activity model of the teacher, an image of what a teacher does or should do which is very far from what our research has revealed.

In any case, we cannot underestimate the collective dimension of the teaching profession: teachers have to collectively control their resources, which could constitute a kind of Commons (Ostrom & Basurto, 2011), and the study of teacher networks (Quentin & Bruillard, 2013; Baron & Zablôt, 2017; Beauné, 2017) is yet to be developed.

REFERENCES

- Baron, G.-L. & Zablôt, S. 2017. De la constitution de ressources personnelles à la création de communautés formelles : étude de cas en France. *Review of Science, Mathematics and ICT Education*, 11(2), 27-45. <http://resmict.e.lis.upatras.gr/index.php/review/article/view/2811>
- Beauné Aurélie, Levoine Xavier, Bruillard Eric, Quentin Isabelle, Zablôt Solène, et al. 2019. Collectifs en réseau d'enseignants producteurs de ressources. Rapport scientifique des laboratoires STEF et EDA. Université Paris 5 Sorbonne Descartes; ENS Cachan. 2019. https://hal.archives-ouvertes.fr/hal-02022830/file/rapport_final.pdf.

- Bhaskar M. 2016. Curation: The power of selection in a world of excess. Piatkus, 368 pages.
- Bruillard, É. (dir.) 2005. Manuels scolaires, regards croisés. CRDP de Basse-Normandie, Documents, actes et rapports sur l'éducation, Caen.
- Bruillard Eric 2007. Textbooks and numerical publishing: an instrumental point of view in B-S Kwak and C-C Gim (eds), *Internet and Textbook, 2006 IARTEM Seoul Mini-Conference Volume*, KyoyookKwahakSa Publishing Company, Korea, p. 115-132.
- Bruillard É.2016. ReVEA project: Living resources for teaching and learning. An overview. In SITE conference, 21-25 march; Savannah.
- Bruillard Éric 2015. Digital textbooks: Current trends in secondary education in France. In Rodríguez J.R., Bruillard E., Horsley M. (dir.), *Digital Textbooks: What's new?* Universidade de Santiago de Compostela.
- Bruillard, E. 2017. MOOCs as contemporary forms of books: new educational services between control and conversation. *IARTEM e-Journal*, Vol. 9, n° 1 , http://biriwa.com/iartem/ejournal/volume9.1/articles/article_7_bruillard_iartem_ej_2017.pdf.
- Diekema A.R., Olsen, M. W., 2014. Teacher Personal Information Management (PIM) Practices: Finding, Keeping, and Re-Finding Information, in *JASIST* [en ligne], n° 11, vol. 65, pp. 2261-2277. ASIST : USA. PDF: 17 p., (consulté le 30 juin 2017). Disponible sur : <http://onlinelibrary.wiley.com/doi/10.1002/asi.23117/epdf>
- Horsley, Mike. 2001 Emerging Institutions and Pressing Paradoxes: Reports from the Virtual School and “ecotone”, the Virtual and Real Classroom research on the nexus between printed and electronic publishing in Horsley M (ed.) *The Future of Textbooks: emergent trends from research*, Sydney: TREAT.
- Gueudet, G. & Trouche, L. (eds.) 2010. *Le travail documentaire des professeurs de mathématiques*. Rennes: PUR & INRP.
- Johnsen Egil Børre 1993. *Textbooks in the Kaleidoscope. A Critical Survey of Literature and Research on Educational Texts*. Scandinavian University Press.
- Khaneboubi, M. 2017. Educational photocopying in French secondary schools: how does a technology adjust the content being taught to students' reading and writing skills? 14th IARTEM Conference, Lisboa (Portugal).
- Loffreda M. 2017. Gestion des ressources éducatives par les enseignants du secondaire : de l'environnement personnel à l'environnement professionnel. Rapport du GTnum6, STEF, ENS Cahan.
- Ostrom, E., & Basurto, X. 2011. Crafting analytical tools to study institutional change. *Journal of Institutional Economics*, 7(3), 317–343.
- Quentin, I., Bruillard, E. 2013. Explaining Internal Functioning of Online Teacher Networks: between personal interest and depersonalized collective production, between the sandbox and the hive. Full paper Society for Information Technology and Teacher Education (Site). New Orleans, Louisiana, 25-29 March 2013.