Chapter 3
Comparative Didactics. A Reconstructive Move from Subject Didactics in French-Speaking Educational Research

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Introduction

Since the 2000's, a field of "*didactique comparée*" (comparative didactics) has been developing in the French-speaking educational research community. Unlike the "*didactiques des disciplines*" (subject didactics), *comparative didactics* is not defined from the outset in relation to the division of knowledge into academic disciplines or school subjects. The denomination of this field often raises many questions about what is compared and for what purposes. In addition, different trends of comparative studies in *Didactics* have also developed in recent years in Europe, in response to the need for dialogue and greater coherence between the traditions of research in teaching, learning and curriculum, within and between different countries (cf. Almqvist et al., in this volume; Klette, in this volume; also see Krogh & Qvortrup, 2021).

This chapter aims to clarify the purposes of the development of *comparative didactics* in French-speaking educational research, as a reconstructive move based on the conceptualization of teaching and learning provided by subject didactics. I argue that in its current state of art, comparative didactics is an epistemological act seeking to overcome the fragmentation of subject didactics, and to provide a common ground of conceptual tools for investigating curriculum –both knowledge content selection and transformation processes and pedagogical practices – from a bottom-up perspective, i.e., starting from classroom studies.

In the first section, I recall some salient characteristics of *subject didactics* development in French-speaking research in education. Both the consideration of the triadic relationship between the teacher, the students and the knowledge contents

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(didactic system) and the consideration of the knowledge taught and learnt in schools as a transposition of social practices (didactic transposition) paved the way for the emergence of comparative didactics. In the second section, I take the seminal paper by Mercier et al. (2002) as a basis to explain the rationale of the development of comparative didactics, as a comprehensive science of knowledge transmission[1] (or re-construction) in teaching and learning practices. As suggested by these authors, the modelling of the generic characteristics of didactic systems relies upon comparison of their specific manifestations about different knowledge contents, in different cultural contexts, and at different time scales. However, such a development faces certain epistemological and methodological issues inherent in comparison. In the third section, I unfold some conditions to avoid the pitfall of explaining classroom events with concepts built in a single context, which would function too quickly as a universal model. One of these conditions is the selection of a sufficiently generic framework for examining the different terms to be compared with the same "lens". Hence, in the fourth section, I present the main features of the Joint Action framework in Didactics (JAD) elaborated as a "tertium comparationis" for operating the comparison of classroom events from one discipline to another, from one institutional context to another. Finally, in the fifth section, I draw some future lines of development for comparative didactics.

Subject Didactics in French-Speaking Educational Research

For more than 40 years, research fields named "*les didactiques des disciplines*" (subject didactics) have developed within the educational research community in France and in some French-speaking regions, such as Western-Switzerland. This development is characterized by being anchored in the school subject-matters and, in certain cases, their related academic disciplines. This trend is not isolated; similar developments have taken place in other Continental European countries (or have been influenced by them), as shown by Schneuwly and Vollmer (2018), and Pace, Zollo & Sibilio (in this volume). In this section, I present some characteristics of the French-speaking tradition of *subject didactics* to explain the rationale of the emergence of comparative didactics.

The French-speaking *subject didactics* were built on the idea, increasingly shared since the 1970s, that the knowledge taught/learned irreducibly shapes teaching and

[1] In this paper, and in the Francophone context more generally, the use of the term "transmission" qualifies ways of doing, saying, and thinking that are learned (or re-constructed) from those who already master these ways of doing, saying or thinking. The use of the term "transmission" stresses the need to consider teaching-learning practices as socio-historical processes marked by the continuity of some cultural traditions (school disciplines or other normative forms of activity) in which knowledge takes shape. Hence, "transmission" here does not presuppose a specific conceptualization of teaching and learning as "transmissive" or "constructivist" in the French-speaking educational discourse.

learning practices (i.e., textbook designs, lesson plans, classroom management and discourse, assessment criteria, etc.). This idea is formalized by the triadic relationship between a teaching pole, a learning pole, and the knowledge content as the third pole, which constitute a didactic system.[2] The didactic system can be regarded as the founding act of the development of *subject didactics*, marking a paradigm shift[3] from the dual "teacher-learner" model of pedagogy and educational psychology (Schubauer-Leoni, 2000).

In *subject didactics* studies, a central concern is the analysis of the epistemological gap between knowledge built and used in various kinds of social activities, and the knowledge contents that are defined in the curriculum texts and studied in classrooms. This gap is theorized as a *didactic transposition*, occurring within schools, classrooms, tutorials, etc. as instances of didactic institutions (Chevallard, 1985/1991; also see Chevallard & Bosch, 2014). In this view, knowledge does not exist as "something" that can be directly "passed on", transferred or acquired.

> "Knowledge is not a given, the theory says, it is built up, and transformed, and – such was the keyword – transposed. (…). The main point in the didactic transposition theory is that it considers knowledge as a changing reality, which adapts to its institutional habitat where it occupies a more or less narrow niche" (Chevallard, 2007, p132).

Knowledge is encapsulated in social practices, as ways of doing and as discourses in the various social spaces in which humans participate. The way that knowledge contents are constructed / formalized in discourses depends on the aims pursued by these practices. This principle is at the core of the didactic transposition process. Teaching and learning are purposive social practices that target the study (by the students with the help of the teachers) of pieces of knowledge built in certain social activities. Hence, when they enter the classroom, the contents taught in teaching and learning activities are recontextualized to fit the organization and purposes of schools, and the cognitive abilities of the students.[4] It follows that the contents learnt by the students in the classroom are always genuine (re)constructions regulated by the teacher, and not mere "transfers" or "acquisitions" of something. A major aim pursued by the French-speaking *subject didactics* is to analyze, model and improve the compatibility of this reconstructive process with the social practices that feature the many domains of academic knowledge and fields of human expertise (Schneuwly, 2021).

The French-speaking *subject didactics* pursue the twofold ambition of (1) being descriptive/explicative sciences that contribute to the broader social sciences

[2] The triangle linking the teacher, the students and the knowledge content is also emblematic of the European traditions of research in Didactics, but its meaning differs according to the conceptual background of these traditions.

[3] The word "paradigm" is used in a general sense without keeping the Kuhnian principle of incommensurability. Didactic research may rather be regarded as a research program in Imre Lakatos's sense.

[4] Programming over time, collective management of activities, and the assessment of the learning outcomes. The notion of didactic transposition shares some similarities with Basil Berstein's notion of "recontextualization" in pedagogic discourses (Bernstein 1990/2003).

studying learning conditions and knowledge diffusion in society and (2) being design sciences that support teaching and learning in schools by providing inputs to the construction of curricula, teaching resources and the professional development of teachers. These ambitions complement each other but they are not pursued in the same way in all the fields and at the same time. The first ambition – being a descriptive / explicative science – was an important driver in the development of the didactics of mathematics until the 2000s:

> "Drawing lessons from the innovative activism of the New Math period with the disillusions it had generated, French didacticians gave priority to understanding the complex interaction between mathematics learning and teaching in didactic systems. Building solid theoretical foundations for this new field in tight interaction with empirical research was an essential step. Theories were thus, and still are conceived first as tools for the understanding of mathematics teaching and learning practices and processes, and for the identification of didactic phenomena" (Artigue et al. 2019, p.14).

The elaboration of the Theory of Didactic Situations in mathematics (Brousseau, 1997) and the Didactic Transposition Theory (Chevallard, 1985/1991), which evolved toward the broader Anthropological Theory of Didactics (Chevallard 1992; Bosch et al., 2020), have influenced the development of other *subject didactics*, and very importantly, that of *comparative didactics*.[5] This is particularly obvious for the didactics of physical education (Amade-Escot, 2006) and the didactics of arts and music (Mili & Rickenmann, 2005), which developed through the descriptive/ comprehensive analysis of classroom practices. In contrast, the didactics of natural sciences and technologies developed mainly by supporting curriculum changes and the design of innovative teaching approaches in the 80's-90's. Since the 2000's, this field has been heading toward more descriptive approaches concerning the implementation of inquiry-based teaching and socio-scientific issues in ordinary classroom practices (Simonneaux & Simonneaux, 2014). The didactics of the French language brings together many subfields (reading, writing, spelling, grammar, language arts, etc.) and it is supported by a range of influential social sciences related to language (linguistics and semiotics, communication sciences, language arts, psychology of development, etc.). It developed by both designing and testing teaching resources and describing / explaining the practices developed (Daunay & Reuter, 2008). The didactics of social sciences (history, geography, citizenship education) remains very focused on the epistemological analysis of curricula and textbooks and the teachers' and students' discourses, since the selection of the knowledge contents and related values in these subjects is very sensitive to societal changes (Audigier, 2013).

This quickly drafted picture of the French-speaking *subject didactics* is, of course, too general to be fair to the diversity of work done in each field. There is much more to say and, above all, there are many comparisons to be made concerning the ways in which the various fields have been constructed, the conceptual tools

[5] The emergence of comparative didactics in the early 2000s, which proposed the Joint action framework in Didactics as a generic set of analytical categories for the study of ordinary didactic practices, may have reinforced the influence of the Didactics of Mathematics on other fields. This aspect will be developed in the third section of this chapter.

that they have developed, and the types of research and interventions that they produce. The comparison of *subject didactics* as a set of research fields forms part of the history and epistemology of educational sciences. The recent gain in interest in the question shown by the French-speaking community is tied to the need to strengthen *subject didactics* as a more unified research domain to face the challenge of the reforms of teacher training structures (e.g., Dorier et al., 2013). The "Association pour les Recherches Comparatistes en Didactique"[6] [Association for comparative research in didactics] promotes important dialogues to find coherence among these fields. The participation of French-speaking researchers in the EERA Network 27 has also supported many attempts to better characterize the French-speaking tradition of *Didactics* in relation to other traditions (Caillot, 2007; Schneuwly, 2011, Schneuwly & Vollmer, 2018; Schneuwly 2021).

The Emergence of *Comparative Didactics*: A New Perspective on Teaching and Learning

The development of *subject didactics* has been fruitful in showing the importance of considering the knowledge contents at the heart of the teaching-learning process. *Subject didactics* have developed their own conceptual tools to analyze and design new teaching practices. The division of *subject didactics* according to school disciplines or curriculum domains has ensured its usefulness and legitimacy in teacher training programs. But does this mean that each *subject-specific branch of didactics* is an autonomous research field? How can we make sure that didactic research does not miss any important teaching and learning issues that are not directly related to the well-established school disciplines? Or that exist at the crossroads of several of them? These issues have generated, and still generate, lively debates within the French educational research community.

An important step forward was made in the early 2000's, with the publication of a special issue of the "Revue française de pédagogie" entitled "Vers une didactique comparée" [Towards Comparative Didactics]. It contains a series of comparative empirical studies conducted from the perspective of different subject didactics, which helped to establish a new strand of didactic research. In the editorial paper, Mercier et al. (2002) summarized some critical questions on the subject of didactics, and formulated the following challenge:

> "[subject] didactics, even when well established in the disciplinary provinces, cannot do without a comparative production, which is the only thing that can ultimately justify their provinciality. It is then a matter of showing, first, how the didactic purposes of [human] relations constrain the possible forms of interaction, then how the different knowledge contents, which are the daily stakes [of these interactions], feed these forms in a specific way, at least in certain dimensions, which it is necessary to identify". (Mercier et al. 2002, p. 7, my translation).

[6] www.arcd.fr

To proceed, Mercier et al. (2002) suggested two fundamental dimensions for furthering subject didactics towards a comparative field of didactics research:

(i) clarify the function of the contents in learning and teaching practices and how these contents are (re)constructed in the classrooms.
(ii) within the activities of the teacher and the students, clarify what is "generic", i.e. can be related to a teaching (or learning) process, and what is "specific", i.e. related to the knowledge taught/learned.

The first dimension addresses the empirical study of the knowledge transposition process using a bottom-up perspective., starting from knowledge contents that are observed to be taught and learnt in teacher and students' interactions, and that can prove to be different from what the curriculum texts, teaching resources, lesson plans, etc. of the school institutions claim is taught and learnt. The second dimension addresses the empirical study of human practices involved in knowledge transmission (e.g., any person taking the position of "teacher" and that of "student" with respect to a content to be learnt, see Chevallard, 2007), for which the seminal anthropological distinction between the specific and the generic is postulated.

The unit of analysis is the *didactic system*, a triadic model of social organization (or institutions) formed to convey some pieces of human culture (Fig. 3.1). The most obvious didactic systems are those that exist in perennial forms, such as schools. But they can also be modelled in ephemeral or diffuse social forms of educational, professional or leisure contexts, in which some pieces of knowledge are deliberately conveyed and learnt.

The didactic system becomes the very object of *comparative didactics* for considering the contents emerging in learning activities, and not only the knowledge that institutions claim to teach. In this view, the epistemological function of the school disciplines changes: the discipline is no longer the starting point of the study but a component among all the dimensions at play in teaching and learning situations.

The analysis and modelling of the specific and generic characteristics of didactic systems is envisioned through a comparison of its empirical manifestations:

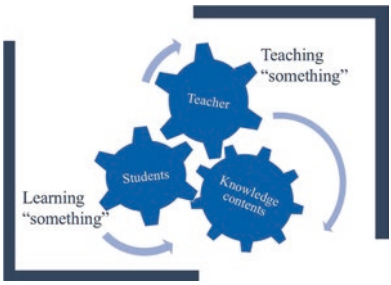

Fig. 3.1 Scheme of the didactic system

different knowledge contents and subjects (e.g. mathematics and science), at different school levels (e.g., contrasting primary and secondary school practices), according to different pedagogical practices (e.g., inquiry-based learning versus more transmissive approaches), in different cultural or national contexts and even, to a certain extent, in different social contexts (not only in schools, but also in nurseries, museums, vocational training, leisure clubs, etc.).

To a certain extent, this French-speaking strand of *comparative didactics* converges on the project of building a "science of didactics", first posited by Yves Chevallard in the early elaboration of the Theory of the didactic transposition (1985/1991). In this view, "la didactique", as a singular noun, which can be translated by the single word "Didactics", is

> "a science of the conditions of diffusion of knowledge in any institutions, such as a class of pupils, society at large…etc. More particularly didactics is the scientific study (and the knowledge resulting thereof) of the innumerable actions taken to cause (or impede) the diffusion of such and such a body of knowledge in such and such institution" (Chevallard, 2007, p.133).

However, nowadays, the "Anthropological Theory of the Didactic" that was developed by Chevallard and his colleagues (Bosch et al. 2020) provides a rather strict epistemological program (Mercier, 2008) about how bodies of knowledge become transformed within didactic institutions (e.g., the study of praxeologies in textbooks) or could be better reconstructed (e.g., the elaboration of inquiry-based teaching designs). Adopting another path, the ambition of *comparative didactics* is to make a comprehensive study of social facts at the heart of didactic systems through the study of the teacher's and the students' actions and discourses. The emergence of *comparative didactics* research is a shift from research focusing on knowledge contents in *subject didactics*, to a pragmatic approach to teaching and learning practices, which echoes the actional turn in the human and social sciences.

Comparing Teaching and Learning Practices: Epistemological and Methodological Issues

The development of *comparative didactics* does not avoid certain epistemological and methodological issues faced by the comparative approaches in the humanities and social sciences more generally. The following lines summarize these issues, which have been discussed in detail by Schubauer-Leoni & Leutenegger (2002), Leutenegger (2009) and Ligozat & Leutenegger (in press). To give them concrete meaning, I provide examples drawn from research that was conducted in the Geneva Research group for comparative didactics (GREDIC).

Comprehensive Approach of Complex and Dynamic Systems

Adopting a descriptive / comprehensive approach, *comparative didactics* relies upon observations of teaching and learning practices in ordinary classrooms. Video-recordings of lessons or teaching units are used, coupled with the collecting of all types of traces useful for the interpretation of the facts observed in the classroom, for example students' writings, the teacher's lesson plans and notes, etc. The participants' discourses, from teachers and students, are also collected through semi-directive interviews. Upstream, a study of school textbooks and teaching materials available to teachers helps to relate direct observations to institutional norms and constraints. From the observation of the system and its internal relations, the researcher tries to understand what is going on. In comparing teaching and learning practices modelled as didactic systems, the challenge is to reduce the uncertainty about the interpretation of the numerous traces of events that are collected.

In tracing the development of medical clinical practice at the end of the eighteenth century, Foucault (1994) showed that the scientific turn taken by medical studies was determined by a change in the relations between the observer and the facts observed.

> "The medical gaze was also organized in a new way. (…) it was a gaze that was not bound the narrow grid of structure (forms, arrangement, number, size), but that could and should grasp colors, variations, tiny anomalies, always receptive to the deviant. Finally, it was a gaze that was not content to observe what is self-evident; it must make it possible to outline chances and risks, it was calculating" (ibid, p.89).

The phenomenon of 'disease' does not exist as such in Nature, it is a human construction based on signs themselves drawn from observable symptoms, but not reduced to them. Each perceived element (symptom) is recorded as part of a random series, so that it can be grouped in convergent or divergent series at different steps of the clinical reasoning. Among the symptoms, only those elements that make sense to the clinician become signs; his/her role is to make the symptoms speak, to erect them into signs by relating them to already established knowledge.

Leutenegger (2009) draws an analogy with the "didactic gaze" when addressing events in the classroom. She formalizes a clinical and quasi-experimental approach to didactic systems.[7]

(i) the clinical dimension consists of constructing a meaningful series of signs from "classroom symptoms" found in recorded discourses, writings, pointing, movements, etc. with respect to available knowledge on the functioning of the didactic system (e.g. the didactic contract, Brousseau, 1997).

[7] The analogy with medical clinical practice supports the idea that the interpretation of classroom events relies upon multiple series of signs found by the observer and, hence, that the methods for investigating classroom events should favor the collection of signs through different perspectives (at least that of the three poles of the didactic system) to compare multiple series. This analogy is epistemological, not methodological.

(ii) the quasi-experimental dimension consists in controlling the construction of meaningful series by cross-checking the series between one another. In this perspective, the multiplicity of points of view on the functioning of a system favors the solidity of the interpretation.

Comparisons between series of recorded facts provide an increased opportunity to reduce the uncertainty about interpretation. Making the didactic system the object of inquiry ensures that the meaning of series of signs (or "clues") is not constituted externally, but it stems from the system where it made sense. In this perspective, and similarly to criminal inquiries, seemingly unimportant facts can prove more productive than the sole account of category-based information. The clinical and quasi-experimental approach of the didactic system belongs to the evidential paradigm that characterizes comprehensive approaches in the humanities and social sciences (Ginzburg, 1992).

With this approach, Leutenegger (2009) showed that the difficulties of certain students in mathematics at primary school have a social origin, linked to the time management of the mathematical contents in the didactic systems in which they participate. By comparing the interactions of these students with the teacher in their usual class (main didactic system) and in the support class (auxiliary didactic system) in the Geneva school, Leutenegger showed that i) the knowledge learnt in the support class (calculation techniques) lags behind the progression of the learning in the usual class; ii) students having learning difficulties stick to the mathematical techniques learnt in the support classroom whereas the tasks to be achieved in the usual class require the construction of new procedures. Hence, the students "having difficulties in math" seem irreducibly "delayed" in learning, as the result a of tacit "contract" (or habit) between them and their teachers about what should be done in the usual classroom. This is what can be termed a "didactic" phenomenon. The breakthrough is to no longer consider the student in isolation, as a cognitive subject, but as an interactant in dynamic and correlated systems, in which the content progression is a major component. This didactic perspective allows different support solutions to be thought of for students having learning difficulties, such as teaching new contents in the support classes, ahead of the teaching in the regular classroom.

"Estrangement"

For comparative didactics, comparison is not – or not only – a matter of method, since, basically, any science calls upon forms of comparison at some point to validate its results. Comparison is an essential process in anthropological studies for revealing dimensions of human activity that are not observable or recognizable at first sight within the native (or mainstream) cultural perspective. Encountering otherness to reconsider local and/or familiar facts and events was discussed by Ginzburg

(2001) as an "estrangement" process.[8] In most social sciences, calls for comparison are often invoked to improve the functioning of human societies: to escape from national closure, to improve national law, to regenerate education, to promote equity between peoples, etc. In history and political sciences, for example, comparison is often understood as taking place between two or more nations, or across one or more borders, or at different times (Sartori, 1991). Comparisons can be made between different cultures or within the same culture to detect essential changes over time and to highlight problems specific to that culture (Julien, 2005).

The comparison of teaching and learning practices in various school subjects is a major source of "estrangement". The purpose is to better understand the specificities of each of the practices for themselves, while identifying common roots that are related to the social functioning of didactic systems. But different sources of "estrangement" can also be productive, for example comparisons with other forms of educational practices in which knowledge is transmitted in a less formal way (e.g., nurseries, sports and leisure clubs, support associations, etc.), or even where learners are supposed to learn by themselves within environments designed to develop autonomous learning paths (e.g., museums).

As an example, in her doctoral work, Munch (2009) compared educational practices in Geneva nurseries for 3–4-year old children and school practices at the beginning of school for 4–5 year old students. The nursery educators stated that they do not want to "school" young children too quickly and analyses of the succession of activities proposed to the children over the day showed that they aimed to respond primarily to their needs (e.g., talking about family events, preparing to eat, getting dressed, playing with peers, etc.). Conversely, at the beginning of school, activities aim to introduce the young students to shared culture organized according to pre-disciplinary areas (reading, writing, counting and logic, drawing / painting, environment observation, etc.). The construction of learning progression over time is confirmed as a major feature of formal didactic systems in schools. However, the analysis of the games proposed to the children in nurseries unveils genuine forms of didactic contract (Brousseau, 1997) in the regulations of the activities. On the one hand, there are clearly some specific expectations from the educators about the children's achievement, similarly to what can be observed in schools. In many activities, there are some contents to be learnt that cannot be related to a specific school subject (e.g., deciphering symbolic representations of moves to be performed in a physical activity). On the other hand, the educators tend to involve themselves in the games in a way that reduces the typical dissymmetry observed between teachers and students. The "estrangement" offered by comparing activities in nurseries and schools works in two ways: i) by reconsidering nurseries as places where children

[8] In the preface of "Occhiaci di legno" ("A distance" in French), the Historian Carlo Ginzburg explains: "*I have been teaching since 1988 in Los Angeles. Addressing a student audience at the University of California, whose background is far removed from my own, and which is itself made up of ethnically and culturally diverse individuals, has forced me to consider my long-familiar research themes in a different way*" (2001, p.11; my translation).

learn some contents, and ii) by reconsidering the spectrum of the didactic contract to include situations in which someone learns to do something by working together with someone who knows how.

Symmetry Principle

For comparative didactics, comparison is not – or not first – a matter of finding similarities or differences between directly comparable facts and events.[9] Comparative approaches in the humanities and social sciences strive to achieve a necessary distancing by virtue of a principle of symmetry i.e., the common element allowing the two terms of comparison to be questioned (Stengers, 2011). In comparing the historical process of territorialization in different cultures, the anthropologist Marcel Detienne explains the functions of the selection of the concepts of "founding, foundation, founders" as "tertium comparationis" (a third comparing term):

> "To access the teeming variety of modes of territorialization, we needed to select a category, making sure that it was generic enough to allow the beginnings of a comparison but neither too general nor too specific to any particular culture. The category we chose was that of "founding, foundations, founders". From the reactions of the various members of the group – Africanists, Japanese specialists, Americanists, and Hellenists – it became clear that, although this category was complex, it was useful in that it prompted a whole series of questions. It was neither too strong nor too weak. Had it been too strong, too powerfully classificatory, it would have impeded the work of comparison; if too weak, it would have produced nothing to think about as a group, whatever the sites and forms of the beginnings and inauguration that seemed to be covered by the common meaning of "to found"(Detienne, 2008, p.25).

The definition of a third comparing term enables comparable terms to be built from the diversity of the social practices of different peoples at different times, which are not directly comparable through obvious differences and similarities. The power of the third comparing term to describe and explain a spectrum of social practices relies upon its generic / specific gradient. However, the meaning of the categories chosen at the outset for performing the comparison remains open to clarification during the study. As Detienne recalls,

> "But we experienced a salutary heuristic shock when we discovered what appeared to be an instance of incomparability. One day, two Japanese specialists, who had long remained silent as we fumbled our way forward, came to confess, to their chagrin, that according to the most ancient texts, in Japan there simply was no founding, no founder. I thanked them most warmly and told them that now we could at last begin to think about what to "found, to establish lastingly" really meant" (ibid, p.26).

[9] In experimental methods, direct comparison is possible through the relation between a test group and a control group, in which all variables but one are the same.

Beyond the heuristic power of the comparison for clarifying the meaning of third comparing terms themselves, this example also makes it very clear that the objective of comparison in anthropological sciences is not to value certain practices over others, but to use the same characteristics identified in the diversity of human practices to model socio-historical processes (e.g., territorialization) or more fundamentally, to deepen a concept (e.g., the "founding").

For *comparative didactics* as a "reconstructive move" furthering *subject didactics*, the selection or identification of third comparing terms ("tertium comparationis") is vital to allow the comparison of different – if not perceived "incomparable" – teaching and learning practices, without overlooking their specificities. Paying attention to the theoretical and methodological construction of this third term is already a means to avoid the projection of one, a priori normative, point of view onto the other.

Let us consider, for example, the double devolution/institutionalization process formalized by the Theory of didactic situations in mathematics (Brousseau 1997). Devolution is the process by which the student takes responsibility for his/her actions in a learning situation designed by the teacher, in the sense that the student can observe the consequences of his/her actions and draw knowledge from them. Institutionalization is the process by which the classroom collective agrees about what counts as valid knowledge with respect to the situation. The teacher plays a prominent role in the institutionalization since he/she is the warrant of the knowledge contents to be learnt. This double process has been studied in numerous didactic situations for the teaching of mathematical knowledge (Margolinas, 2021). It is both specific to the contents learned (i.e., responsibility about "what"), but it is also generic because it concerns the responsibility of the participants in the didactic system in making meanings and validating them.

In her doctoral work, Ducrey-Monnier (2014) compared the teaching and learning practices in primary classes (grade 2) in the canton of Vaud, in French lessons (the reading-comprehension of tales) and mathematics lessons (decimal numbering system). One of the comparative terms she used was the "devolution/institutionalization" pair. In both disciplines, she showed that there is a balance between the share of responsibility left to the students in the construction of meanings, and the interventions of the teacher confirming these meanings as valid knowledge. However, the devolution process takes different forms in mathematics and in reading. In mathematics, devolution is visible in the time lapses given to students to research a problem, in the teacher's prompting to find solutions and in the comparison of the efficacy of these solutions. In the case of reading, devolution shows up in a more subtle way, in the degree of exploration of possible justifications for the behavior of characters in the story being read. Ducrey-Monnier's work shows the relevance of using a third comparing term to consider teaching and learning in different subjects, not only to characterize the generic / specific dimensions of these practices but also to deepen the fund of conceptual tools that can be used.

Hence, the necessities of comparison, in addition to the epistemological and methodological aspects discussed here, have led comparative didactics researchers

to develop a conceptual framework, the first function of which is to serve as a "tertium comparationis"for examining different forms of teaching and learning practices.

Teaching and Learning as Joint Actions: Towards a Generic "Tertium Comparationis"

Mercier et al. (2002) suggested using certain concepts initially elaborated in the didactics of mathematics as candidate generic descriptors of the "reality" that is played out in all didactic systems characterized by a knowledge transposition process. A decade later, the "Joint Action framework in Didactics (JAD)" proposed an analysis of the contents taught and learnt in the classroom that is both situated and institutional. It stems from certain concepts built up in the didactics of mathematics and re-conceptualized within a socio-interactionist and pragmatist approach to human actions (Ligozat & Schubauer-Leoni, 2010; Sensevy, 2011). In this section, I recall the basic ideas and main concepts used as a brief overview of this framework.

The notion of "didactic joint action" captures the idea that the teacher and the students jointly (re)construct some knowledge contents in the classroom within an evolving learning environment. As Schubauer-Leoni & Leutenegger put it, "we cannot understand the teacher's action in the classroom (and therefore the processes of re-actualisation of knowledge in a specific teaching project), without describing the modes of participation of the students" (2002, p. 233, my translation) and vice-versa. From this empirical statement, a set of concepts were selected to enable the description of teaching and learning as a joint process (Sensevy & Mercier, 2007; Sensevy, 2011, 2012).

(i) The "Milieu"[10] features the material and symbolic components that the teacher or students act upon, use, talk about, interpret, etc. (i.e, a worksheet, a ruler, a verbal instruction given by the teacher, the writing of a number on the blackboard, the verbal designation of "the solution" of a problem, etc.) and within which meaning-making processes take place.

(ii) The "Didactic Contract" features the interdependency of actions of the teacher and the students in the classroom in the search for an agreement[11] on what has to be done and how – and hence what knowledge content may be learnt-, within the milieu. These actions are based on a system of habits, norms, and assigned

[10] The notion of « milieu » was first conceptualized by Brousseau (1997) within the Theory of Didactic Situation in Mathematics, as anything upon which the students act with and upon, and from which they may get feedback about their action. In the JAD framework, the milieu is rather seen as the context in which the teacher and the students' action develop, featuring both the resources and the problems to address in performing a task (see Sensevy, 2011).

[11] Brousseau (1997) termed this search for an agreement a "didactic contract" at play between the teacher and the students. It is not a firmly established contract because its stakes – from the participants' standpoints – are always renewed as teaching progresses.

> expectations to each other's. Most of the components of this system are played implicitly in the classroom interactions, unless one of the participants does not act according to them, and hence make the rules, norms and expectations visible in the "response" of the others.

Conceptualizing teaching and learning as joint actions does not mean that the teacher and the students carry out the same actions together or that they share the same agendas. Didactic joint actions involve separate and distinctive lines of action that are bound together by both the evolution of the milieu and the didactic contract. The specific nature of students' actions is *reconstructive*: at each step of a lesson, the students must make sense of new tasks, questions or problems set by the teacher and based on their previous experience. The specific nature of the teacher's actions is *anticipative*: At each step of a lesson, the teacher supports the students' constructions and reorganizes them according to the next steps of the lesson plan and the curriculum objectives. Hence, the students and the teacher do not share the same perspective in the timing that the knowledge content unfolds in the classroom (chronogenesis); it follows that they do not have the same responsibilities in this process either (topogenesis). This distinction is at the core of the first theorization of didactic systems developed by Chevallard (1985/1991). The articulation of the *didactic contract* and the *didactic milieu* in the JAD framework enables us to grasp the meaning-making process evolving continuously through the teacher's and students' joint actions (a mesogenesis in Chevallards' terms, 1992).

Since its premises (Sensevy & Mercier, 2007), the JAD framework has developed in different directions: (i) through the conceptualization of learning games and epistemic games as models of human activities (Sensevy 2011, 2012, Sensevy et al., 2015), and (ii) through the conceptualization of breaches and continuity in the meaning-making process (Ligozat et al., 2018; Marty et al., in press; Amade-Escot & Verscheure, Chap. 10 in this volume). The dialogue with the Swedish pragmatist approach to classroom discourses (Wickman & Östman, 2002; Wickman 2012; Hamza & Wickman, 2013), offering tools for analyzing the participant's practical epistemologies, has been influential in the latter development.

The JAD framework provides a generic set of categories for describing relations within the didactic systems. However, these categories cannot work without an articulation with the analysis of the knowledge contents in the didactic system. This analysis involves two complementary movements (top-down and bottom-up) which enable both the situational and institutional viewpoints to be reconstructed in the transposition process. The articulation between the analysis of the specific dimensions of knowledge and the analysis of the joint action of the teacher and the students provides a global model for the analysis of didactic systems (Fig. 3.2).

This model serves as a "tertium comparationis" to address two main types of questions.

On the one hand, this model allows impacts of the school contents on teaching/learning practices to be analyzed in a given institutional context i.e., how these practices are 'shaped' by the specificity of the knowledge contents. For example, in a gymnastics lesson on performing handstands and a physics lesson on modelling

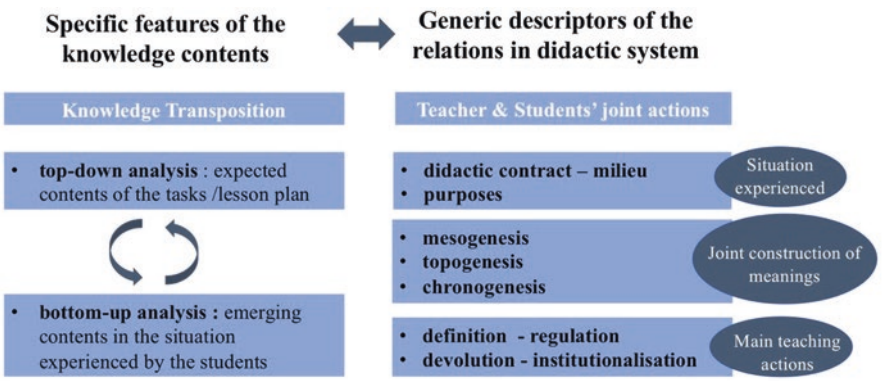

Fig. 3.2 The specific – generic articulation in the analysis of didactic systems

changes in states of the matter, how do the students participate in the knowledge construction? How do the teachers support continuity in the meaning-making process from the students' actions in the milieu to the collective construction of knowledge? These questions have been studied by Ligozat et al. (2018), and Marty et al. (in press) for example.

On the other hand, this model makes it possible to analyze the impacts of school norms and habits on teaching/learning practices about the same contents, or within a single school discipline. For example, how is the measurement of quantities taught in the French and Swiss-French contexts, at primary school? How is teaching on the states of matter similar and different at the end of primary school and at the beginning of secondary school? The first question was studied in my own doctoral work (Ligozat, 2008) and the latter in Laurence Marty's (2019). Comparisons of teaching and learning practices between different school systems behave as an anthropological "lab" for understanding the variation in the social process of knowledge transmission (or re-construction).

Toward New Perspectives on the Relation Between Curriculum and Classroom Practices

Exploring Knowledge Contents at the Crossroads of School Subjects

In most educational contexts, the alignment of the school subjects with the seemingly corresponding academic disciplines is not trivial. At primary school, the decimal numeration system for writing numbers is knowledge that is certainly part of the body of "mathematics" in general, but what of time condensed in a calendar and its uses for remembering / anticipating events? It belongs both to "History", since it

is a representation of social time lived by humans, and to mathematics as it is a representation of time as a quantity. In the higher school grades, a content such as "modeling" in sciences is certainly too general to account for specific issues of teaching and learning models in biology and models in physics. Are the models of the same kind in both subjects?

Beyond the structure of the school subjects, teachers also deal with new contents introduced into the curriculum to address certain social needs, such as education for sustainable development, health education, media education, critical thinking, entrepreneurship, citizenship, etc. It is not possible to assign these contents to a single subject since their specificity lies precisely their multiple disciplinary roots. In addition, the definition and status of these new contents also change rapidly as problems in society evolve.

Because *comparative didactics* allows us to consider what contents emerge in the teachers' and students' actions in various instances of didactic systems, it offers a bottom-up approach to the analysis of the consequence of curriculum changes. In particular, the influence of the disciplinary structure of school knowledge in the teaching and learning of new contents can be traced. In her doctoral work in progress, Sudriès (2020) focuses on the teaching and learning of chemical transformations in lower secondary school through the carbon cycle. Her project is to unveil the disciplinary dimensions that may be privileged by the teachers (e.g. molecular re-arrangement in physics, energy conversion in organic through photosynthesis in biology) but also the modes of participation that the students may develop with respect to broader environmental issues.

Changing Realities of School Subjects across Cultural Contexts and National Educational Systems

International comparisons shed light on differences in the subject structures of curricula. For example, in Sweden, science subjects are taught by general science teachers at lower secondary level. In France, "Physics and Chemistry" on the one hand and "Earth and life sciences" on the other, are taught separately by specialized teachers (Marty et al., 2018). The "Earth and life sciences" school subject groups together biological and geological knowledge in lower and upper secondary schools. In Switzerland, biology is taught separately from geology, as a school subject in its own right, certain topics of geology being included in geography (with some substantial differences between French-speaking and German-speaking Cantons). This has consequences on the teachers' professional epistemologies and the way they contextualize the contents that are described in the curriculum texts. It follows that international comparisons of teaching and learning practices cannot simply rely upon the subject structures established in national contexts, because these structures are the product of cultural norms and socio-political choices. These norms and choices should be an integral part of the study because they are the most generic

determinants of the teachers' and students' actions that can be observed in the classrooms.

On the one hand, international comparisons of teaching and learning practices make the didactic transposition process at work in the teaching and learning practices observable in classrooms particularly salient. On the other hand, international comparisons of teaching and learning practices is particularly conducive to the "estrangement" of the researchers' gaze, and hence to the study of the epistemologies that shape their conceptual tools. It is then possible to understand that conceptual frameworks in didactics emerge (or have emerged) in different socio-historical contexts of educational research, and they cannot be totally detached from the educational aims of the school systems in which they were born.

In the "cultural shock" of the encounter between different research traditions on teaching, learning and curriculum in the European educational research space, new research questions are addressed to comparative studies in Didactics (Ligozat et al., 2015). It is important to create the conditions for collaborative work between researchers through the comparison of different conceptual tools. In turn, there are opportunities for densifying the existing knowledge of teaching and learning practices that are determined by distinct socio-histories.

Concluding Remarks

To sum up, the purposes of the French-speaking stream of comparative didactics goes beyond a mere dialogue between the *subject didactics*. Nor is it oriented towards a new *general didactics* that would be created by bringing together the subject didactics in a seemingly unified scientific field. Since its very beginning, this stream of research has aimed at overcoming the fragmentation of subject-specific approaches to teaching and learning, by challenging the naturalization processes that accompany exclusive disciplinary standpoints.

Through the development of the Joint Action framework in Didactics, the strand of comparative didactics initiated by Mercier et al. (2002) has deepened the meaning of the concepts of "didactic system" and "didactic transposition". Both these concepts played an essential function in the development of *subject didactics* (Schneuwly, 2021). However, the inclusion of these concepts in the anthropological background of the study of human practices dedicated to the transmission (or reconstruction) of knowledge in diverse social contexts, frees the conceptualization of the didactic transposition process from the disciplinary structure of school knowledge only. It is no longer the school subject structures that serve as the sole reference for the study of the relationships within the system. *Comparative didactics* allows the transposition process to be (re)thought as a broader constructive process, which takes place above all in human transactions concerning a large range of contents towards specific educational goals. In this way, comparative didactics also strives to relate the stakes of specific teaching and learning contents to the broader social, cultural, and political issues embedded in educational systems.

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