

# INTERDISCIPLINARITY IN FRANCOPHONE EDUCATION:

## The Weal and Woe of a Research Journey

by

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**Abstract:** This article presents elements from the research journey pursued by the author in the area of interdisciplinarity in education, and more specifically in elementary education, which he has been studying for 30 years. The text begins by presenting the reasons that led to undertaking doctoral studies on this issue. It then addresses the foundations of the conceptual frame of reference used by the author in performing research studies. The article then examines three results that emerge from this research: a conceptual clarification of the notion of interdisciplinarity with respect to curricula and professional training; certain empirical findings on the conception and practice of interdisciplinarity among elementary school teachers; and the existence of three interpretive logics of interdisciplinarity associated with three distinct cultures: English-speaking American, French-speaking European, and Portuguese-speaking Latin American. To conclude, the article proposes a definition of interdisciplinarity in schools based on the Francophone reality, along with three principles for promoting an integrative approach in teaching-learning relationships.

**Keywords:** research on interdisciplinarity, primary school, curricular structure, professional training, empirical results, distinct logics

Introduction

For a little over 30 years now, I have been studying how elementary school teachers in Quebec draw on, understand and apply interdisciplinarity in their teaching practices. Two factors are at the source of this preoccupation, which has only grown with time. The first is the will of the Quebec Ministry of Education to promote in its elementary curriculum of the early 1970s what it called at the time the “integration of learning.” The deep-seated reason for this government interest came from the fact that elementary teachers were teaching only the subjects that were considered to be important: French and mathematics. Over and beyond the positive discourse, the fact is that this integration of subjects provided a way to endorse the existing situation. Specifically, it enabled teachers to claim to integrate other subjects while using them as mere pretexts to teach French and mathematics. The second factor is directly linked to an experience at this time when I was a guidance counselor working under a school board. The administration asked me to go to a school where the teachers had obtained a grant to develop an integrative and interdisciplinary approach. I was to write a report on the quality of work I observed, which, *a priori*, was considered to be of great quality by the administration. After a few hours of discussion with the teachers at this school and an analysis of their written productions, I left the school thinking that if this was the integration of learning, it was assuredly the best way to guarantee a disintegration of student learning.

## 1. A Point of Departure: The Doctorate in Sociology

This reflection, together with subsequent empirical observations in classrooms and the somewhat unconsidered or at least ambiguous government ministry discourse, led me to undertake a doctorate in the sociology of knowledge (Lenoir, 1991) with a focus on the relationships between the issues of interdisciplinarity and integration in education: This was, to my knowledge, a first in the French-speaking world! Although, over the course of my literature review, I encountered interesting and important works by the OECD (Apostel et al., 1972) and UNESCO (Apostel et al., 1983), as well as by Piaget (1964, 1967, 1970, 1971) and a few other French-speaking authors (for example, Gusdorf, 1975; Resweber, 1981), these texts were mainly epistemological and centered on research. No other scholar, with the partial exception of Belgian researcher Louis D’Hainaut (1979), examined interdisciplinary practices in classrooms. In France, a few initiatives, strongly criticized, addressed what their authors called the “pedagogies of awakening.” In Quebec, two or three authors wrote about the issue, but from a very

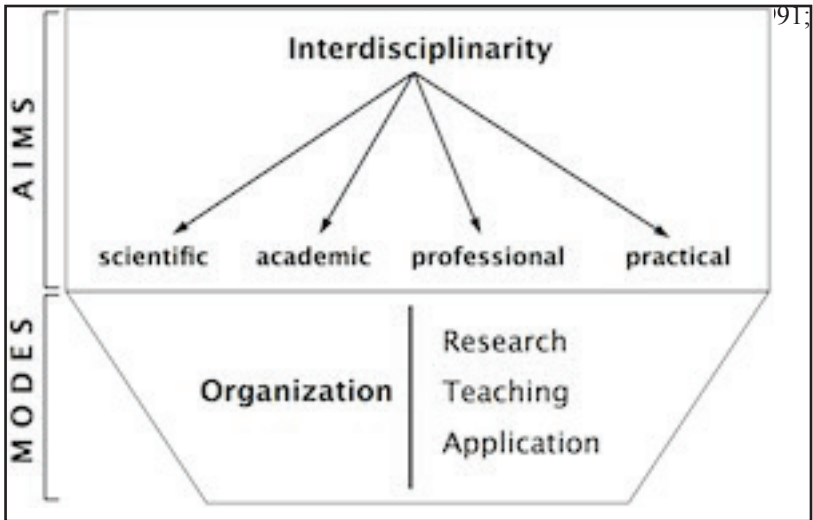
psychologizing and moralist perspective, in the context of a so-called “open” pedagogy, under the influence of Ivan Illich and Alexander Sutherland Neill.

My investigations then led me to explore the English-speaking literature. And here, I came across a gold mine. I will avoid presenting an exhaustive list, as I would likely forget one author or another. However, I must mention the publications, at that time, of James Beane (1991, 1992), Julie Klein (1985, 1986a, 1986b, 1990), Joseph Kockelmans (1979), William Newell (Newell & Green, 1982; Newell, 1998), and Gordon Vars (1987), as well as Joseph Connole (1937), Nelson Henry (1952, 1958), Thomas Hopkins (1937), and many others such as Ciccorio (1970) or Knudsen (1937). The ties I forged with Julie Klein, as well as our exchanges and her advice, have led me to broaden my horizons even further and to learn about the work of other researchers interested in school realities in the United States, for example Heidi Hayes Jacobs (1989) and Veronica Boix-Mansilla, with whom I have recently collaborated (Boix-Mansilla & Lenoir, 2010).

It is the work of Klein, Kockelmans, and Newell that first allowed me to find my bearings among thousands of publications (almost 7,000 at the time on ERIC) when undertaking my doctoral thesis in the sociology of knowledge at the start of the 1980s. The publications of Connole, Henry, Hopkins, and later Beane provided a basis for making links between the notions of interdisciplinarity and integration. Vars, Jacobs, and Boix-Mansilla more particularly shed light on interdisciplinary approaches in teaching. These authors and many others, including Ciccorio and Knudsen, compelled me to adopt a distanced and critical posture so as to avoid any kind of biased attitude.

### *1.1 The Foundations of a Conceptual Frame of Reference*

It is on these foundations that I progressively built a conceptual frame of reference. Up through the 1990s, most Francophone works on the issue of interdisciplinarity were epistemological in character and were related to debates on the structure of the tree of science. The French-language publications of Apostel et al. (1972, 1983) and Piaget (1964, 1967, 1970, 1971) are perfect illustrations in this regard. During my work in the field of education and teacher education—which, in these same years, was beginning to adopt increasingly professionalizing orientations and was becoming centered on practice—one of my first tasks was to distinguish between four types of interdisciplinarity: scientific, school-related (academic), professional, and practical (Figure 1). These distinctions appeared necessary because the context, aims, operating modes, and even consequences of interdisciplinar-



**Figure 1:** The fields of interdisciplinary operationalization and its angles of approach.

I came to understand that practical interdisciplinarity has to do with the experience acquired by an individual and is aimed at using this experience on a practical level to solve everyday problems, whether in managing individual life or life in society. It brings into play practical, technical, or procedural knowledge of everyday life. As a result, it appears as natural as the prose of Molière’s famous would-be noble, Monsieur Jourdain. A mechanic repairing a car, a housekeeper maintaining a house in order, a speculator “playing” the stock market, and a bus driver driving his public vehicle all use procedural knowledge, experiential knowledge, and more or less routine and conscious practices from various horizons, including disciplinary, technical, and professional ones.

Interdisciplinarity in the educational realm (academic interdisciplinarity) must, from the outset, be clearly differentiated from scientific interdisciplinarity with regard to its aims, goals, application methods, and system of reference. Indeed, implementing interdisciplinarity in a school setting requires major adjustments compared to the case of scientific interdisciplinarity. For example, it relates to a school discipline rather than a scientific one; its over-

arching aim is the dissemination of scientific knowledge and the education of social actors rather than the production of new knowledge and the meeting of social needs; etc.

For its part, professional interdisciplinarity, owing to its pursued aims, involves the integration of methods and knowledge (scientific and practical) with a view to developing the competencies required by a given profession. It consequently calls for going beyond the traditional conception of interdisciplinarity and necessitates the use of knowledge that can be described as non-disciplinary. These are social practices of reference, made up of explicit and implicit (incorporated) competencies, distinct from professional acts, that interact with disciplinary knowledge in a way that is dynamic, nonlinear, and nonhierarchical, and that complete a given professional act.

In addition, depending on the particularities of problems and preoccupations, these four fields of interdisciplinary operationalization can be addressed from three angles of approach, as Hermerén (1985) has pointed out: organizational questions, research, and teaching. As I thought the subject through, I added a fourth angle of approach, namely that of practice (Hasni & Lenoir, 2001).

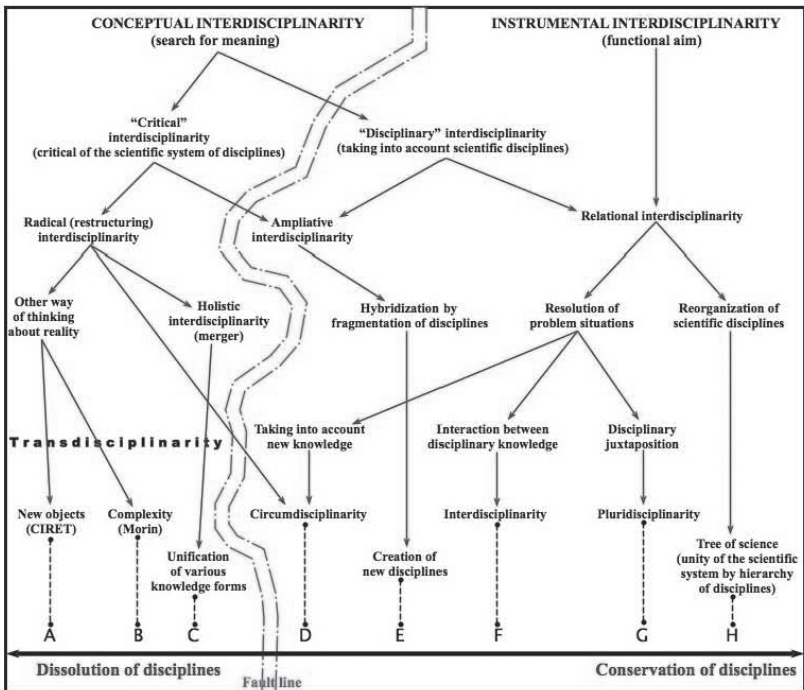
It was also necessary for me to determine the various interdisciplinary or supposedly interdisciplinary models implemented in Quebec and Francophone education (Lenoir, 2001; Lenoir, Geoffroy, & Hasni, 2001) (Figure 2 on the following page).

The crossroads of three parameters—the relation to disciplines, ranging from disciplinary dissolution to merging; the social aims (meaning-functionality); and the epistemological conceptions of interdisciplinary relations (Lenoir & Sauvé, 1998b)—enabled me to identify eight distinct forms of interdisciplinarity (Lenoir, Geoffroy, & Hasni). These were established following an analysis of some 200 writings and along an axis ranging from disciplinary preservation to dissolution. A fault line, which is obviously relative, runs between a more conceptual perspective that poses the question of the search for meaning, on the one hand, and a more instrumental perspective geared towards functional aims, on the other. This abundance of conceptions assigned to interdisciplinarity<sup>1</sup> can be found in education,

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<sup>1</sup> Klein (1996) has in fact shown the numerous difficulties that need to be mapped out in interdisciplinarity: “This mapping is all the more complex as it must reflect the multiple demarcation lines that are overstepped by interdisciplinary activities” (Lenoir, Geoffroy, & Hasni, 2001, p. 88).

teacher training, and other disciplinary and professional training fields. This testifies to the term’s polysemy and the need for a researcher to clearly define what is meant by “interdisciplinary” from a conceptual standpoint.

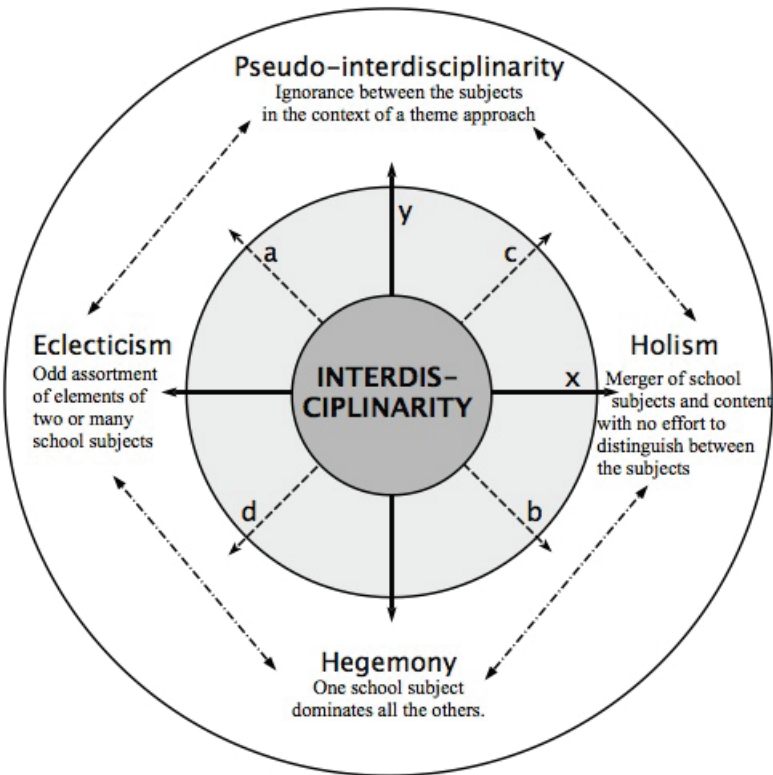


**Figure 2:** Types of interdisciplinarity, according to the relation to disciplinary knowledge, to social aims, and to the epistemological conception of interdisciplinary relations.

### 1.2 Interdisciplinarity in Elementary Teaching

The same foundations also provided the basis for my research activities. The results of my doctoral research (Lenoir, 1991) and my subsequent research on interdisciplinarity-related representations and practices enabled me to identify four predominant approaches to interdisciplinarity among Quebec primary teachers (Lenoir, Larose, & Geoffroy, 2000; Lenoir & Hasni, 2010). Regardless of the foundations and orientations of the three

curricula that have followed one another since 1970, few significant changes can be detected regarding interdisciplinarity. Placed on a Cartesian axis ( $x$  and  $y$ ), these four dominant approaches make up the extreme poles of two intersecting continua. The  $x$  axis (holism-eclecticism) concerns the degree of fusion or dispersion of academic disciplines, while the  $y$  axis (hegemony-pseudo-interdisciplinarity) concerns the intensity of relations between academic disciplines, ranging from domination to the absence of real links. The two-sided arrows  $ac$  and  $bd$  illustrate the fact that interdisciplinary practice can be associated with one approach or lie somewhere between two approaches. The circle at the center of the diagram represents the interdisciplinary perspective presented here (Figure 3).



**Figure 3:** Trends in interdisciplinary practices in Quebec elementary education.

The results of various research show that the pseudo-interdisciplinary approach based on the use of themes is especially evoked by teachers in the first cycle of elementary school. This trend primarily stems from their strong preoccupation with stimulating the interest of their students, with relational and psycho-affective dimensions (together with the organizational dimension) taking up a preponderant place in their actions with students, to the detriment of cognitive dimensions (Lenoir, 2006). The hegemonic approach, in which certain disciplines in point of fact merely serve as a pretext and springboard for the teaching of other disciplines, can especially be noted among teachers at the third cycle of elementary school. This trend may be explained by the priority these teachers give to the teaching of French. The eclectic approach—which is profoundly disjointed, since it conceives of teaching content as an odd assortment or “potpourri” to use the expression of Jacobs (1989) that can be randomly drawn upon—can be observed at all levels of elementary school. The holistic approach, which is based on a refusal of any specificity of disciplines in the name of the existence of a natural approach, is common among teachers who adhere to the pedagogical conceptions prevailing in Quebec in the 1970s. These last conceptions advance an open and active pedagogy, centered on student interests, which can overshadow the pursuit of cognitive objectives. It is worth mentioning that, as noted earlier, these four approaches are also used by teachers whose principal objective is to meet curricular objectives from a strictly administrative point of view. In this case, the above approaches become justifications for the absence (or near absence) of teaching of certain academic disciplines that are officially mandatory and planned in the pedagogical program, but are in reality considered to be of secondary social importance. The teaching of arts, natural sciences, and humanities can especially be cited in this regard (Lenoir, Larose, Grenon, & Hasni, 2000). Finally, it is important to also note arrows a, b, c, and d, which illustrate that teachers can use several types of approaches or even mix them together.

## 2. Three of the Principal Aspects Examined in My Research

Now, I would like to address three points on which I have especially concentrated my efforts during my research journey on interdisciplinary issues: the conceptual perspective, certain empirical results, and the existence of distinct paradigms or logics.



## *2.1 Interdisciplinarity in Teaching Practices*

### 2.1.1 Curricular Structure and Interdisciplinarity

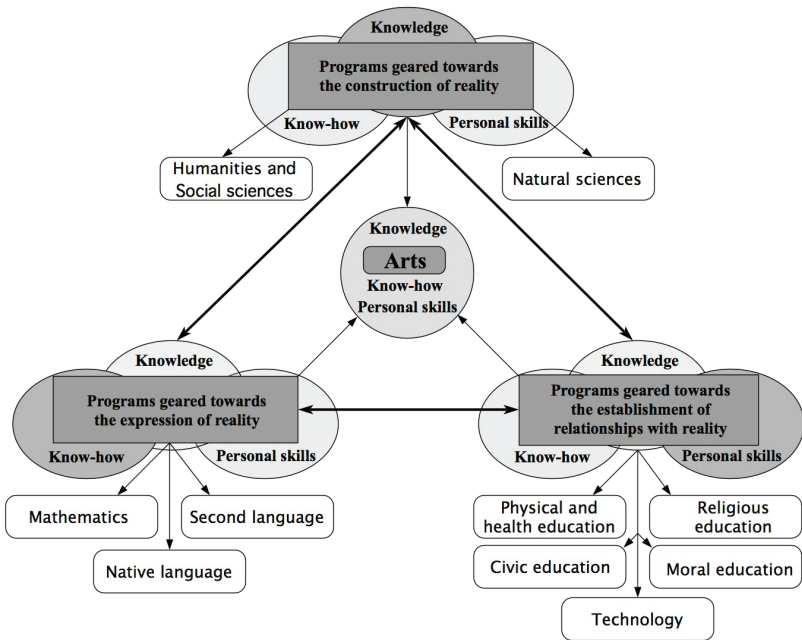
The first point I would like to raise has to do with the curricular structure of educational programs. Traditionally, the curricular structure is based on school disciplines presented side by side. The new curriculum announced in 2001 innovated by, among other things, grouping these disciplines into learning areas, namely the areas of languages, mathematics and science and technology, social studies, arts, and personal development. In my view, this grouping is problematic in several respects (see Gosselin, Lenoir, & Hasani, 2005; Lenoir, 1990, 1991, 1992). For example, while the curriculum officially promotes socioconstructivism, the teaching of humanities and social sciences is not mandatory in the first two years of instruction. How, then, can students be enabled to construct human and social reality in order to be able to communicate it? On what will the teaching of French be based, if not a strictly instrumental approach? Another example lies in associating the natural sciences with mathematics. Over and beyond the unfortunate use of the singular to qualify the natural sciences, hence making them out as “the” science—and excluding humanities and social sciences as well as mathematics, thus producing a monolithic and dogmatic conception and a real danger of reification—these two incoherencies, in my view, come down to the same lack of understanding about these academic subjects’ function. In addition, and perhaps most importantly, the teaching of natural sciences primarily exists to allow students to construct natural reality, just as the teaching of the humanities and social sciences primarily exists to allow students to construct human and social reality (Lenoir, 1990, 1991). In my view, it would therefore be more appropriate to dissociate the natural sciences—which deal with the construction of natural reality, that is, an environment made up of relations between natural elements including living beings, as humans understand them—and mathematics, a fundamental subject in the sense that De Landsheere (1979) has highlighted its primary function, as a formal language, as a “tool” subject. What the curriculum does not clearly show is the primordial function of conceptualization and, hence, the conceptualization process, which is related to the natural sciences and humanities and constitutes their specificity. While curricular orientations insist on the constructivist perspective, a certain resistance to this perspective begins to emerge when reading the curriculum. Indeed, one can detect that the conceptualization process is somewhat concealed, as if epistemological

realism constituted an indelible backdrop, or as if the distinction between what must be transmitted and what must be constructed at a cognitive level is not clearly established. More broadly speaking, the problem-solving and project-based approaches that are privileged by the curriculum are a source of confusion because they tend to conceal the existence of various scientific processes.

An analysis of more than 50 publications on curricular conceptions (for example Eisner, 1975; Eisner & Vallance, 1974; McNeil, 1993; Jackson, 1992; Pinar, Reynolds, Slattery & Taubman, 1995) has led me to produce an analytical grid composed of four criteria (Table 1) that I have subsequently applied to some 30 types of curricula.

<b>Table 1</b> <b>Four criteria by which to analyze a curriculum</b>	
<b>Criterion</b>	<b>Dimensions</b>
Ordering of content	Structuring into school disciplines (compartmentalized curriculum). Structuring into disciplinary branches. Globalism (integrated curriculum).
Focus of the curriculum	Focus on objects of learning. Focus on learning subjects (students).
Educational aims	Training or transforming through the transmission of a pre-existing reality. Training or transformation through the production of reality.
Operational modes	Teacher-centered. Interaction. Student-centered.

Taking into account certain parameters relating to the place and function of the various school subjects (their *raison d'être*) as well as their taxonomical structure, their objects of study and learning, and their learning approaches—and especially inspired by Bernstein (1971), De Corte, Geerligs, Lagerweij, Peters, and Vandenberghe (1976), Phenix (1964) and Young (1971)—I proposed a grouping of academic disciplines into four closely interrelated sets. These sets are established in line with three modes of relationships to reality and thus form a curricular structure with interrelated branches aiming to promote interdisciplinary approaches (Figure 4):



**Figure 4:** Proposed interdisciplinary restructuring of primary school curriculum in Quebec.

1. A set of disciplines that I refer to as fundamental subjects, as they constitute the indispensable materials for any apprehension of reality (programs geared towards the construction of reality). The object of these subjects is the structuring of natural, human, and social reality, and as such they prioritize the development of knowledge, in particular conceptual knowledge, which in no way excludes the learning of methodological and technical know-how as well as their related social and intellectual savoir-être or personal skills. These disciplines belong to the humanities and social sciences, as well as the natural sciences.

2. A set of disciplines that I refer to as basic subjects. The object of these subjects is the expression of reality, and as such they prioritize the development of know-how, which in no way excludes the learning of knowledge and personal skills with which they are associated. These subjects are languages (native and second language) and mathematics.
3. A set of subjects whose object is the establishment of a relationship with reality from various angles. These subjects consequently prioritize the development of personal skills, which in no way excludes the learning of knowledge and know-how with which they are associated. Among these we can cite technology, religious education, moral education, and various other types of education relating to health, peace, citizenship, etc.
4. A set of artistic disciplines whose object is the production and expression of reality, as well as the establishment of a relationship with this reality.

If this last set of disciplines occupies a special place, it is because of the specificity of its apprehension of reality and an expression of reality that calls upon an aesthetic approach to learning. While the perception of reality is only a point of departure for constructing reality in the humanities and natural sciences—a starting point from which the child will have to become detached—this perception will be systematically developed and exploited in the area of arts, for example when students exercise their imagination. An example can serve to illustrate this fundamental distinction. Students 6 to 7 years old are always led to give human characteristics to inanimate objects, for example their teddy bears, and to make them speak and live like humans. Their dolls are living beings; their toys talk to one other. In arts, it is normal to call on the imagination and fiction, and this can represent an appreciable contribution. This imagination can also be transplanted to communication processes. However, at the same age, students will learn in the humanities and social sciences as well as in the natural sciences to clearly distinguish between what is alive and what is not. This example, although perhaps somewhat simplistic, illustrates the difference between an aesthetic approach and a scientific one.

Indeed, while the teaching-learning process<sup>2</sup> in arts is fundamentally aes-

<sup>2</sup> I will here use the expression “teaching-learning,” which is employed in the French-speaking world, rather than “teaching” or “learning” taken individually. The

thetic in nature, the first three sets of disciplines (programs geared towards the construction and expression of reality and the establishment of relationships with reality) share the same methodological approach with a scientific character expressed through specific learning approaches depending on the cognitive aims pursued: conceptualization processes (what to know...), experimental processes (how to verify...), communicational processes (what to say..., how to say...), problem solving (how to go about...), etc. Implementing an interdisciplinary approach therefore requires that strong complementarity be established between the various teaching-learning processes involved.

### 2.1.2 Professional Training and Interdisciplinarity

The second point I would like to address has to do with the relations between interdisciplinarity and the professional training of teachers. Besides the political and economic motivations underpinning the promotion of interdisciplinarity in professional teacher education, what is in play here is the very conception of the foundations of teacher education. This training could be approached from a pluridisciplinary standpoint, consistent with a classic and cumulative approach based on the successive teaching of different disciplines along with what is conventionally called practical training (student teaching). However, approaching this training from an interdisciplinary perspective (in the generic sense of the term) raises questions about the subordination of professional training to the disciplinary model of training. It also brings up questions about the relation to disciplinary knowledge in the context of professional training, links between theory and practice, and the consideration of adisciplinary knowledge such as experiential knowledge, skills incorporated in action, and knowledge of otherness. These knowledge types are non-disciplinary and yet indispensable forms of knowledge that contribute to professional acts. In this sense, professional teacher education goes beyond interdisciplinarity and even transdisciplinarity; it becomes circumdisciplinary<sup>3</sup> in that professional knowledge encompasses a complex

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intent here is to highlight the perspective privileged by Vygotsky in using the term *obuchenie* to describe the bi-directional process of knowledge transmission-appropriation. This relates to the interactive and intersubjective option that, in my view, characterizes links established in the classroom between students, and between the students and teacher, in line with the pursuit of learning objectives.

<sup>3</sup> Circumdisciplinarity comes from the Latin *circum*, meaning “around,” which is the adverbial accusative of *circus*, meaning “circle.”

and interrelated whole of knowledges of various kinds, both disciplinary and non-disciplinary (Lenoir, 2000; Lenoir, Larose, & Dirand, 2006).

As in the case of scientific interdisciplinarity, academic interdisciplinarity—whether school-related or professional—can therefore be tugged between two opposing orientations: that of meaning turned toward epistemological issues, and that of practicality, of its social usefulness. Focusing exclusively on epistemological aspects may lead to a temptation to promote pluridisciplinary approaches. Conversely, thinking only from a social usefulness standpoint can lead to a utilitarian perspective that underemphasizes the importance of cognitive dimensions articulated within the disciplines. This is why interdisciplinary education as well as training on, by, and for interdisciplinarity must keep these two dimensions indissociable in order to avoid any kind of approach founded exclusively on practice or theory, and to guarantee that integration truly remains the aim pursued.

## *2.2 Empirical Results*

I would now like to take a few moments to address the empirical results obtained over the course of my research. For 30 years we have been collecting empirical data on the conceptions of interdisciplinarity, on the importance of school disciplines, and on the ways interdisciplinarity is implemented in the classroom. The results ultimately show that regardless of the official curriculum in effect—and three curricula have succeeded one another—the conception and implementation of interdisciplinarity have not changed significantly since 1980 (Table 2).

The latest data collection (research from 2004-2007 and 2007-2011) has yielded the same results as the research dating to 2002-2005.

The effects of this hierarchical order of disciplines have been clearly analyzed in Great Britain by the “New Sociology of Education” movement of the 1970s, and particularly by researchers such as Bernstein, Keddie, and Young in books that have had a strong impact in certain milieus (Bernstein, 1971, 1975; Forquin, 1989, 1997; Young, 1971). Bernstein promoted the use of integrated curricula (integrated code), since the contents remain open to one another, with classifications remaining flexible. He showed the negative social and educational effects of a curriculum that is compartmentalized into hierarchically defined disciplines (collection code), even if intra- and interdisciplinary structuring is frequent at a discursive level in these programs. Curricular structuring itself is a vehicle for social and ideological options that serve a particular conception of power relations within a given soci-

<b>Rank</b>	<b>CRSH research (1980-1981)</b>	<b>Lenoir research (1990-1991)</b>	<b>FCAR research (1992-1995)</b>	<b>CRSH research (1995-1998)</b>	<b>CRSH research (2002-2005)</b>
1	French	French	French	French	French
2	Mathematics	Mathematics	Mathematics	Mathematics	Mathematics
3	Physical education	Humanities	Humanities	Humanities	Geography, history, citizenship
4	Humanities	Physical education	Natural sciences	Natural sciences	Technology and sciences
5	English	Natural sciences	English	English	Phys. + health ed.
6	(Health education)	English	Pers. and soc. ed.	Physical education	English
7	Moral education	Pers. and soc. ed.	Religious ed.	Pers. and soc. ed.	Plastic arts
8	Natural sciences	Religious ed.	Moral education	Plastic arts	Dramatic arts
9	Religious ed.	Plastic arts	Plastic arts	Religious ed.	Music
10	(Sex education)	Music	Physical education	Music	Moral education
11	Plastic arts	Moral education	Music	Dramatic arts	Dance
12	Music	Dramatic arts	Dramatic arts	Dance	Religious ed.
13	Dramatic expr.	Dance	Dance	Religious ed.	
14	Manual activities				
15	Dance				

ety. With an approach similar to and developed on that of Bernstein, Young (1971, 1997) underscored that the selection and organization of cognitive and cultural teaching content translate the ideological presuppositions and social interests of dominant groups. His work cites three criteria by which

curricula can be classified, namely their degree of hierarchization, their specialization, and the compartmentalization of the knowledges that they contribute to transmitting. But for Young, “it is the question of stratification (or hierarchy) of teaching content that appears . . . most important, because it is through this stratification that one can better apprehend the political issues of knowledge transmission within educational systems” (Forquin, 1989, pp. 103-104, our translation). In addition to leading to divided instruction, this stratification leads, among other things, to devaluing many school subjects, as our research findings indicate.

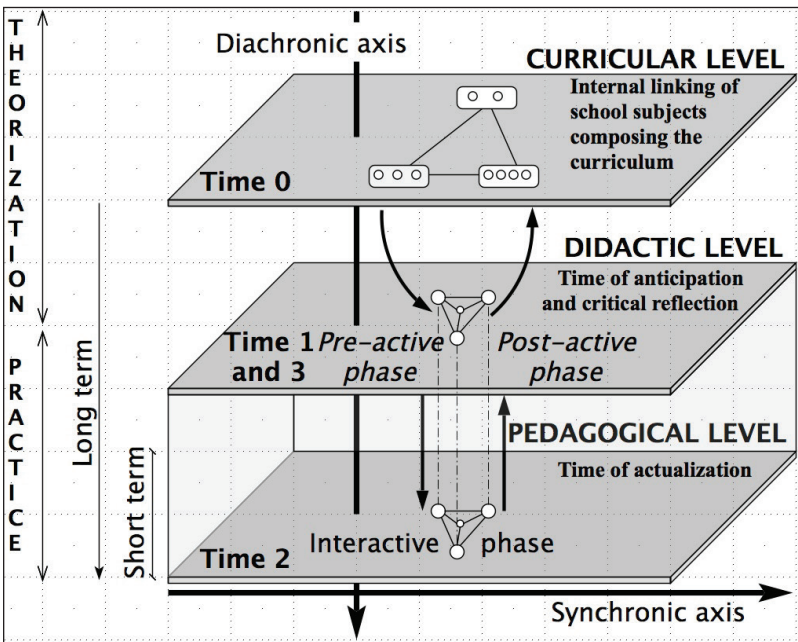
Social factors external to the school influence the hierarchical representations of school subjects among teachers (Lenoir, Larose, Grenon, & Hasni, 2000). A strong distinction also continues to be made today between fundamental and secondary subjects. In a word, progress has been minimal and government policy directions for curricula are often a source of confusion and obstacles to understanding. University training is just as deficient, with the logic of compartmentalized disciplines prevailing most of the time.

One case is especially interesting insofar as it highlights the weight of collective social representations on the hierarchy of subjects established by teachers. The pronounced decline in the importance ascribed to religious education is undoubtedly the result of a stronger rejection of the “confessionality” or denominational aspect of the Quebec school system. In fact, the deconfessionalization of administrative structures was ultimately made official in June 1998 with the replacement of denominational school boards (Catholic or Protestant) by linguistically designated ones (Francophone or Anglophone). Moreover, we are currently seeing a much younger generation of elementary teachers and can hypothesize that these new teachers adhere less to the Catholic faith or, at least, consider that religious education should not fall under the prerogative of education in schools. This hypothesis, which future teachers have explicitly confirmed in my research by justifying the place of religious education as a secondary subject, corresponds to the observation made 10 years earlier by the Catholic Committee of the Superior Council of Education, as well as the proposals outlined in the report of the Working Group on the Place of Religion in Schools (Gouvernement du Québec, 1999). The weight of political and economic factors appears to be decisive, as illustrated by the trajectory of the teaching of religion and science, which today have gained more consideration following an awareness campaign addressed to the general public.

In addition, with a few rare exceptions, the links required between the curricular, didactic, and pedagogical dimensions are not established from an



integrating perspective (Figure 5). Most often, teachers are situated only at a pedagogical level, that of their immediate action in the classroom. They are not aware of the curricular and didactic levels. The passage from the curricular level to the pedagogical level or, put more clearly, to the practice of teaching in class, requires the mediation of didactics in line with school disciplines. The step of classroom actualization requires that the teachers understand the aims pursued by each school discipline, as well as the specificities and mutual contributions of all the disciplines.



**Figure 5:** Relations between the curricular, didactic and pedagogical levels.

Actualizing interdisciplinarity at a pedagogical level therefore requires not only a theorization of interdisciplinary practice on the didactic level, using rich and coherent models, but also the light that can be shed by a curricular analysis of interdisciplinary possibilities offered by programs in effect. Otherwise, there is a risk that the practice of interdisciplinarity will become a mere recipe, mere agitation, or the illusion that anything is possible and that all that is needed is to put a few learning objectives, garnered here and there, into a few programs to create an interdisciplinary activity.

As a result, it is important, once this is understood, that the teachers design teaching-learning activities that draw on the didactic dimensions that guide the structuring of learning objects so as to make them accessible to students. Hence, the interactive phase, that of actualization in class, requires a preactive phase, that of planning the teaching-learning situation, which calls upon didactic aspects.

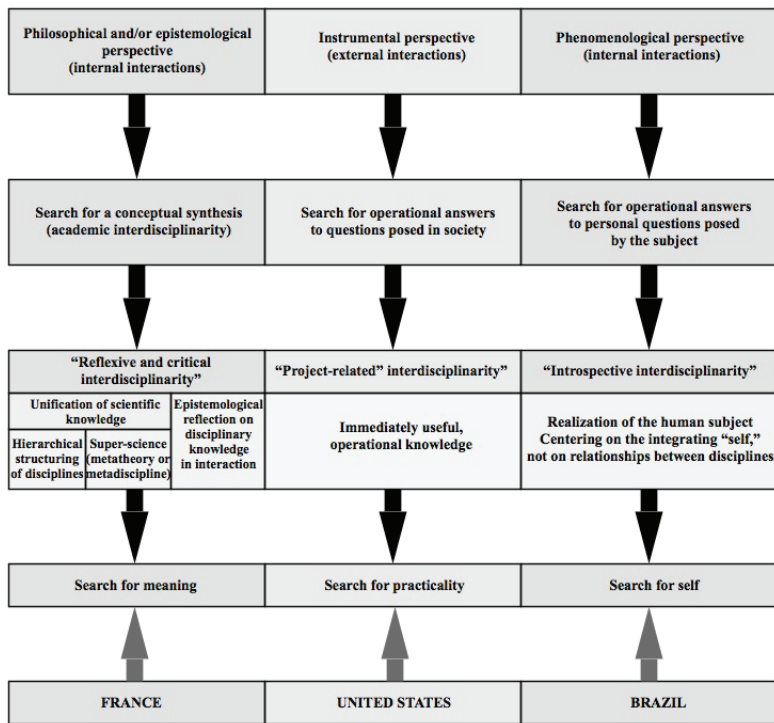
The didactic level, through didactic models, provides this mediating function. It serves as an indispensable interface between curricular structuring—in terms of disciplines, but aimed at interdisciplinarity and integration—and pedagogical actualization that is transdisciplinary or even circumdisciplinary (Lenoir & Sauv , 1998b), since it is situated in a project of educative production and draws on other knowledge types than experiential knowledge and knowledge of otherness. Seen in this way, the pedagogical level leads to a social recontextualization of learning and reinserts it in its functional dimension.

### *2.3 The Existence of Distinct Logics*

I would also like to say a few words about the cultural paradigms or logics that underpin teachers' conceptions about interdisciplinarity. In Quebec, we have the advantage of participating in two cultural traditions—Anglophone and Francophone—which leads us to read at least the French- and English-language publications, and, today, increasingly, the Spanish and Lusitanian ones. Most university professors completed their doctoral studies in France, Belgium, the United States, English-speaking Canada, and Quebec. The confrontation between distinct scholarly references is a strong source of vitality. As for myself, I have one foot in French-speaking Europe where I was born, where I lived the first years of my life, and where I completed my studies. But for almost 50 years now, my other foot has been in North America, where I have been immersed in another culture.

In terms of interdisciplinarity, this situation has strongly interested me. By more extensively examining the Anglophone North American and Francophone European perspectives (and, later, the Brazilian and Latin American perspective), I have been able to identify a series of factors that may explain the existence of distinct sociohistorical logics and their underlying rationales (Figure 6). I will explain these logics based on a personal experience and on an analysis of the literature (Lenoir, 1999, 2002). In 2000, in an international conference, I invited 32 researchers from various European countries (Belgium, France, Switzerland), North America (Canada, United

States) and South America (Argentina, Brazil, Chile). The European participants extensively discussed the relevance of implementing interdisciplinarity, the meaning it should be given, and its impact on the hierarchy of scholarly disciplines (the Tree of Knowledge). Gordon Vars and Julie Klein then took the floor and wrote on a board to explain, in a few very systematic points, how interdisciplinarity can be operationalized. As for the Brazilians, they put on music and projected slides. Although I wish to avoid over-generalization and caricature, this concrete example taken from direct experience spurred on my reflection, in parallel with a critical analysis of publications originating from these three cultures.



**Figure 6:** Three logics of interdisciplinarity.

Various observations have allowed me to highlight at least three distinct logics in the field of education. These logics result from sociohistorical and cultural factors that cannot be developed here (see Lenoir, 2002). The Fran-

cophone European logic, strongly marked by Cartesianism, Voltaire, and the Encyclopedists, is founded on the question of meaning. The epistemological perspective comes first, as also clearly shown by methodological publications. As a result, knowledge is also foremost and has taken up all the space at school, at least until recent decades. The Anglophone and North American logic is based on other ways of thinking. Transformations in the educational system inherited from the United Kingdom at the end of the 19th century, marked by pragmatism, emphasized the importance of know-how. This phenomenon is well illustrated by methodological publications in education that primarily develop procedures for data collection and treatment. Conversely, Francophone publications tend to concentrate on the epistemological foundations and issues of educational research.

In Brazil, in interdisciplinary discourse, it is neither knowledge nor know-how that predominates, but rather a certain form of *savoir-être* or what might be called “personal skills” centered on affective, aesthetic, and perhaps playful dimensions. To me, these three paradigms of meaning, practicality, and affectivity appear complementary and should link together to ensure the implementation of interdisciplinary approaches in teaching practices. To put it otherwise, interdisciplinarity requires the mind, the hand, and the heart, in Spanish *la razón, la mano, y el corazón* (Lenoir & Hasni, 2004).

## Conclusion

In conclusion, I must note that today, the interdisciplinary approach is especially conceived in education, at least in the Francophone world, in the sense put forth by Huber in 1992: “[I]nterdisciplinary studies must have their place as a supplement, even a corrective measure for education and training based on the disciplines” (p. 194). Interdisciplinarity offsets the weakness of disciplinary education, in terms of the construction of social and biophysical reality as well as the construction of the meaning students seek in their learning and their motor, intellectual, and affective engagement in this learning. However, resistance is still very strong, and pluridisciplinarity and interdisciplinarity are frequently confused.

In my view, three principles must underpin the endeavor to link the school subjects together in order to enable the adoption of an interdisciplinary perspective with an integrative aim:

1. Curricular interdisciplinarity does not seek the disappearance of

disciplines or the establishment of a common methodology, a common language, common techniques, common specific objectives, or even a combination of all of these constitutive elements. To the contrary, while respecting specificities and differences, it targets the establishment of convergence and complementarity between knowledges.

2. Curricular interdisciplinarity is based on the principles of equality and complementarity between the various learning contents.
  - a. It targets the establishment of a general and coherent conceptual structuring of all knowledge as convergent and complementary contributions between basic disciplines (the “basic tools” enabling the expression of reality) and fundamental disciplines (subjects enabling the construction of reality, that is, its conceptualization).
  - b. It gives each school subject a functional meaning with respect to learning, a meaning established according to previously established social choices. In this sense it is at odds with the common distinction between primary (important) subjects and secondary (lesser) subjects.
3. Curricular interdisciplinarity must provide a basis for close relations to be established between the concept of interdisciplinarity and that of integration. The objective is not primarily to design an integrated curriculum, but rather an integrating curriculum, thus favoring the implementation of integrative approaches that seek the integration of integrating processes and integrated knowledge.

These are the conditions required for this interdisciplinary conception of the elementary school curriculum to be able to reveal true possibilities for interaction between the various subjects, knowledge types, and characteristic approaches.

Understood in this way, academic interdisciplinarity can be defined as follows (Figure 5): It is the action of putting two or more school disciplines into relation on the curricular, didactic, and pedagogical levels, leading to the establishment of links of complementarity or cooperation, interpenetration, or reciprocal actions from various standpoints (aims, objects of study,

concepts and notions, learning approaches, technical abilities, etc.). These interactions aim to promote the integration of learning processes and knowledge among students. In teaching-learning practices, the teacher's role is to establish the conditions judged to be the best, the most appropriate, to promote and support student learning processes. To draw on interdisciplinarity at school is to introduce conditions that are normally favorable to students' implementation of integrating processes by calling upon various and inter-related disciplinary angles. For, indeed, it is not the teacher who must do the integrating, but the students.

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