DEVELOPMENT OF SPELLING SKILLS IN GRADE 4: EFFECTS OF AN INTEGRATED AND DIFFERENTIATED PEDAGOGICAL APPROACH

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Abstract

In the context of this study, a pedagogical approach was developed which integrates spelling instruction into meaningful writing tasks. This approach was then tested in the classroom over a period of twelve weeks by four Grade 4 teachers who had received training to this end. To explore the effects of this pedagogical approach on the development of students' spelling skills, an experimental group and a control group were created. The students in both these groups were given a pretest and a post-test which included a gap dictation and a narrative writing task. The results show that this pedagogical approach helped the students who benefited from it to improve their spelling ability, in particular, with regard to the morphographic dimension of spelling.

Keywords: integrated pedagogical approach, differentiated pedagogical approach, development of spelling skills, French language, Grade 4

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In order to help students learn to write quality texts, it is essential to give them the chance to write often and to guide them through this complex learning task (Smets, 2010). This enables them to construct their representations of the written language in a concrete context in which all the components involved in writing a text, including spelling, must be taken into account. Thus, Cogis stated: "To learn to write, you have to engage in writing. When you write, you spell. To learn how to spell correctly by writing, you have to work on spelling through writing activities" (Cogis, 2005, p. 157, trans.).

Several authors maintain that spelling instruction should be tied to authentic writing tasks (Allal, Bétrix Köhler, Rieben, Rouiller Barbey, Saada-Robert, & Wegmuller, 2001; Brissaud, 2007; Simard, Dufays, Dolz, & Garcia-Debanc, 2010). However, few studies have attempted to define and verify the effectiveness of pedagogical approaches used to this end (Chiss & David, 2011). This article reports on a study[1] that developed and tested, among French-speaking students in Grade 4, a pedagogical approach which integrates spelling instruction into writing activities in the students' mother tongue.

1. STUDY CONTEXT

Statistics on the writing performance of students in their final year of elementary school published by the Quebec Ministry of Education, Recreation and Sports (MELS) showed success rates of 83% in 2000 and 79% in 2010 (MELS, 2006; 2012). In other words, in 2010, 21% of students did not have the minimal writing skills needed to function at the secondary school level. As for spelling, in particular, success rates on the same tests were 87% in 2000 and 89% in 2010 (MELS, 2006; 2012). These results indicate that, over the last decade, there has been little improvement in the spelling performance of Quebec students in the final year of elementary school.

These difficulties in writing are most likely due in part to the fact that writing is a complex task which involves taking several different components into account simultaneously. More specifically, when writing a text, the writer must take the reader into account and choose an appropriate vocabulary. He/she must also pay attention to syntax and punctuation, as well as the overall organization and coherence of the text. There is also the neatness of the writing to attend to. Lastly, the writer must concentrate on both lexical and grammatical spelling (Simard, 1995; Simard, Dufays, Dolz, & Garcia-Debanc, 2010).

It should be pointed out that the French spelling system is one of the most challenging to learn and apply, which does not make the task any easier for the writer (Fayol & Jaffré, 2008). The French writing system is complex, in particular, because it is composed of both symbols that denote the spoken language and symbols that

[1] *This study was funded by a research grant from the Fonds québécois de la recherche sur la société et la culture (FQRSC).*

convey information about meaning (Biedermann-Pasques & Baddeley, 2008). Moreover, this system is not highly transparent because, as in English, there is a great deal of irregularity in the correspondence between phonemes and graphemes (Catach, 2005). If French is compared to Spanish, for example, it can be noted that there are approximately twenty graphemes in French to represent the phonemes /p/, /t/, /k/, /b/ and /g/, whereas only ten graphemes are used to represent these same phonemes in Spanish (Sprenger-Charolles, 2008). The writer must therefore develop the ability to choose the graphemes required by French spelling conventions (rules) (Séguin & Desrochers, 2008).

While not underestimating the need to support the development of all the components involved in writing, it appears to be important to develop pedagogical approaches that focus on spelling since this is the component that often presents the greatest difficulty for students (Hawken, 2009). Difficulties in spelling can, in fact, have repercussions on students' overall writing ability because so much of their attention has to be devoted to managing the spelling code (Cogis, 2005).

To this end, a number of studies have explored the use of an integrated pedagogical approach to teach spelling to students in Grades 3 and 4 (Allal et al., 2001; Brassard, 2011; Butyniec-Thomas & Woloshyn, 1997; Davis, Clark, & Rhodes, 1994; Morin, Montésinos-Gelet, Parent, Charron, & Prévost, 2006; Needels & Knapp, 1994; Rouiller Barbey & Rieben, 2002; Saada-Robert, 2001). The type of integrated approach used in these studies varied. However, in each of them, spelling instruction was contextualized, that is, spelling was taught in connection with authentic written texts. Several of these studies showed positive effects on the development of spelling skills among the students who had benefited from an integrated approach (Allal et al., 2001; Davis, Clark, & Rhodes, 1994; Rouiller Barbey & Rieben, 2002; Saada-Robert, 2001). According to Butyniec-Thomas & Woloshyn (1997), using an integrated approach to teach spelling is more effective when combined with the teaching of spelling strategies. In our opinion, this is even more true when the teacher uses differentiated instruction.

The study presented in this article differed from those cited above in that the pedagogical approach developed focused on differentiated instruction. Indeed, the proposed pedagogical approach can be said to be "integrated" because it ties spelling instruction to concrete and meaningful writing tasks. It can also be said to be "differentiated" because it encourages teachers to consider the students' orthographic representations (their knowledge of and reasoning about spelling). Thus, we will refer to this approach as an integrated and differentiated pedagogical approach (an ID pedagogical approach). This approach proposes that students be assigned writing tasks and that the teachers observe them as they work, taking cues from them in order to decide which aspects of spelling to work on in subsequent classroom interventions and activities. The teachers' analysis of the students' orthographic representations is central to this approach because it is what makes differentiated instruction possible.

The overall goal of this study was to develop an integrated and differentiated pedagogical approach and to test it among students in Grade 4. This article focuses mainly on the effects of this ID pedagogical approach on students' spelling ability.

2. FRENCH SPELLING

Before presenting the ID pedagogical approach, we will first describe the French spelling system and how spelling instruction can be tied to writing tasks in various ways. Spelling entails recognizing writing conventions. Thus, it requires being able to distinguish between correct and incorrect written forms (Dubois, Giacomo, Guespin, Marcellesi, Marcellesi & Mével, 2002). According to Catach (2005), spelling is the "way the sounds or words of a language are written, based, on the one hand, on a writing system adopted at a given time in the past and, on the other hand, on established links with other subsystems of language (morphology, syntax, vocabulary)" (p. 16, trans.).

There is a close relationship between spoken language and written language. More specifically, there is a correspondence between phonemes, which can be defined as the smallest contrastive units in the sound system of a language, and graphemes, which are the smallest contrastive and/or meaningful units in the writing system of a language. A grapheme can consist of a single letter, with or without a diacritical mark. It can also consist of a group of letters. It should be noted that, in addition to their phonic reference, graphemes can also have a semic reference. Since, in French, graphemes can refer to a unit of sound or meaning, French can be said to be a "mixed" writing system (Biedermann-Pasques & Baddeley, 2008; Zesiger, 1995).

It is possible to divide graphemes into three categories, namely, phonograms, which have a phonic reference, and morphograms and logograms, which have a semic reference[2] (Catach, 2005). Phonograms are graphemes that represent sounds (phonemes) in the spoken language (e.g. the French "ch" → /ʃ/ Morphograms convey lexical information (prefix, suffix, or derivation) (e.g. *a*social, boi*serie*) or grammatical information (gender and number for nouns; mood, tense, person and number for verbs; e.g. *fleurs, marchent*). Logograms convey a particular relationship between written forms and words. Their main function is to distinguish between homophones (e.g. *ce* → determiner / *se* → personal pronoun).

Following d'Angoujard's example (2010), we adopted Catach's typology for several reasons. From a linguistic perspective, this typology shows both the complexity and coherence of the spelling system. From a didactic perspective, it allows the teacher to take note of the specific difficulties experienced by students as they

[2] It should be noted that some graphmes can be said to be "outside the system." These graphemes often convey etymological or historical information. Thus, they refer back to older forms of words that come, in particular, from Greek or Latin (Catach, 2005). For example, the letter "g" in the word *doigt* comes from the Latin *digitus*.

learn to spell and to identify their needs more precisely. Moreover, Catach's typology presents spelling as a structured system that is within the reach of students.

3. SPELLING INSTRUCTION TIED TO WRITING TASKS

Spelling instruction can be more or less closely tied to complex writing tasks. Allal et al. (2001) outlined four different types of educational programs that illustrate the various degrees to which spelling instruction can be tied to complex writing activities. Before describing these different programs, an explanation of the difference between complex and specific teaching-learning activities is in order. Specific activities focus on the acquisition of knowledge and skills (e.g. a task centred on a particular aspect of grammar). Complex activities, on the other hand, aim to develop students' overall writing ability. They are similar to authentic activities (e.g. writing texts).

3.1 Two-track program

A two-track program includes both specific and complex teaching-learning activities, but provides for few functional links between them. In concrete terms, the teacher uses both types of activities, but does necessarily encourage students to reinvest what they learn in one type of activity back into the other type. Specific activities are thus not highly contextualized.

3.2 Hierarchical program

A hierarchical program involves moving gradually from simple teaching-learning activities to complex ones. In this type of program, the learner is presented with a series of specific activities in preparation for subsequent, more complex activities. This type of program is designed to help students learn without making errors, since the specific activities are constructed and ordered in such a way as to prepare the learner for the activity that will follow. This type of program, therefore, does not favour the creation of cognitive conflicts.

3.3 Inclusive program

An inclusive program consists of a series of complex activities with specific activities integrated into them. In this type of program, the learner is encouraged to be active and to try to solve problems by using whatever material or human resources are available, thus enabling him/her to develop knowledge and skills. Allal et al. (2001) point out that this type of program is central to the whole language approach used in the English-speaking world (Goodman, 1986).

3.4 Spiralling program involving looped series of activities

In a spiralling program, students are presented with complex activities which serve as a springboard for more specific teaching-learning activities. Insofar as is possible, these specific activities are differentiated and chosen based on observation of the errors students make and difficulties they encounter during the complex activity. The knowledge and skills developed through these specific activities are then reinvested in other complex activities. In this type of program, "the complexity (open situation, but designed to be accessible to the learner) is present right from the beginning of the series of learning activities. This complexity leads students to ask questions, search for solutions to problems and communicate with one another, while difficulties, obstacles and errors act as the driving force behind their learning" (Allal et al., 2001, p. 20, trans.). Piaget's constructivism (Piaget, 1973) is thus central to this type of program. Socio-constructivism (Vygotsky, 1986/1962) also plays a crucial role because students are encouraged to compare and debate their ideas, and the teacher, intervening to foster the development the children's representations, often pushes them to question their assumptions.

4. ID PEDAGOGICAL APPROACH

Scholars in this field generally agree that an integrated approach to spelling instruction refers to an approach in which complex writing tasks provide the framework for the teaching and learning of more specific aspects of spelling. These specific activities can be integrated into writing tasks or carried out separately (Allal, 1997; Brissaud, 2007; David, 2006). An integrated approach allows students to see the connection between the writing task and the components related to the spelling code (Cogis, 2005; Fayol, 2008). According to Simard (1995), when spelling instruction is continually tied to complex and meaningful writing tasks, lessons aimed at imparting the knowledge and skills needed for writing are more likely to be beneficial.

The ID pedagogical approach developed in this study is based on the spiralling type of educational program involving looped series of activities. To present this pedagogical approach in a concrete way, we developed a model (Figure 1). The star shape on the left-hand side of the model represents meaningful writing tasks (complex activity). The writing tasks presented to the students are varied and flexible, thus allowing the teacher to more easily integrate them into regular classroom activities in order to address the interests and needs of their students. The arrows connecting the planning, writing and revision phases are two-way arrows because this process is iterative and non-linear.

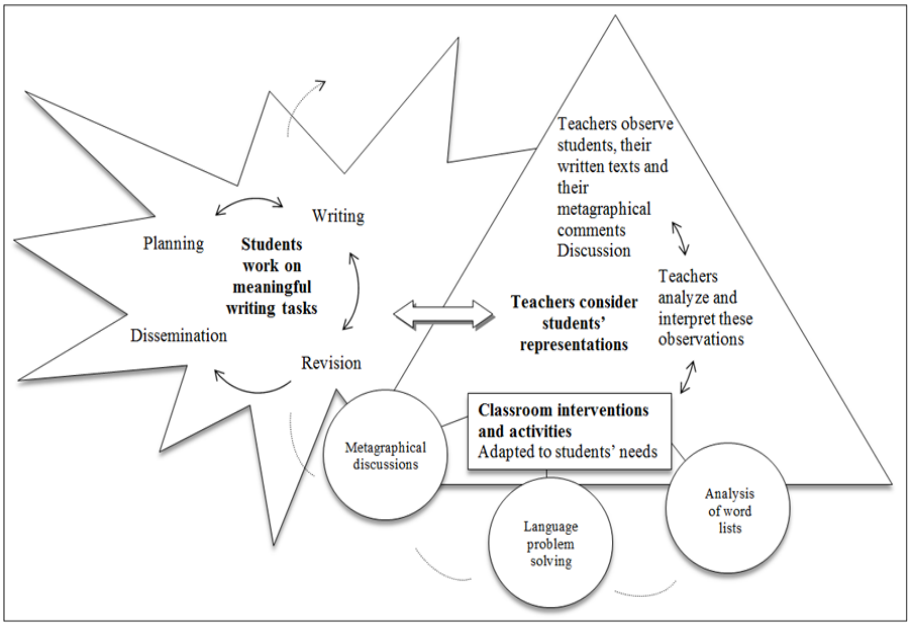

Figure 1. Modeling the ID pedagogical approach.

The triangle on the right-hand side of the model represents the teachers' consideration of the students' representations (Figure 1). Since errors reveal the learning process as it unfolds (Montésinos-Gelet & Morin, 2008), the teacher observes what the students write. The teacher must also pay attention to the metagraphical comments that a student addresses to the teacher or other students. The teacher talks with the student in order to get a better grasp of his/her orthographic representations (Hass, Maurel, Moreau, Nicolle, Romano, & Ruth, 2011; Sirois, Boisclair, Darveau, & Hébert, 2010). The teacher analyzes and interprets these observations in order to be able to intervene effectively. It should be noted that it is essential for the teacher to have good knowledge of the French spelling system and its various dimensions so as to be able to identify the cause of the student's difficulties. It is also crucial for the teacher to have in-depth knowledge of the development of writing and spelling skills among students (Lefebvre & Giroux, 2010). Understanding the students' representations and how they are progressing will allow the teacher to make classroom interventions and activities that are adapted to where each student is at in terms of the development of his/her spelling skills.

In this approach, interventions and activities are metagraphical discussions (Cogis & Ros, 2003), language problem solving (Angoujard, 2010; Cogis, 2005; Nadeau & Fisher, 2006), and analysis of word lists (Arra & Aaron, 2001; Brissaud &

Cogis, 2011).[3] These classroom interventions and activities are listed in the circles under the triangle in the model (Figure 1). It should be noted that metagraphical discussions can be integrated into complex writing tasks or carried out separately. Language problem solving activities and analysis of word lists are carried out as separate activities. Moreover, metagraphical discussions are held on an individual basis whereas the other two types of activities are carried out with the whole class. Pedagogical differentiation in group activities occurs in different ways. For example, the words chosen for the activity involving the analysis of word lists are those that the students often spell incorrectly in their narrative texts. These words are thus adapted to their level and needs since they are used by the students and pose problems to them. Moreover, during the analysis, the teacher asks the students questions in order to move them away from their orthographic representations (their knowledge and reasoning related to the way these words are written) and get them to think and take the spelling code into account. For the language problem solving activity, pedagogical differentiation occurs in a similar way except that sentences instead of words are chosen from the students' narrative texts. During this activity, the emphasis is put on grammatical spelling (e.g. adjective endings, subject-verb agreement).

During interventions and activities, the students' metalinguistic awareness is developed since the focus is on making them reflect on the written language and how it works, whether at word or sentence level. It should be pointed out that various authors maintain that the development of metalinguistic awareness appears to have a positive influence on written language skills (Dabène, 1992; Gombert, 1990; 1991; Pothier, 2011; St-Pierre, Dalpé, Lefebvre, & Giroux, 2010).

In the model, the dotted lines connecting the different classroom interventions and activities show that there is a link between them. Indeed, using a variety of classroom interventions and activities helps students to progress in their orthographic representations. The skills they acquire are then reinvested in the current writing task as well as in future writing tasks. In the model, the dotted-line arrow at the top of the star shape points to a future writing task.

As mentioned above, this article deals mainly with the effects of this ID pedagogical approach on the development of spelling skills among students in Grade 4. To this end, we addressed the following questions:

Question 1: Does using this ID pedagogical approach have an impact on the overall quality of the spelling in students' written texts?

Question 2: Does using this ID pedagogical approach have an impact on students' ability to use phonograms in accordance with the conventions of the French spelling system?

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[3] *To support teachers, we developed guidelines to help direct them as they carry out classroom interventions and activities. These guidelines are presented in the form of steps to follow. For more information, see Marin, Sirois, & Lavoie, 2013.*

Question 3: Does using this ID pedagogical approach have an impact on students' ability to use lexical and grammatical morphograms in accordance with the conventions of the French spelling system?

Question 4: Does using this ID pedagogical approach have an impact on students' ability to use logograms in accordance with the conventions of the French spelling system?

5. METHODOLOGY

5.1 Study type and participants

We chose to use a quasi-experimental study design (Boivin, Alain, & Pelletier, 2000; Boudreault & Cadieux, 2011; Van Der Maren, 2005). Thus, an experimental group and a control group were created. These groups were each composed of two classes of Grade 4 students. The experimental and control classes came from different schools in order to avoid contamination of the control classes. A total of 93 Grade 4 students thus participated in the study. The number of girls and boys was relatively well-balanced, 43 girls and 50 boys. Students with specific learning disabilities (e.g. dyslexia) were excluded from the sample. The experimental group included 48 students and the control group included 45 students. Lastly, four Grade 4 teachers participated in the study. Two of them taught students in the experimental classes while the other two taught students in the control classes.

5.2 Study plan

The study, including data collection and experimentation, lasted five months (from mid-January to mid-June). The experimentation was conducted over a period of 12 weeks, from mid-February to mid-May, during which the teachers in the experimental classes used the ID pedagogical approach. Training and follow up were provided to them. The teachers in the control classes pursued their regular classroom activities. A semi-structured interview (Savoie-Zajc, 2011; Van Der Maren, 2005) was held with them to find out about these activities and ensure that they were not similar to those prescribed by the ID pedagogical approach.

In the experimental classes, to ensure rigor in the study, frequencies were set for the meaningful writing tasks as well as for the other classroom interventions and activities to be carried out with students. Regarding the meaningful writing tasks, the frequency was set at twice a week (approximately 2 hours of writing in total). Regarding the other classroom interventions and activities, it was determined that metagraphical discussions (integrated into the writing tasks or carried out separately) would be held as often as possible, whenever the opportunity arose. No specific frequency was set because it was difficult for the teachers to accurately determine the number of metagraphical discussions to be held with each student, as this was determined based on their needs. A list of the students'

names was used by the teachers to provide follow up by checking off the name of students who had benefited from a metagraphical discussion. This helped to avoid the situation whereby the same students always received support. Regarding group activities, two language problem-solving activities were carried out and a list of 12 to 15 words was analysed each week.

5.3 Data collection and measurement instruments

Before and after the ID pedagogical approach was used by the teachers in the experimental classes, students in both the experimental group and the control group took a pretest and a post-test which included a gap dictation and a narrative writing task. The gap dictation lasted an average of 30 minutes and the narrative writing task was spread over two periods of approximately one hour each. The dictation and the two narrative writing periods were scheduled on different days to prevent test fatigue. The same tests were used for both the pretest and the post-test to facilitate the comparison of results.

During the gap dictation, the first seven paragraphs of the legend "*Memphré, le dragon du lac Memphrémagog*" [Memphré, the Dragon of Memphrémagog Lake] (Tardif & Broder, 2009) were read aloud to the class. The students were then given a print-out of the last two paragraphs of this legend with some words missing and were asked to fill in the blanks. These paragraphs were also read aloud. For this test, the students were not allowed to use their correction tools (e.g. dictionary, grammar book). A total of 20 words were missing. These words were chosen based on their particular characteristics so as to evaluate the students' ability with regard to various elements pertaining to the different dimensions of spelling (phonographic, morphographic, logographic). Moreover, the learning progression proposed by the MELS (2009) for students in Grades 3 and 4 was consulted to ensure that the chosen words contained the characteristics covered in these grades (e.g., use of silent letters, knowledge of some rules on positions, knowledge of some spelling constants). The lexical spelling development scale (ÉOLE) (Pothier & Pothier, 2004) was used to choose the words to ensure that they were neither too difficult nor too easy for students in Grade 4.

For the narrative writing task, the beginning of the story was given to the students. More precisely, the opening lines of the story "*Le trésor*" [The Treasure] (De Vailly & Laverdière, 2009) were read to them and they were then asked to continue the story in their own way. No limit on time or length was imposed on them. Thus, they were free to write the number of words they wished. For this test, the students were allowed to use their correction tools. Thus, in order to stay close to the methods used at school, we decided to allow them to use a dictionary and a grammar book during the narrative writing task but not for the gap dictation.

5.4 Data analysis

The gap dictations and narrative writing tasks were analyzed based on a grid developed for this study to evaluate the students' spelling ability. The first criterion related to overall spelling quality (Table 1). The number of words conforming to spelling conventions was compared to the total number of words written, which produced a ratio. This method provided an accurate measure of students' spelling ability, since it made it possible to determine, in terms of a percentage, the number of words conforming to spelling conventions that they were able to produce. Moreover, since the length of the narrative texts varied from one student to another, the ratio made it easier to process the data since it allowed for comparisons to be made. This analytical criterion was used to answer the first research question.

Table 1. Analysis of Gap Dictations and Narrative Writing Tasks

Criteria
1. Overall spelling quality:
a. Ratio
2. Specific spelling quality:
Phonographic dimension
a. Ratio
b. Portrait of errors
- Single phonograms
- Double phonograms (with double consonants)
- Compound phonograms (digraphs and trigraphs)
Morphographic dimension
a. Ratio
b. Portrait of errors
- Lexical morphograms
- Grammatical morphograms
- Nouns
- Verbs
Logographic dimension
a. Ratio
b. Portrait of errors
- Monosyllabic words
- Polysyllabic words
- Poorly segmented words
3. Others

The second criterion involved specific spelling quality (Table 1). This criterion was used to answer research questions 2, 3 and 4. This criterion was divided into three spelling dimensions, namely the phonographic dimension, the morphographic dimension and the logographic dimension. For each of these dimensions, a ratio was

also calculated to determine the number of words whose phonograms, morphograms or logograms conformed to French spelling conventions compared to the total number of words.[4] For example, in the following sentence: *Le pirate naje vite pour attrapper le baton* [The pirate swims fast to grab the stick], a ratio of 63% was obtained for the phonographic dimension, since all the phonograms conformed to French spelling conventions in 5 out of 8 words. Moreover, the analytical grid allowed for a descriptive analysis of errors. In fact, the errors were counted according to their type and were transcribed one by one, which yielded a portrait of the errors made. To use the example given above, it was observed that all the errors involved single phonograms (naje → nage, attrapper → attraper, baton → bâton). A last section called *Others* was used to classify errors related to historical or outside-the-system letters, errors related to the capitalization of proper nouns, and those related to word segmentation. This detailed analysis of errors helped to determine whether the ID pedagogical approach had a particular impact on some specific aspects of spelling.

To ensure objectivity in the analytical process, interjudge agreements were performed on 10% of the gap dictations and 10% of the narrative texts, yielding an agreement ratio of 100% for the gap dictations and 99% for the narrative texts. This high ratio indicates that the analytical grid yielded a true and reliable coding of errors made by the students.

ANCOVA covariance analysis was used to perform all the statistical tests to answer the study questions. It was performed based on the ratios obtained for overall spelling quality as well as those for each dimension. This procedure was used to measure the effect of the independent variable (the ID pedagogical approach) on the dependent variable (the overall and specific quality of the students' spelling) by controlling for the effect of their pretest scores (co-variable).

6. RESULTS

6.1 Overall spelling quality

For the gap dictation, at pretest, students in the experimental group (*N* = 48) obtained a mean score of 45% (*SE* = 17%) whereas students in the control group (*N* = 45) obtained a mean score of 58% (*SE* = 18%) (Figure 2). At post-test, students in the experimental group obtained a mean score of 65% (*SE* = 17%). At the same

[4] *It should be noted that some phonograms can also pertain to either the morphographic dimension (e.g. the prefix "a" in the word asocial) or the logographic dimension (e.g. the preposition à) (Catach, 2005). To avoid a double treatment, the phonograms that had a semic value were considered as pertaining to either the morphographic dimension or the logographic dimension, depending on the case. Thus, to use the same examples, the prefix "a" in the word asocial would have been classified in the morphographic dimension while the preposition à would have been classified in the logographic dimension.*

measurement time, students in the control group obtained a mean score of 60% (*SE* = 18%). Based on ANCOVA, the post-test mean score obtained by the experimental group was significantly higher than that obtained by the control group (F (1,90) = 26.465, $p < .001$) and the size of the difference between the two groups appeared to be high (*Eta squared* = .227). This indicates that the ID pedagogical approach helped students who benefited from it to produce gap dictations that were more consistent with French spelling conventions at post-test than students who did not benefit from this pedagogical approach.

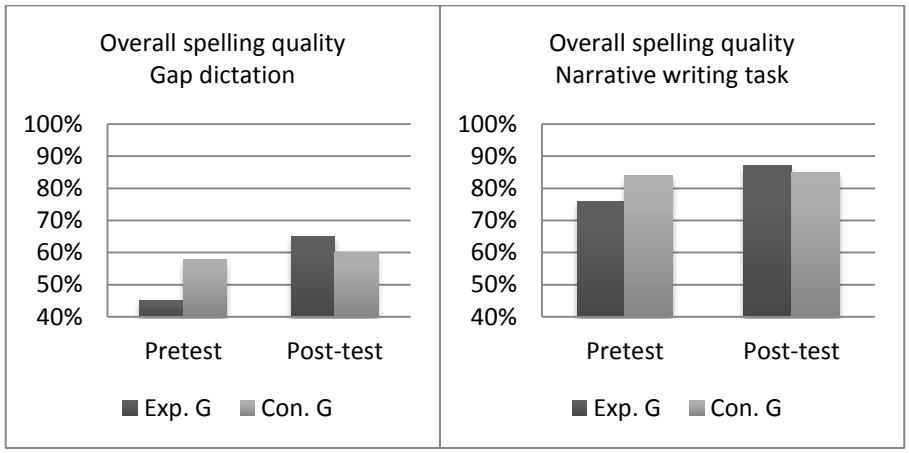

Figure 2. Overall spelling quality.

Regarding the narrative writing task, at pretest, students in the experimental group obtained a mean score of 76% (*SE* = 9%) whereas students in the control group achieved a mean score of 84% (*SE* = 7%) (Figure 2). At post-test, students in the experimental classes slightly outperformed those in the control classes with a mean score of 87% (*SE* = 9%) versus 85% (SE = 7%). ANCOVA reveals that the post-test mean score obtained by the experimental group was significantly higher than that of the control group (F (1,90) = 25.112, $p < .001$). Moreover, the size of this difference appeared to be high (*Eta squared* = .218). These results are thus consistent with those for the gap dictation since students who benefited from the ID pedagogical approach were able to produce narrative texts with a better overall spelling quality at post-test than students who did not benefit from this pedagogical approach.

To sum up, it is observed that, at pretest, the scores obtained by students in the experimental group were lower than those of students in the control group. On the other hand, in both the gap dictation and the narrative writing task, students in the experimental group made greater improvements than those in the control group. Their improvement was so substantial that they even outperformed students in the

control group at post-test. In fact, in the gap dictation, the scores of students in the experimental group improved by 20% whereas those of students in the control group improved by only 2%. The improvement of students in the experimental group was thus 18% higher than that of students in the control group. In the narrative writing task, the scores of students in the experimental group improved by 11% while those of students in the control group improved by 1%. The scores of students in the experimental group thus improved by 10% more than those of students in the control group. Thus, it can be affirmed that using the ID pedagogical approach developed as part of this study helped students who benefited from it to produce narrative texts with global spelling that was more consistent with spelling conventions.

6.2 Phonographic dimension

Regarding the phonographic dimension, for the gap dictation, at pretest, the mean score obtained by students in the experimental group was 62% (*SE* = 14%), indicating that 62% of words containing phonograms conformed to French spelling conventions (Figure 3). For students in the control group, the mean score was 69% (*SE* = 15%). At post-test, students in the experimental group achieved a mean score of 77% (*SE* = 16%) while the mean score of those in the control group was 72% (*SE* = 16%). The improvement made by students in the experimental group was thus 15% while that made by students in the control group was 3%. Based on ANCOVA, the mean post-test score of the experimental group was significantly higher than that of the control group (F (1,90) = 12.217, p = .001). However, the size of the difference between the two groups appeared to be moderate (*Eta squared* = .12). This reveals that the gap dictations of students who benefited from the ID pedagogical approach contained more words with phonograms that conformed to French spelling conventions at post-test than those of students who did not benefit from this pedagogical approach.

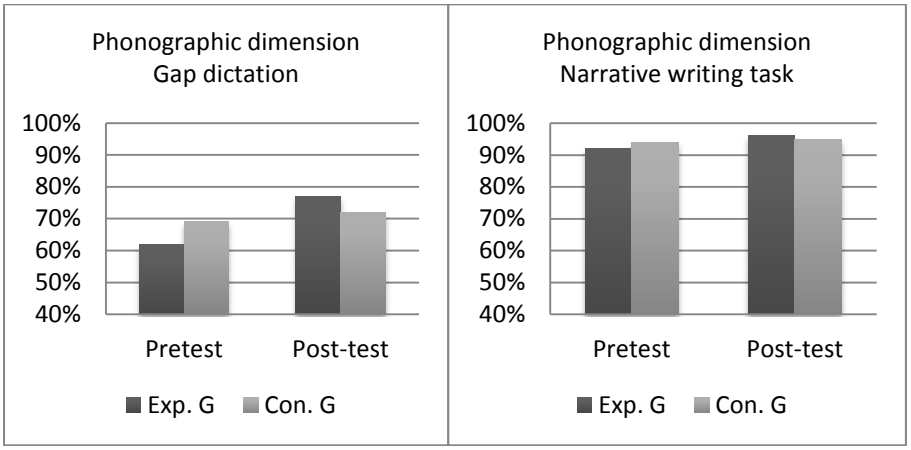

Figure 3. Specific spelling quality: phonographic dimension.

For the narrative writing task, at pretest, students in the experimental group achieved a mean score of 92% (*SE* = 6%) whereas students in the control group slightly outperformed them with a mean score of 94% (*SE* = 5%) (Figure 3). At post-test, students in the experimental classes obtained a mean score of 96% (*SE* = 4%) while the mean score of students in the control group was 95% (*SE* = 4%). Thus, the scores of students in the experimental group improved by 4% while those of students in the control group improved by 1%. ANCOVA reveals that the post-test mean score obtained by the experimental group was significantly higher than that obtained by students in the control group (F (1,90) = 9.057, p <.01), although the size of the difference between the two groups only appeared to be moderate (*Eta squared* = .091). The results of the statistical analysis thus show that, like their gap dictations, the narrative texts of students who benefited from the ID pedagogical approach contained more words with phonograms that conformed to French spelling conventions at post-test than those of students who did not benefit from this pedagogical approach.

More generally, it is observed that, at pretest, the scores of students in the experimental group were slightly lower than those of students in the control group for both the gap dictation and the narrative writing task. Nevertheless, students in the experimental group made greater improvements than students in the control group. Thus, at post-test, they achieved higher scores than the control group. However, it should be noted that the difference was more striking for the gap dictation.

Regarding the errors made, it is found that, at both measurement times, single phonograms posed the greatest difficulties for students in both the experimental group and the control group. However, at post-test, students in the experimental group, in contrast with those in the control group, made fewer errors of this type. It

is thus likely that the ID pedagogical approach had a positive effect on this aspect of spelling.

6.3 Morphographic dimension

Regarding the morphographic dimension, for the gap dictation, at pretest, the mean score obtained by students in the experimental group was 61% (*SE* = 20%), indicating that 61% of words containing morphograms conformed to French spelling conventions (Figure 4). Those in the control group achieved a mean score of 72% (*SE* = 17%). At post-test, the mean score of students in the experimental group increased to 78% (*SE* = 18%) whereas that of students in the control group decreased to 69% (*SE* = 20%). Thus, the scores of students in the experimental group improved by 17% whereas those of students in the control group regressed by 3%. Based on ANCOVA, the post-test mean score of the experimental group was significantly higher than that of the control group *(F* (1,90) = 21.531, $p < .001$) and the size of the difference between the two groups appeared to be high (*Eta squared* = .193). It can thus be affirmed that, at post-test, the gap dictations of students who benefited from the ID pedagogical approach contained more words with morphograms that conformed to French spelling conventions than those of students who did not benefit from this pedagogical approach.

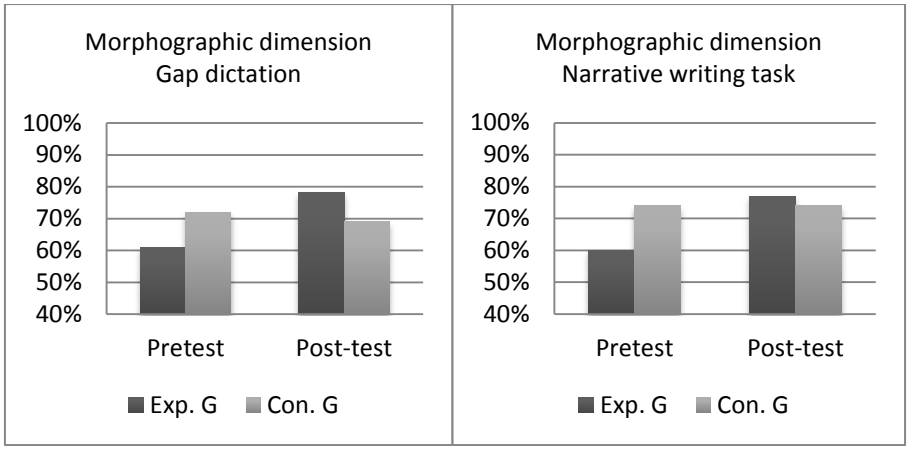

Figure 4. Specific spelling quality: morphographic dimension.

Regarding the narrative writing task, at pretest, students in the experimental group obtained a mean score of 60% (*SE* = 16%) whereas the mean score of students in the control group was 74% (*SE* = 12%) (Figure 4). At post-test, the mean score of students in the experimental group increased to 77% (*SE* = 15%) while the mean score of those in the control group remained at 74% (*SE* = 13%). The scores of stu-

dents in the experimental group thus improved by 17% while those of students in the control group remained stable. ANCOVA indicates that the mean score of the experimental group at post-test was significantly higher than that of the control group (F (1,90) = 1.588, p < .01). The size of this difference appeared to be moderate (*Eta squared* = .078). The results of this analysis are thus consistent with those for the gap dictation since they reveal that, at post-test, on a percentage basis, the narrative texts of students who benefited from the ID pedagogical approach contained a greater number of words with morphograms that conformed to French spelling conventions than those of students who did not benefit from this pedagogical approach.

These results are consistent with those for the phonographic dimension, that is, students in the experimental group achieved lower scores than those in the control group at pretest, but this trend was reversed at post-test, for both the gap dictation and the narrative writing task. In fact, the scores of students in the control group slightly decreased in the gap dictation and remained stable in the narrative writing task whereas those of students in the experimental group increased in both contexts. Thus, they achieved higher scores than students in the control group at post-test. The difference between the two groups at post-test was more striking for the gap dictation.

Regarding the errors made, it is observed that verbs posed the greatest difficulties for students in both the experimental and control groups at both measurement times. However, students in the experimental group made fewer errors related to this aspect at post-test whereas students in the control group made approximately the same number of errors. It thus appears that the ID pedagogical approach helped students who benefited from it to improve on this aspect of spelling.

6.4 Logographic dimension

Regarding the logographic dimension, for the gap dictation, at pretest, the mean score obtained by students in the experimental group was 55% (*SE* = 19%), indicating that 55% of words containing logograms conformed to French spelling conventions (Figure 5). Students in the control group, at this same measurement time, obtained a mean score of 69% (*SE* = 18%). At post-test, students in the experimental group achieved a mean score of 65% (*SE* = 20%) while the mean score of those in the control group was 69% (*SE* = 22%). The scores of students in the experimental group thus improved by 10% while those of students in the control group remained stable. ANCOVA indicates that the mean score of the experimental group at post-test was similar to that of the control group. Thus, based on the statistical analysis, the ID pedagogical approach did not help students who benefited from it to produce gap dictations that contained more logograms conforming to French spelling conventions at post-test than students who did not benefit from the pedagogical approach.

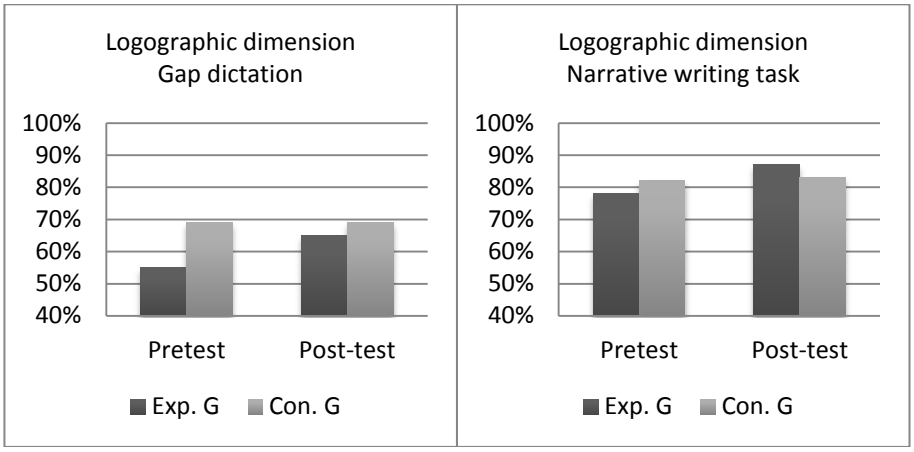

Figure 5. Specific spelling quality: logographic dimension.

For the narrative writing task, at pretest, students in the experimental group obtained a mean score of 78% (*SE* = 13%) while the mean score of those in the control group was 82% (*SE* = 12%) (Figure 5). At post-test, students in the experimental group achieved a mean score of 87% (SE = 10%) while students in the control group obtained a mean score of 83% (*SE* = 11%). Thus, the scores of students in the experimental group improved by 10% while those of students in the control group improved by only 1%. Based on ANCOVA, the mean score of the experimental group at post-test was significantly higher than that of the control group (F (1,90) = 7.892, p <.01). The size of the difference between the two groups appeared to be moderate (*Eta squared* = .081). The results of this analysis show that, in contrast with the results for gap dictations, students who benefited from the ID pedagogical approach produced more logograms that conformed to French spelling conventions than students who did not benefit from this pedagogical approach.

To sum up, at pretest, the scores of students in the experimental group were lower than those of students in the control group for both the gap dictation and the narrative writing task. At post-test, for the gap dictation, the scores obtained by students in the experimental group were still lower than those obtained by students in the control group. However, for the narrative writing task, the scores of students in the experimental group exceeded those of students in the control group.

Monosyllabic words posed the greatest difficulties for students in both the experimental and control groups, at both measurement times. However, students in the experimental group made fewer errors of this type at post-test whereas the number of errors of this type made by students in the control group remained relatively stable. It can thus be said that the ID pedagogical approach helped students who benefited from it to improve on this aspect of spelling. It should nevertheless

be pointed out that the size of the difference between the two groups with regard to the logographic dimension was significant only for the narrative writing task.

7. DISCUSSION

7.1 Overall spelling quality

The results related to overall spelling quality in the gap dictations and narrative writing tasks indicate that students in the experimental group made greater improvements than students in the control group and that the difference between the two groups at post-test was significant. Thus, the ID pedagogical approach appears to have fostered the development of spelling skills among students who benefited from it. These results corroborate those obtained by some above-cited studies on an integrated pedagogical approach to spelling (Allal et al., 2001; Davis, Clark, & Rhodes, 1994; Rouiller Barbey & Rieben, 2002; Saada-Robert, 2001). They also suggest the positive effect of differentiated instruction in the use of an integrated approach.

A closer examination of the results related to overall spelling quality in both the gap dictations and narrative writing tasks shows that, at pretest, students in the experimental group obtained lower mean scores than students in the control group. In fact, for the gap dictation, the mean score was 13% lower while for the narrative writing task, the mean score was 8% lower (Figure 2). These differences at the first measurement time are difficult to explain. It may be that, in their previous years of schooling, students in these two groups had benefited from different approaches to spelling instruction and that some of these approaches were more effective than others. In this respect, prior research has shown that students' performance is associated with the pedagogical practices used by teachers (Coche, Kahn, Robin, Rey, & Genot, 2006; Dupin de Saint-André & Montésinos-Gelet, 2012; Gauthier, Mellouki, Simard, Bissonnette, & Richard, 2004). Since the students came from different socio-economic environments, it may also be that some students in the control group had received more stimulation in terms of reading and writing at home, which helped them improve their spelling ability. In this respect, various studies have shown that students' performance in reading and writing is influenced by their socio-economic environment, that is, students from a low socio-economic environment have more difficulty learning to read and write (Bara, Gentaz, & Colé, 2008; OCDE, 2011).

Moreover, the scores on the gap dictations were lower than those on the narrative writing tasks (Figure 2). This result may seem surprising as it is more difficult for students to concentrate on spelling when writing texts since their attention is focused on all the components linked with the act of writing (Simard, Dufays, Dolz, & Garcia-Debanc, 2010; Smets, 2010). Thus, how can the lower scores obtained in the gap dictations be explained? Various reasons could account for these differences. First, they could be attributed to the fact that students were allowed to use

their correction tools when writing the narrative texts, but not when doing the gap dictations. Therefore, during the narrative writing tasks, students could look up unknown words in the dictionary and consult a verb conjugation guide in order to find the right endings of verbs. They could also consult a grammar guide to check some rules. During the gap dictations, students could only rely on their orthographic representations. Another reason that may explain these differences is that, in the narrative writing tasks, students could choose words that they knew how to spell. They could also write simple sentences with grammatical agreements that were easier to make. In the gap dictations, they did not have this latitude because the sentences and missing words were imposed on them. Thus, they were confronted with the task of having to spell unknown words or make grammatical agreements with which they were unfamiliar.

It was also found that students in both groups made greater improvements in the gap dictations compared to the narrative writing tasks (Figure 2). This fact could be explained by different reasons. First, since the scores on the gap dictations were lower at pretest, students had a greater opportunity to improve. The fact that the same words were given in the gap dictation at both measurement times may also have had an effect.

7.2 Specific spelling quality

Regarding the results related to specific spelling quality in both the gap dictations and the narrative writing tasks, it was noted that, at pretest, students in the experimental group obtained lower scores than students in the control group on all dimensions. Nevertheless, at post-test, they outperformed students in the control group in all cases except on the logographic dimension in the gap dictation. These results show that the pedagogical approach developed appears to have been effective.

The morphographic dimension was most positively affected by the use of this ID pedagogical approach (Figure 4). Morin and her team (2006) obtained similar results in a study exploring the impact of an integrated approach to spelling conducted among students in Grades 1 to 6. However, in their study, the effects of the approach on the morphographic dimension were greatest among students in Grades 1 and 2.

The morphographic dimension of spelling was worked on extensively in the language problem solving activities. Thus, these activities appear to have been particularly effective. In this respect, several researchers have suggested that priority should be given to language problem solving activities since they help to create contexts that lead students to ask questions and reflect as well as to mobilize the resources available to them to solve problems (Balslev, Claret-Girard, Mazurczak, Saada-Robert, & Veuthey, 2005; Chartrand, 1996; 2009; Cogis, 2005; Nadeau & Fisher, 2006).

7.3 Limitations and future research

This study contains a number of limitations. First, the small sample size does not ensure representativeness. Moreover, the subjects were not randomly assigned since the classes selected were already formed. It is therefore impossible to guarantee that the control group was entirely comparable to the experimental group. The presence of similar scores at pretest usually reduces the problem of internal validity. However, in this study, students in the control group obtained better scores than those in the experimental group at this measurement time. On the other hand, our statistical analyses largely controlled for this difference. Another limitation of this study involves the duration of the experimentation (12 weeks). If the ID pedagogical approach had been used during an entire school year, it might have been possible to observe more striking differences between students in the experimental group and those in the control group. Moreover, the experimentation was conducted in the students' natural environment as the approach was used by the teachers in their classrooms. The activities carried out in the context of this study were thus integrated into regular classroom activities. However, the data were collected in a less natural way. In fact, the gap dictations and narrative writing tasks were administered by the researcher. The presence of a person other than the teacher might have had an effect on the behaviour of some students. It is thus possible that the situation brought about by the data collection process affected the scores.

This study is likely to have effects in the school community since its results can inform teachers on spelling instruction based on an integrated and differentiated pedagogical approach. It is also likely to have effects in the academic community since it represents an original pedagogical approach in which spelling is taught in an integrated and differentiated way and sheds light on the effects of this approach on the development of spelling skills among students. Indeed, various authors (Brissaud, 2007; David, 2006) have mentioned that few studies have explored a contextualized didactic approach to spelling. The results of this study could thus serve as a basis for other research projects investigating this subject.

In future research, a study similar to this one should be repeated using a larger sample and a longer timeframe in order to validate the results of the present study. In this future study, the effectiveness of the ID pedagogical approach could be explored among students in different age groups. It would also be beneficial to adapt the ID pedagogical approach so that it could be used to work in an in-depth way on writing components other than spelling. This would allow students to work on different components in an integrated way, always in the context of writing tasks. This approach could then be tested in elementary school classes. In this respect, a study conducted by Sirois, Boisclair, Darveau & Hébert (2010) showed the effectiveness of an approach in which different writing components are worked on with beginner writers in the context of writing tasks.

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