

REALITIES AND CHALLENGES OF EDUCATIONAL REFORM IN THE PROVINCE OF QUÉBEC: EXPLORATORY RESEARCH ON TEACHING SCIENCE AND TECHNOLOGY

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ABSTRACT. Exploratory and descriptive research was conducted in a secondary school to reveal the realities and difficulties of the implementation process that awaits teachers under Québec's Educational Reform. A team of teachers agreed to be observed while simulating implementation one year ahead of other schools. Results underscore the importance of in-service training, of an implementation plan, and of the level of professionalism. Analysis tends to indicate that the Québec implementation experience is not uncommon.

RÉALITÉS ET DÉFIS DE LA RÉFORME SCOLAIRE QUÉBÉCOISE : UNE ÉTUDE EXPLORATOIRE DE L'ENSEIGNEMENT DE LA SCIENCE ET DE LA TECHNOLOGIE

RÉSUMÉ. Une recherche exploratoire et descriptive qui a été menée dans une école secondaire illustre les réalités et les difficultés relatives au processus d'implantation chez les enseignants qui vivent la réforme scolaire québécoise. Une équipe d'enseignants a consenti à faire l'objet d'observations alors qu'ils tentaient une implantation anticipée du programme de science et technologie (premier cycle) au secondaire, une année avant l'implantation officielle. Les résultats obtenus réaffirment l'importance de la formation continue, de l'existence d'un plan l'implantation et de la professionnalisation enseignante. L'analyse tend également à montrer que l'expérience d'implantation québécoise n'est pas fondamentalement différente de celle qui a été conduite ailleurs.

We cannot lose sight of the fact that innovation is about abandoning practices and routines, and that means going without tried and true signposts. Thus, to innovate is to accept both professional and personal risks.

(Finkelsztein & Ducros) (free translation)

ISSUES

Social and political context

In the wake of a worldwide educational overhaul, and other research and publication initiatives by the *United Nations Educational, Scientific and Cultural Organisation* (UNESCO) and the *Organisation for Economic Co-operation and Development* (OECD), Québec's education system is undergoing substantial

reform (hereinafter, the Reform). Begun almost 15 years ago, with hearings held by the Commission for the Estates-General on Education and the filing of their final report entitled *The State of Education in Québec (États généraux sur l'Éducation)* (Gouvernement du Québec, 1996), the underlying philosophy of the approach started to become tangible in the *Rapport Inchauspé (Inchauspé Report)* (Gouvernement du Québec, 1997) and the *Énoncé de politique (Ministerial Plan of Action for the Reform of the Education System)* (Gouvernement du Québec, 1997). It also materialized through numerous other reports issued by the Ministère de l'Éducation and the Conseil Supérieur de l'Éducation, culminating more recently in the new curricula (Gouvernement du Québec, 2001), which began to be introduced into elementary cycle one (first and second years of elementary school) in 2000. This implementation process, which will impact the entire elementary and secondary school system, is being phased in in stages, with completion expected by 2009-2010. Secondary school reform was originally anticipated by 2004-2005, but in the end it was delayed until 2005-2006, on the grounds that the implementation conditions were not in place. It was thought that this deferral would grant the teachers a little more time to familiarize themselves with the new programs, presented as a "year of familiarization" (*Année d'appropriation*). However, despite the opportunity this created to facilitate teachers' preparation and training to cope with the challenges that lie ahead, this extra year passed very much like the previous ones, meaning that teachers did not benefit from any special or new assistance. Many observers have deplored the lack of a province-wide training strategy. Although a very few training programs were set up in the more urbanized areas, they were essentially based on top-down approaches and were aimed at training multiplying agents (teachers assumed to pass on new knowledge to their colleagues). Moreover, those overseeing the process were barely able to meet the demand. Meanwhile, the outlying areas were, for their part, almost completely left to their own devices. In these places, responsibilities for implementation, management and organization of skills upgrading and training fell to the school commissions (school boards) and the schools themselves, thereby giving rise to numerous interpretations, messages, and oftentimes confusion and a feeling of apathy about the implementation process.

All in all, it can be argued that a genuine culture of implementation does not seem to exist in the province of Québec, at least not as it does in the anglophone culture. The best contributions to the subject are very recent (Biron & Cividini, 2005) and were not yet published at the beginning of this research. To explain the lack of an implementation culture in the schools, we may put forward the hypotheses of the relative youth of the teaching staff, who are largely unaware of previous implementations (most recently 1992 for the 4th year of secondary science classes), or the lack of support from the universities, which are too small to provide adequate support and which very

rarely possess deep expertise in implementation processes. This is in contrast to the United States, for instance, where this is an important field. In the vast majority of cases, the people in charge find themselves in a position of having to reinvent the notion of implementation in a context of overload. Also, teachers are often entrenched in passive, wait-and-see attitudes as far as these changes are concerned. Although academics (Hasni, 2005), the unions and the media have raised a number of concerns about teacher training and the implementation plan, the government was determined to forge ahead, with application to the level of secondary one in 2005-2006.

The professional context of secondary science and technology teachers

Within the framework of the Reform, the challenges that await science and technology teachers are probably among the greatest that a teaching professional may encounter (Francoeur, 2005; Barma & Guilbert, 2005; and Dionne & Potvin, 2005). Among these challenges, we note the need for familiarization in or appropriation of new knowledge from several different disciplines (including engineering technology), and the requirement to incorporate this knowledge into broad, contextualized and integrated learning experiences and to provide a diverse range of activities (Gouvernement du Québec, 2004a). From now on, teachers must also apply a curriculum based on a two-year cycle, replacing the annual programs, and requiring tighter coordination of teachers' work in a given cycle. They must also abandon their ingrained habits of transmitting knowledge to the students and instead embrace new approaches based on social constructivist theories (Gouvernement du Québec, 2001) of learning. In addition, they must target general, cross-curricular competencies, for example, the second competency in science and technology, "make the most of his/her knowledge of science and technology" (2001), along with all the attendant business of class management, personalized coaching and assessment. Lastly, teachers are asked to frame their teaching within what is termed "the broad areas of learning" in order to establish connections with present-day social realities like the "media," "consumption and the environment," "citizenship," etc. (2001). In short, the practice of teaching must be renewed, to turn out students capable of actively participating in a democratic society in a changing social context where knowledge is exploding and the ability to fulfil one's potential is a social and economic issue.

The pedagogical and organizational challenges and social responsibilities that these teachers are facing appear to be wide-ranging and extensive, and yet the teachers seem to have few resources and little support when it comes to implementing the Reform. As Gauthier (2004) points out, when individuals must transform their practices, that is, do things they have never done before, all reforms must produce incompetence. And, since very few research studies preceded the Reform, the authors encourage the universities

and their researchers to propose research initiatives so as to at least follow its progress.

RESEARCH QUESTIONS

The current professional situation seems particularly alarming at this point. Thus, as Fullan points out, “Curriculum innovations fail more often than they succeed and one of the main causes of this failure is simple neglect of the implementation process” (Fullan, 1992), and according to Paquette, “How often interesting proposals are stillborn due to an evident lack of support by the organization” (free translation) (Paquette, 1987). It seems that the implementation process should be as important as the nature of the prescribed change, at the very least. We therefore thought it valuable to contribute to clarifying the current implementation process in order to chart a path for all those involved in the educational field, including teachers, boards or administrations, school boards, etc., who are called upon to intervene or act in this context up to 2010 and beyond.

On this point, previous implementation experiences (OECD, 2005) merit some attention, although each implementation is distinctive, and it is not clear that past events can always provide appropriate information for the current Québec context. Even so, this particular Reform is considered a major pedagogical change and a new way of thinking, and is, moreover, taking place in a context of a decentralized implementation process, where small and medium institutions become almost entirely responsible for this process. Here, we address secondary science and technology (S&T) teaching, since many consider it the subject with the greatest pedagogical challenges. We will attempt to account for the difficulties that teams of teachers are likely to encounter when faced with challenges similar to those posed by the implementation of the Québec Educational Reform. We will focus on the following points:

1. Curricular considerations (planning and teaching)
2. Assessment-related issues (planning, tools, diagnoses)
3. School systems
4. Professional development for teachers involved (ideology, design, recommended approaches, rationale for the Reform, etc.).

The objective of this study, emerging from these sub-objectives, is therefore to inform teachers, as well as the education and research communities, of the constraints and difficulties in Québec’s coming implementation process, and to suggest potentially productive ways to proceed. Hopefully, the lessons drawn from this research initiative will help education practitioners avoid unproductive approaches and needless time wasting.

The objective of this article was to inform anglophone readers of the overall realities of the implementation process, as examined in this case and as will

presumably be experienced throughout the French-speaking province of Québec over the next few years. A second objective was to attempt (in the results and interpretation section) to compare our findings with those obtained by researchers in other contexts, notably Liang (1997), Porter (1999), and Vander Borcht (2004). We will also examine studies by Paquette (1987), which, although less recent, are closer to home, and which bear witness to the reality of an implementation process with intentions and implementation conditions very similar to those currently put forward by the Ministry.

Clearly, a few pages are not enough to faithfully reproduce the events in all their detail and enormous diversity, nor all the observations made during the year of “appropriation,” but we felt it important to at least report the key findings emerging from the analysis and interpretation of results. Let us start by explaining the methodology employed.

METHODOLOGY

Given the social relevance of the subject and the recentness of the implementation situation in the province, exploratory research seemed appropriate. The implementation phenomenon – as a whole and as a teamwork experience – has been identified as the research topic. Observation and interviews were the strategies favoured.

A cycle-one teacher team made up of six science and technology teachers, two laboratory technicians, a pedagogical counsellor and the principal of a secondary school in the Greater Montreal area agreed to take advantage of the 2004-2005 school year, designated by the government as the year of familiarization with the new curriculum, to undertake implementation of the process one year ahead of other Québec schools. A total of a little more than 800 secondary one and two students were involved through teaching initiatives. The teachers concerned, who varied greatly in years of teaching experience, initially showed plenty of enthusiasm for and interest in the project. Two researchers – education and evaluation specialists – followed them for a full school year in an exploratory study. The researchers conducted interviews (explicitation interviews [Vermersh, 2000]), observed classes (participating observations [Deslauriers, 1991]), held discussions, and attended the teachers’ planning/debriefing meetings. These meetings were an opportunity to report on the progress of the team’s recent efforts and organize upcoming work, or at least set deadlines. To preserve the characteristics and representative nature of the simulation at these meetings, the researchers refrained from actively participating in any of the teachers’ teaching initiatives and restricted themselves to answering questions posed by them (Distal position [Dionne, 2004]). In a few rare instances, they initiated discussions and gave feedback on the documents produced when asked to do so, but without actively intervening in the decision-making or initiative-taking.

The six teachers involved were required to construct or adapt at least eight “learning situations” (four for each level of the cycle) that complied with the requirements of the new curriculum. The term “learning situation” refers to lesson planning from the moment when a theme or a problem is proposed to the students until the teachers’ objectives are achieved.

It was agreed at the outset that the teachers would be responsible for reaching a consensus identification of the subject matter topics to be dropped to “make room” for the new learning situations. Thus, the intervention model proposed a phased integration of new content and requirements and former programs were to be phased out. We believe that this progressive implementation approach complies with the OECD recommendations (2005). We had two further reasons for retaining this model. First, we considered this a sufficient workload, and second, the teachers did not have all of the teaching materials (manuals and workbooks supplied by the publishers) that they would be able to use later during the actual implementation. In addition, to free our subjects from the constraints of having to teach and assess the entire content of the current programs, they could benefit from a moratorium on the year-end evaluation. They were also mandated to try out their four learning situations on all their students (regular classes of from 28 to 34 students), except for the first situation they developed, where, with a view to gradual implementation of the teaching methods, they were allowed to choose the classes in which to try it out. Furthermore, the learning situations had to include tools for assessing the potential development of student competencies. As far as possible, these tools had to comply with the government’s *Policy on the Evaluation of Learning* (Gouvernement du Québec, 2004a).

The teachers also had to agree to participate in a minimum of three individual interviews of about one hour each. The first was held before classes started, the second at mid-term (in March), and the third at the end of the school year. All the interviews were tape-recorded, transcribed and analyzed. In addition, the six teachers were instructed to participate in all the “planning/debriefing” meetings (held about once every three weeks), for which they were given time off by the school administration, and to allow us free access to their classrooms for observation purposes. The researchers prepared detailed reports on all these meetings and observation sessions. They also analyzed the lesson plans provided by the teachers.

As for the pedagogical counsellor (a school board based professional in charge of supporting professional teaching practice), the principal and the technicians, their role was to make regular contributions to the simulated implementation, as far as their duties allowed. The principal and one of the technicians were interviewed on one occasion (at the end of the year), and the pedagogical counsellor was interviewed twice. All the interview questions were based on the research objectives. Over the summer and fall of 2005, we carried out an analysis of the interview transcriptions, the reports of the

meetings and observation sessions, and the documents submitted by the teachers. This data was examined and coded by key words pertaining to the previously stated research objectives. Interpretations progressively emerged (emergent categories coding) as the two researchers examined them.

RESULTS AND INTERPRETATION

We will begin this section with a brief presentation of the overall results of the experiment, insofar as it can be considered as a whole. This first section will give the reader an idea of the general progression of the most noteworthy events. Next, further results revealed by a deeper analysis will be presented in categories that are closely related to our objectives but not necessarily with one-to-one correspondence. These results will then be compared with those of other typical studies in the field. We elected to organize the presentation in categories highlighting the most significant findings emerging from the analysis.

Overall presentation of the results of the experiment: some instructive findings

A first noteworthy result was uncovered through overall analysis of the events that transpired during the experiment. We may begin by mentioning that, despite the explicitly worded invitation in the *Québec Education Program* (Gouvernement du Québec, 2004b) for secondary one and two teachers to work together within “cycle teams,” our subjects nonetheless decided to divide the work into two sub-groups, one for each secondary level, the mandate thereby becoming that each team establish four learning situations. From an analysis of the initial interviews, it was clear that, even with initially comparable motivation levels, the two work teams were not equally capable of fulfilling the agreed mandate.

More specifically, while the secondary one team managed a sustained development and design process and created three learning situations, the “secondary two” team were practically ineffective all year long, and did not succeed in putting together any learning situations with the potential to meet the research project criteria. Although this failure led to an important gap in our research data, it nonetheless served as a basis for analysis, since it was then possible for us to investigate some causes of evolution – or non-evolution – throughout the process (see the section on teamwork). Indeed, with one exception, and despite some occasional discomfort, we were able to conduct all the interviews.

It therefore became apparent that some of our subjects were not, and even, *not at all* invested in developing learning situations (apart from participating in discussions during the meetings and interviews). We note that these individuals were, paradoxically, the very ones that had originally expressed the strongest enthusiasm, in some cases even proposing that we push the

envelope beyond the stated criteria of the research project. We may also note that these subjects, despite the difficulties encountered and the mounting delays, repeatedly reaffirmed their desire to pursue the project, frequently going so far as to spontaneously promise to fulfill the mandate, but “later.” These observations raise methodological questions about the value of very common assertions about the importance of good initial motivation for reform implementation. Our data could not able us to understand this phenomenon, but our results seemed striking enough to raise important questions and invite further research on the topic.

A second interesting finding concerns the overall limitations of the progress made by the secondary one group. The work started off late enough (December), and quite modestly, with the adaptation of an activity called *Les tropismes*. This activity, under-managed and calling for most of the work to be done by the students outside classroom hours (i.e., homework), was, in the teachers’ words, a “catastrophe.” They saw unmotivated students, hasty work, poor learning, senseless experimental reports, oral presentations that “missed the mark,” and so on. The teachers characterized the results as “discouraging.” A second situation that took place in February-March, called *Projet Labyrinthe*, was also an adaptation of a situation that had been previously tried by some of our teachers, and concerned the behaviour of mice moving through a student-fabricated cardboard labyrinth. Although this project was better managed, more appreciated by the students and conducted in class – unlike the former – learning objectives were apparently not reached, and we could see the enormous workload involved in designing this kind of activity, as well as the quantity of resources (technicians, materials, and storage) required. The activity was also an opportunity to comprehend problems of class management and organization. Finally, the last situation, that was entirely new, named *Projet Eau là là!*, involved pinpointing the origin of a make-believe drowned body, using samples of water taken from the lungs. The activity was preceded by a series of exercises to investigate potential water properties. Identifying the body’s origin was then posed as a police mystery to be solved. Very well managed and less open-ended, it was considered a resounding success by teachers and students alike. As the designers themselves admitted, however, it was not based on a systematic development of competencies.

The secondary one team, which delivered a sustained effort, expressed over and over again that the planning of this “learning situation” took a great deal of work, to the point where some of them questioned the feasibility of this kind of approach in their milieu, and they felt exhausted. On the other hand, the team claimed they were satisfied with the way they had worked together, and the researchers reported substantial progress in the level of discussion during the meetings, along with a certain increase in individual satisfaction.

Teamwork

At first, it appeared that a particular kind of leadership in the work teams was a determining factor in the results obtained. For example, in the secondary one team, two experienced teachers assumed strong leadership from the outset right to the end, although they also did more than their share of the work. In the opinion of all the members, this appeared to be a significant difference from the secondary two team. We also noted – in both teams – that it would probably have been very difficult for the less experienced teachers to take the lead. In the secondary two team, the work almost never got underway, and they spent the last months of the school year casting blame on their colleagues for their lack of leadership: “Such-and-such a person should have become the team leader because he/she had more experience,” or “... because they had more motivated groups of students,” or simply “more cycle one groups” (free translation).

Another characteristic of effective work teams seemed to be their ability to organize the work, define clear goals and set deadlines. Even if deadlines are not precisely met, they allow the work to get started and energies to be focused. In the secondary two team, the work was not well organized, meetings were put off until later, deadlines and goals were poorly defined, consensus never emerged from “brainstorming” ideas, individuals would not deviate from their positions, scepticisms or personal preferences, and the work was tabled for “later” until the end of the year was upon them.

Thus the secondary two teachers initially seemed to have neither the instinct nor habits for teamwork. When things finally started to come together, it came with numerous adaptations and radical changes in work habits. In every case, the teachers stated that teamwork required a lot of collaborative time, and that this time should have been taken outside of class hours, since the teachers did not like to be excused from their classes, leaving them in the hands of substitutes. It was even more difficult to get the teachers to take time off to attend all the “planning/debriefing” meetings. Several of them also mentioned that they felt effective teamwork depended on whether or not they were lucky enough to be grouped with colleagues that worked well as a team.

Although these observations concerning teamwork do not constitute new knowledge (Paquette, 1987), they do underscore the importance of effective teamwork in the context of practice renewal (Proulx, 2005), and this seems to be even more salient in cases of very radical reform processes, like the one studied. They also suggest that the teamwork culture may not have been sufficiently developed across Québec’s teaching system, and that this could prove a major obstacle to the implementation process.

Teacher training

Numerous indicators suggest that our participants did not receive all the required preparatory training to implement the Reform. Each of them explicitly complained, sometimes repeatedly, that they had not received or had received very little “Reform” training. In every case, the very few initiatives proposed by the authorities proved unsatisfactory or even “frustrating” to them. We also noted that the teachers expressed very divergent notions of why the Reform was taking place in Québec. Of the 19 reasons cited, only one, high dropout rates, was mentioned by more than four teachers. It was therefore evident that the Ministry has not transmitted a clear message to the teachers as to the causes and consequent pathways for development. Meanwhile, certain researchers have identified an unequivocal understanding of the goals of a reform as an essential condition for their successful implementation (Porter, 1999) (Perrenoud, 2005; and Goertz, Floden, & O’Day, 1995). Nonetheless, for many participants in the Reform, especially when it comes to the evaluation of competencies and cross-curricular competencies, “there are still a lot of grey areas” (free translation). They recognize that they have been abandoned to their own devices and that the authorities have not addressed the underlying issues nor provided answers to their most important questions. They also deplore the fact that the school administration takes no interest in them:

I don’t get the feeling that I’m talking about the Reform with the administration. I get the impression that they live in a completely separate world, and it’s got nothing to do with learning. I haven’t had good experiences with the administration. [...] I’ve never had a principal come and ask me what we’re doing. (free translation)

As for the administration, it simply complains that it has “no time” to get involved with all the teachers in the school.

Paradoxically, even though the teachers differ on the reasons for the Reform, they nevertheless express some convergent views when asked about the ways and means, such as timelines, material resources, training and collaboration.

Also, the teachers stated, principally during the school year, that their experience with the project would give them “a considerable head start on the other teachers” (free translation). They believed it necessary to “jump in” and “get their hands dirty” (free translations) if they were to understand how to convert the Reform plan into reality. This seems to support the observations made by Paquette (1987) during the previous reforms. At the end of the experiment, our subjects felt better equipped, but paradoxically, they also felt they had not evolved enough in their views and attitudes towards the Educational Reform. Moreover, they said they had not progressed enough with respect to the evaluation of competencies, most of their

concerns centering on the marking system. This obsession with grades was also observed by certain authors during the 1982 implementation (Paquette, 1987), as well as in other research contexts (Dionne, 1999). The following statement would be typical:

It's the evaluations... that's what scares me. The parents are used to the way it's done. Personally, I'm afraid that when they see the new way, [...] I'm afraid that the parents will do an about face and say, no, we don't want that at all. We want marks. (free translation)

Finally, at the end of the process, they considered that the teachers would probably not need training so much as *coaching* (ongoing feedback and academic support) in the design and practical application of learning situations.

Resistance to change

Even though they were able to achieve most of the stated objectives, and despite their strongly expressed motivation, the secondary one teachers exhibited a number of behaviours and attitudes that suggest they had a lot of trouble letting go of their old teaching habits, with respect to both content and customary practices and methods (Perrenoud, 2005; Tardif, 2005; Proulx, 2005). First, despite the fact that they were freed from the constraint of having to teach and evaluate the entire former program (ecology), the teachers had serious reservations about dropping some of its elements. In fact, by February 7, absolutely nothing had been cut! The first learning experience, rather than taking place in the classroom, had to be done as homework by the students. In addition, this activity was heavily inspired by ideas taken from the old ecology course, which considerably diminished its innovative nature. This result was in no way surprising, since many similar observations have been made in the past (Goertz et al., 1995), although we must admit that the resistance we observed here was, perhaps, even more tenacious than the literature appears to indicate (Lafortune & Deaudelin, 2001; Lafortune & Martin, 2004; and L'Hostie & Boucher, 2004), despite subjects' repeatedly expressed willingness to upgrade their practices. Instead, it took a sense of pressure and great urgency before some time was freed up at the very last minute for the remaining learning situations to "make room" for innovative activities to be applied in the classroom. By their own accounts, the teachers were "resistant to change" (free translation). As for the secondary two team, we know that they did not relinquish any of their content, even stating, in some cases, that they wanted to protect their "favourite" parts of the program.

Our participants also had great "ideological" difficulties in producing pedagogical innovations. Some of their proposals looked more like "window dressing," with little change in methodology. For example, the Reform requires that, henceforth, learning situations should be designed to lead from the complex to the simple, but some teachers argue that "the students really have

to have a certain amount of background before they can initiate learning situations (sic)" (free translation). In addition, faced with the requirement to design learning situations focused on developing competencies rather than knowledge, some expressed concerns that the Reform threatened to "sacrifice a generation of students" (free translation). Researchers have already noted a similar tendency among teachers to maintain "an apparent dichotomy between the wish to provide scientific literacy for all and the need to prepare students to be future scientists" (Porter, 1999), and to move away from the "eternal focus on content" (free translation) (Goertz, et al., 1995; Paquette, 1987). When classroom problems surface during learning situations, teachers evoke lengthy lists of student inadequacies, suggesting that they are not "ready" to experience this kind of thing, or that the scholastic problem is essentially a social or family problem, which, they think, the school cannot resolve.

We note also that in the last (third) learning situation (*Projet Eau là là!*), which was considered an impressive pedagogical success, the teachers nonetheless watered down some of the requirements previously imposed on their students in other activities (which had not been considered successful). Thus, even though the "Eau là là" project offered the secondary one students some very exciting activities with quite interesting laboratory experiments, exercises and reflections, it left very little place for student autonomy, nor did it explicitly claim to develop competencies, which clearly strays from the intents of the Reform. It therefore seems quite possible that motivated teachers who propose innovations in line with the Reform, and who achieve them, could in the end deliberately decide to back-pedal for all kinds of reasons (Paquette, 1987), for example, to reinstate classroom equilibrium or simply prevent teacher burnout. We also saw that teachers frequently gave students hints for the answers instead of giving them time to work them out for themselves, although this was the stated requirement. This type of behaviour has also been observed in other studies (Liang, 1997). The school administration claims that "The teachers that tried out new things found themselves in situations of uncertainty and discomfort, which might make them back off" (free translation).

Classroom experience with the developed activities

In the teachers' views, and according to our classroom observations, it appeared that the activities developed, especially the final ones, seemed to have a positive influence on student motivation. Although it is difficult here to control for the novelty effect of the learning style, the students appeared to have responded very positively to the activities and participated enthusiastically. Moreover, some students apparently found materials to investigate some of the concepts further:

And I realized that some of them produce much more elaborate things, much more ... They were like ... They like that, the kids, when they're really involved. That's why I think that it's [the Reform] going to be a good thing. (free translation)

[...] we could even reach certain students with these kind of learning situations. So why let them down? (free translation)

Similar realizations were observed by the OECD (2005) among other teachers in an implementation context.

In our classroom observations, we also noted that, in an atmosphere of open learning situations that promoted student ownership of the learning process, a teacher's poor classroom management became even more apparent than in a traditional teaching context, since the students were more involved. In addition, the emergence of unexpected – and therefore uncomfortable – classroom management problems (induced by the use of individualized coaching, by new ways of giving instructions, or new time management and teamwork) and *new* disciplinary problems was serious enough to potentially generate strong resistance to innovation, since these difficulties could be identified with the innovation itself. For example, the teachers who normally use a lecturing style almost exclusively seemed the most unsettled when the pedagogical parameters were changed. Among our teachers, those who had the fewest years of experience were usually the ones that encountered this kind of problem. In some cases, the achievement of pedagogical goals was heavily compromised, and these problems were often interpreted as attributable not to poor classroom management but to a lack of discipline, know-how and control of the students.

We noted that in every case, the teachers became progressively aware of the importance of supervising the students in their learning situations and providing for this aspect in the lesson plans. And as the school year went by, "The first task [was] abysmal, the second task, a little less abysmal, the third task ... and so on." (free translation)

This situation raises a very interesting question about the status and role of lecture style teaching. If its discontinuation appears to accentuate or at least transform classroom management problems, perhaps we might advance the hypothesis that its current widespread and often exclusive use could be attributable to its organizational virtues rather than its pedagogical merits. In other words, we could therefore posit that lecture style teaching would in the end be a way to control the class rather than a valuable way to educate. It seems clear, however, that the application of constructivist practices is demanding, especially in view of the heavy teaching loads that prevail in the current Québec school system.

Resources

The teachers insisted from the start of the school year that the issue of allocation of resources was essential to the advent of the Reform. The nature of these comments did not change much from start to end of the school year. The teachers felt “abandoned” to “inadequate” conditions:

They're not giving us smaller classes, they're not giving us permanent jobs, they're not saying we're going to stay in one school for more than one year, there's no extra budget, and they're integrating students with learning and behavioural problems. How can they try to put something in place that is totally new, totally disruptive, and not give us any additional tools? (free translation)

For example, from the teacher's standpoint, the number of students per class and the number of students identified with “problems” constitutes a significant hindrance to running activities based on broad areas of learning. However, this did not seem to be the most important factor, since the teaching periods that presented the most management problems were not the ones with the largest class sizes or the most “problematic” students, but were those conducted by the teachers with the least skills in class management. Among other resources that they considered essential, they are hoping for more technical support (more laboratory technicians), storage space for student projects, facilities (labs), perishable materials and high-quality teaching materials (manuals and workbooks). Some of our teachers admitted to being quite exhausted at the end of the experiment, and suggested that these support resources would probably make their task a little easier.

Teachers following through

As the experiment came to a close, some subjects said that they had learned to “talk pedagogically” (free translation) and scrutinize their practices. Such “heightened awareness” (free translation) and moments of extreme doubt have also been observed in other implementation contexts (Paquette, 1987).

After our “planning/debriefing meetings” for example, I could come out of there totally down and say to myself: “Oh Lord! How can it be possible, putting in so much work, going to so much effort to get something going and then feeling like there is always a millstone around your neck dragging you down.” To the point where, from a professional standpoint, I start to question the whole scheme. (free translation)

Our eyes have been opened. We've seen the kids get involved, something they haven't done practically all year long. So, yes, we can pat ourselves on the back. Bravo. Something got done. But seventy-five percent of the time, when you're building the lesson, when you've got your doubts, when you're questioning the very basis of the Reform because there are still questions that have not been answered 100 percent, well, that's the tough part. (free translation)

According to our teachers, the results were nevertheless sufficiently encouraging for them to try to pursue their pedagogical progress in the year following the project. On the other hand, they felt at the mercy of the capacity or the willingness of their workplace to renew its organisational practices. They felt that they had to go “against the current” to produce innovation and that their environment did not facilitate any of it (Pelletier, 2005).

CONCLUSION

Aside from the evident difficulties encountered by our teachers in the particular context of this experiment, three key conclusions emerged.

1) When we compare the current implementation context with that of 1982 (Paquette 1987), we have to admit that circumstances have not changed much in Québec’s implementation traditions. It also appears that the difficulties encountered are surprisingly consistent with numerous other initiatives to implement new practices worldwide. Thus, Québec’s implementation problems would seem quite ordinary and routine. The present study therefore constitutes an appeal to implementation leaders not to overlook the accomplishments in these various contexts on the grounds that they showed differences. On the contrary, they should prove useful guides for organizing their own work.

2) We may equally note that pedagogical innovation difficulties appear to follow immediately on the heels of lack of professionalization. The *Conseil Supérieur de l’Éducation* states that “professional” teaching constitutes “a reflective act and not simply the execution of a task [...], which requires reflection on and within the action, and must include the transformation of the experience into knowledge” (free translation) (Conseil supérieur de l’éducation, 2004). The Conseil also talks about working “with others,” and about the importance of mobilising complete “competency arsenals” as well as autonomy and ethical dimensions. This study reported on many areas of progress in these respects during the experiment. Although we could not determine cause and effect, it seems that innovation and professionalism go hand in hand (Perrenoud, 2005), and that the difficulties identified as hindrances to innovation were probably related more to a “technical” notion of the practice than to issues of professionalism (Baillat, 2005; Demers, 2005) or lethargic attitudes towards overall professional development.

3) Finally, it was clearly evident that in-service teacher training would constitute a basic requirement for successful implementation of the Reform (Proulx, 2005). However, to promote genuine change, this training should at some point take the form of practical coaching initiatives rather than conveyed ideologies and rhetorical speeches. Buying into the Reform might be an important requirement, but it is apparently insufficient (Finkelsztein & Ducros, 1996).

The main interest of this research is that it prepares the ground for further research on implementation of Québec's reform. So it becomes possible to develop new research initiatives (or other in-service training programs) while anticipating some obvious difficulties. We believe it also highlighted the importance of considering full cycles of implementation for valuable research data. In addition, it revealed the importance of combining many research tools (interviews, observation, etc.) for this type of research, not relying solely on questionnaires, because intentions do not always translate into action.

Clearly, more research on the topic is essential. Among other things, this research will have to consider more subjects, for even longer periods and in many different contexts. Only then will it be possible to really comprehend and improve the implementation process of this vital social change of educational reform.

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