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A short teacher-led intervention using direct instruction
enhances 5th graders' purposeful reading skills

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Abstract

Proficient readers use strategies in order to achieve various types of reading purposes. However, purpose-driven strategies are seldom taught in elementary schools. Based on current theories of purposeful reading and direct explicit instruction, the present study developed and tested an instructional program to promote fifth graders' purposeful reading skills. Teachers from five different schools, representing 10 classes, were trained to implement the program. The intervention included two weekly 45-minute workshops over a period of five weeks. Using a quasi-experimental design, participating classes were assigned to an experimental group ($n = 78$) or an active control group ($n = 89$). Trained students outperformed controls on post-tests assessing each purposeful reading component. However, effects on an integrated and unguided purposeful reading tasks did not reach significance. The study suggests that the explicit teaching of purposeful reading strategies can effectively support students' skill acquisition. The conditions needed for innovative interventions to yield robust and lasting outcomes are discussed.

Keywords: purposeful reading, primary school, instructional resources, training program

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1. Introduction

Reading takes place in a diversity of contexts (Snow et al., 2002) and for a variety of purposes (Britt et al., 2018). Although any form of reading arguably comes with a purpose, the phrase “purposeful reading” emphasizes the need for the reader to actively set goals based on external or self-generated instructions, and to implement goal-relevant strategies (McCrudden & Schraw, 2007; Vidal-Abarca et al., 2010). For instance, depending on their goals, mature readers may generate different types of inferences while reading (e.g., van den Broek et al., 1995); or they may decide to skim some portions of a text and to focus on task-relevant segments (e.g., Kaakinen & Hyönä, 2014). Critical to the construct of purposeful reading is the view that reading strategies and outcomes depend on readers' understanding of the task to be achieved (i.e., their *task model*, Rouet & Britt, 2011), and on their ability to make goal-relevant reading decisions (see RESOLV model, Britt et al., 2018).

The need for effective literacy skills extends to online information environments. Although Web search engines and other online reading tools provide increasingly efficient tools to support user search, their benefits are pending on readers' acquisition of online reading skills (Leu et al., 2017; Salmerón et al., 2018). In addition, key strategic processes such as skimming a page to locate a piece of information are no less demanding when reading online compared to printed text (Potocki et al., 2017). In fact, online reading may entail as many, if not more challenges to the reader (Delgado et al., 2018). Thus, teaching effective task-dependent strategies is no less relevant in the online world as it is in the world of printed texts (Kohnen et al., 2020).

In the present study, we report the design and test of an instructional method to teach purposeful reading skills to elementary school children. We first review current theories of purposeful reading and evidence that mature readers adapt their reading behavior to the task at hand. We highlight the challenges of purposeful reading for developing readers. Then, we review studies that have attempted to train purposeful reading skills, with various levels of success. We draw from the benefits and limits of prior attempts to present a new framework for teaching purposeful reading skills in the elementary grades. In the later sections of the paper,

we present the methods and results of an experiment involving the design and implementation of a teacher-led intervention based on this framework.

1.1. Challenges of purposeful reading in print and digital environments

As online reading becomes common practice in most parts of the world, readers find themselves with more opportunities to read diverse types of texts in a broader diversity of contexts (Britt et al., 2022). Indeed, there has been an increased interest on the part of researchers for the situated, goal-driven nature of reading (McCrudden & Schraw, 2007; Snow, 2002; Vidal-Abarca et al., 2010). In their MD-TRACE model, Rouet and Britt (2011) described the processes whereby readers engage with one or several text(s) in order to achieve a purpose. Like prior descriptions of purposeful reading (e.g., the IPS-I model by Brand-Gruwel et al., 2009), MD-TRACE features a series of steps that unfold both sequentially and in interaction with each other. First, the reader understands the requirements of the instruction and builds a mental model of the task (a *Task model*, Step 1). The task model includes the expected task outcome and the actions to be performed (e.g., construct an answer to a question by gathering information from a set of documents), based on the reader's interpretation of any available contextual cue (e.g., instructions, stakes, resources, constraints). Once a task model has been generated, the reader starts searching for relevant information with the available information resource(s) (Step 2). They then selectively process and integrate information to come up with a *task product* (e.g., an answer to the search question; Step 3). Before giving a final answer, the reader may check that his or her task product corresponds to the question's requirements in terms of relevance and sufficiency (step 4). If not, the entire process gets repeated until the goal is achieved (or, sometimes, updated). Distinctive features of MD-TRACE are the role of goal formation and monitoring, and the cyclical nature of the activity, with several recycling loops corresponding to metacognitive processes.

Numerous studies have evidenced that mature readers strategically adjust their reading behavior as a function of the assigned task. For instance, Kaakinen and Hyönä (2010) found that a proofreading task prompted different text scanning strategies, compared with a reading-for-understanding task. Similarly, Radach et al. (2008) asked undergraduates to answer questions (i.e., comprehension task) or to decide which of the four words presented was in a passage they had just read (i.e., word verification task). Participants fixated the text longer and more frequently when preparing to answer comprehension questions rather than word checking questions. In most educational systems, children are expected to acquire purposeful reading skills throughout primary education. Indeed, Kaakinen et al. (2015) asked 3rd, 4th and 6th grade

students, as well as adults, to read a text either to answer a specific question or to understand the text as a whole. Both children and adults showed different reading patterns for question answering than for global understanding. Nevertheless, older students and adults were more likely to backtrack to earlier portions of the text when reading to answer questions. In general, research suggests that older and/or more proficient readers are more prone to using purposeful reading strategies (e.g., Cataldo & Oakhill, 2000; Kobasigawa, 1983; Rouet & Coutelet, 2008). Nevertheless, some tasks, for instance those that require finding and integrating information from different paragraphs, remain difficult, even for 15-year-old students (OECD, 2019). Further research has attempted to identify the factors that could explain such difficulties.

Consistent with Step 1 of the MD-TRACE model, readers' understanding of the task instructions is key to their reading outcomes. Vidal-Abarca et al. (2010) examined how skilled and less skilled 4th and 5th graders responded to questions containing inconsistencies (e.g., "When should treatment begin in order to cause (vs. to prevent) malaria?"). Skilled readers were more likely to report that the question was not correct than less skilled ones. These results are consistent with a study by Cerdán et al. (2013) exploring 9th graders ability to rephrase questions in their own words. Better comprehenders incorporated a higher number of transitional inferences indicating an effort to understand the questions, while poor comprehenders' reformulations contained many incomplete and erroneous ideas. As a result, poor comprehenders constructed incorrect and incomplete mental representations of the questions, resulting in poorer purposeful reading performance.

Developing readers' access to relevant parts of the text (i.e., Step 2 of the MD-TRACE model) can also be hindered by their limited use of text organizers. For instance, Rouet et al. (2011) found that 5th and 7th graders' selections in simulated Web menus were strongly influenced by shallow cues such as list order or capitalized keywords, irrespectful of their intrinsic relevance. In addition, Potocki et al. (2017) found that only half of 5th graders used section and paragraph headers systematically to access relevant information, while others either read linearly or browsed randomly. Finally, Salmerón et al. (2018b) found that 7th to 10th grade students' ability to select of relevant pages increased with grade and was related to their comprehension outcomes.

Monitoring and evaluating the relevance and sufficiency of information (i.e., Step 3 of the MD-TRACE model) is also a complex facet of purposeful reading activities. Vidal-Abarca et al. (2010) observed that 4th and 5th graders did not systematically propose an answer to a comprehension question, even after reading a paragraph containing relevant information. Better comprehenders did so on two thirds of the occasions, as compared with less than half of the

occasions for poor comprehenders. In addition, Cerdán et al. (2011) examined 14-year-old students' ability to reject distracting information contained in a text. Students were asked to read two texts and answer questions. Half of the questions had been manipulated to induce a misleading correspondence between the wording of the question and distracting information in the texts. Good comprehenders were more able to reject distracting information than poor comprehenders, who selected and processed the distracting information more frequently.

Finally, developing readers may struggle to assess the quality of reading outcomes (Step 4). In an early study, Kobasigawa (1983) asked 4th and 5th graders to assess another student's response to a purposeful reading assignment. In general, younger students did not spontaneously mention criteria such as the relevance or sufficiency of the information provided. However, when explicitly prompted by the experimenter, 4th graders were able to correctly indicate if the answer did not contain all the required information. This suggests that developing readers may have trouble monitoring the demands of a search question throughout the reading process (see also Cerdán et al., 2019).

Thus, the processing steps involved in purposeful reading entail a number of challenges for developing readers, both in printed and in online reading situations. Nevertheless, reading for explicit purposes account for most daily reading activities of adolescents (Lenhart, 2015) and adults (White et al., 2010). Learning to use text in the service of different tasks therefore represents a crucial instructional issue.

1.2. Teaching purposeful reading to developing readers

There is a long tradition of research aimed at teaching reading strategies using a variety of innovative instructional approaches (e.g., National Reading Panel, 2000; Palincsar & Brown, 1984; Paris et al., 1984). However, as Ng and Graham (2017) correctly pointed out, most of these interventions were conducted in the pre-Internet era and within the so-called *Simple View of Reading* framework (i.e., reading a text to form a broad understanding). Only a few studies have attempted to train elementary school students to address different types of reading tasks and purposes. These interventions can roughly be categorized in reference to the MD-TRACE model outlined above, depending on the type of process that was the focus of the intervention.

Some studies have tested the effectiveness of "pre-search" activities to improve the understanding of the question and the construction of an appropriate task model (i.e., Step 1 in MD-TRACE). For example, Dreher and Sammons (1994) asked 5th grade students to reflect on keywords in a question, with beneficial effects on their document search strategies. More recently, Llorens and Cerdán (2012) invited undergraduate students to identify the key

information in the question and to explain how they would read in order to answer it, prior to engaging with the text. Compared to students in a control condition, those students gave significantly more correct answers. In addition, Cerdán et al. (2019) asked 8th grade students to read two texts and answer questions about them. For some of the questions, a paraphrase of the question was presented to the students before they started reading the texts. The presentation of paraphrases was beneficial to less-skilled readers. Finally, Ayroles et al. (2021) asked 5th graders to describe the information needed to answer a question prior to searching the answer in a text. Compared with a control task, the pre-search elaboration resulted in a sharp increase in response correctness, although the examination of online reading patterns failed to show any speeding up of the search process, nor any increased focusing on relevant portions of the document. Having students elaborate on the question arguably supports their construction of a more complete and robust task model, subsequently informing their reading strategies and leading to better outcomes.

In contrast with the evidence suggesting a link between patterns of visual inspection and document comprehension performance (e.g., Mason et al., 2013), there is a dearth of research on readers' use of so-called metatextual cues (e.g., keywords, headers) during purposeful reading in printed and online settings (i.e., steps 2 and 3 of the MD-TRACE model). Coutelet and Rouet (2004) implemented a five-week classroom training program with one 30-minute session per week in 3rd and 4th-grade classes. The training tasks prompted students to think about their search goal and to consider metatextual cues such as keywords and headers. At an immediate post-test, trained students used more effective strategies compared to a control group. However, this effect did not significantly last after a delay. Interestingly however, among the trained students who were initially inconsistent in their use of a strategy (i.e., using sometimes linear, sometimes selective reading), 62.5% entirely gave up ineffective strategies at the delayed post-test.

Assessing one's response quality (Step 4 of the MD-TRACE model) is considered a challenge for students, including at a post-secondary level (Dunlosky & Rawson, 2012). In an early study of purposeful reading, Dreher and Sammons (1994) prompted 5th graders to reflect on their acquisition of information prior to giving an answer to a search question. Compared to a control group, prompted students gave significantly more correct answers than students who completed the information-seeking activity without assistance. Likewise, Rouet et al. (2010) observed that secondary school students' selections in a simulated Web search results page improved after reading a short text on the topic, but the effect was limited to better

comprehenders. Whether instructional procedures could foster students independent monitoring of response quality is, to our knowledge, an open question.

1.3. An instructional program to teach purposeful reading strategies

In total, there is some evidence that interventions focused on critical steps and challenges of purposeful reading can enhance grade school students' mastery of the respective skills. However, to date no intervention has attempted to provide a systematic program encompassing all the processes involved in purposeful reading. Regarding instructional approaches, purposeful reading relies on a mix of declarative and procedural knowledge (Britt et al., 2018). For instance, students need to learn both about the structure of texts, and how to engage or disengage from a text passage. Therefore, we developed a direct instruction program involving a combination of explanation and guided practice on each and every stage of the purposeful reading cycle. The program introduces the various subtasks involved in purposeful reading, with a combination of direct explanations followed by guided practice with feedback (see Table 1 for an overview; section 3.3.3 below and appendix A for details).

Table 1. Overview of the training program based on the MD-TRACE model of purposeful reading.

MD-TRACE component	Means of intervention	Target declarative and procedural skills
Step 1. Construct a task model	Reflect on the key words of the questions and the nature of the information to be found.	<i>Declarative aspect:</i> analyze questions. Identify interrogatives and keywords. <i>Procedural aspect:</i> highlight questions' keywords and articulate nature of information to be found.
Step 2. Select relevant text	Use textual cues such as headers, paragraphs or keywords in the text.	<i>Declarative aspect:</i> define textual cues. <i>Procedural aspect:</i> link keywords from the question with keywords from the textual clues to identify the location of relevant information.
Step 3. Extract and integrate task-relevant information	Draw connections between the question and several portions of the text.	<i>Declarative aspect:</i> understand the differences between <i>locate and integration</i> questions. <i>Procedural aspect:</i> identify relevant information in the text and integrate as needed to construct an answer. Disengage and resume searching if no information is found.
Step 4. Construct an answer	Rephrase text information, check answer with respect to question.	<i>Declarative aspect:</i> understand the elements that make up a correct answer. <i>Procedural aspect:</i> compare the demands of the question and the proposed answer to check that they match. Recycle if they don't.

We subsequently tested the impact of the program in an experiment involving a series of teacher-led workshops in a pre- post-test design with an active control group.

2. Objectives and hypotheses

The objective of this study was to develop and test the effectiveness of a new training program based on an analytical approach of the steps and challenges involved in purposeful reading for 5th graders. The program involved a set of instructional workshops, materials and tasks, developed in cooperation with a group of teachers. We tested the effectiveness of this teacher-

led intervention against an active control group both on direct application tasks assessing each specific purposeful reading component, and on a more integrated (and unguided) purposeful reading task (i.e., a more naturalistic assignment, similar to what students typically encounter at school). We expected trained students to outperform controls on both purposeful reading component tasks (hypothesis 1) and on integrated purposeful reading task (hypothesis 2). We also explored whether potential progress was dependent on children's characteristics in terms of initial level in word reading, reading comprehension and metatextual knowledge.

3. Method

3.1. Population

Participants were nine teachers and 167 fifth graders from five primary schools located in a large semi-urban area of France. The participating teachers (6 female) had received their degree from a public teacher training institute and they had between five and 35 years of experience. Only the 139 students who were present at both the pre and post-test sessions were considered in the analyses (mean age = 10.41). All the included students attended at least half of the training sessions and 81% attended all of them. Students participated as part of regular classroom activities led by their usual teachers. All the participants had French as their mother tongue. Their reading level (i.e., written word identification and reading comprehension) as well as their strategy knowledge and skills were controlled for.

3.2. Study design

The program was designed collaboratively and approved by the local school authorities. Throughout the experiment, data were collected by the teachers and transferred anonymously to the researchers following the guidelines of the European General Data Protection Regulation.

Teachers from a large school district that includes urban, semi-urban areas were informed about the study through in-service professional development events and direct contact. The two-pronged literacy training program outlined in section 3.3.1 was introduced as part of a one-day training workshop organized by the regional school authorities. Participation to the study was voluntary. Participating teachers were explained the goals, design, and methods of the study. They were presented the instructional approach and the type of explanations and tasks to be assigned to the students. During the implementation of the program, the researchers worked in close cooperation with the teachers. Teachers filled out a logbook indicating their progress and describing how the session went. Teachers and researchers also communicated informally over email.

Using a quasi-experimental design, participating classes were assigned to one of two subgroups balanced for students' overall level of comprehension as well as their geographic and socioeconomic status. One subgroup was initially assigned to the active control condition (i.e., the writing workshops; 4 classes from 13 to 22 students each, $n = 78$, mean age = 10.41), whereas the other was assigned to the experimental condition (i.e., the purposeful reading workshops; 6 classes from 11 to 23 students each, $n = 89$, mean age = 10.43). The initial plan was to later reverse the conditions, so that students in every participating class would take both the purposeful reading and the control writing prongs of the program. However, the study was interrupted due to the Covid-19 pandemic, which roughly coincided with the ending of the first phase. Therefore, the design was converted into a standard between-participant design. In addition, one of the teachers initially assigned to the control condition chose to withdraw from the study after a few sessions because of unrelated circumstances, reducing the size of the control group to 56 students (3 classes, mean age = 10.37).

3.3. Materials

3.3.1. Training programs

Two training programs relevant to the acquisition of language skills were developed: The "Purposeful Reading Training Program" focused on the four steps of purposeful reading, whereas the "Reading and Writing Training Program" focused on reading comprehension and writing from narrative texts. The latter program served only as an active control condition and we had no specific hypothesis about its impact. Each program consisted of five modules, with each module involving two 45-minute workshops. Each workshop was composed of a workbook for students and a practical guide describing the structure and content of the workshops for teachers. The materials were sent to the teachers ahead of time and the researchers answered any clarification questions from teachers (see below, procedure).

3.3.1.1. Purposeful Reading Training Program (experimental condition). The purposeful reading training program followed the different stages of purposeful reading described in the MD-TRACE model (Rouet & Britt, 2011): (1) Construct a mental representation of the question - i.e., a task model, (2) Locate relevant passages among the available documents, using cues such as titles, (3) Extract and integrate information, and (4) Construct and evaluate the quality of the answer. Thus, the first four modules focused on each of the steps presented above (see Table 1). The last module contained purposeful reading tasks

requiring the coordination of all these steps. An overview of the workshop contents and an example of student booklet are presented in appendices A and C, respectively.

3.3.1.2. Reading and Writing Training Program (control condition). Each module of the reading and writing training program began with the reading of a text (180 words on average) followed by a series of tasks focusing on different syntactic and grammatical aspects (e.g., punctuation, sentence form and complements, morphology). The second workshop of each module consisted of a written production task in which the students had to rewrite a text by applying the elements worked on in the previous workshop (e.g., reproducing the structure of the text and using different punctuation marks appropriately). Thus, the control program was focused on written language skills, it featured activities that were new to the teachers and to the students, but it did not include any direct instruction of purposeful reading skills.

3.3.2. Pre and post-test measures.

Two types of tasks were administered at the pre- and post-tests. The first set of tasks (“purposeful reading component tasks”) aimed to study whether students could reuse the skills specifically targeted by each training module (e.g., being able to build a task model, to access information efficiently and so forth) in tasks similar to those worked on during the workshops. These measures allowed us to ensure that some kind of actual learning had occurred during the workshops. The second set of tasks (“integrated purposeful reading task”) aimed to investigate whether students could reuse the targeted skills in a more “complete” purposeful reading task without any guidance on the different strategies to be used. This task consists in answering comprehension questions on a set of documents, without any question or instruction pointing to the strategies learned in the training modules.

3.3.1.3. Purposeful reading component tasks. To test each specific component of the purposeful reading process, we created four tasks directly inspired by modules 1 to 4 of the purposeful reading program (Table 1). Each task was composed of four items with a preceding example to explain students how to complete the task. The first task (“Task model”) focused on reflecting on the key words of questions and the nature of the information to be found. In this task, pupils had to underline and circle the key words of the question and then complete the generic sentence “Find _____ that corresponds to _____” (e.g., for the question “*When was Salvador Dali born?*”, the expected answer was “*Find a date that corresponds to the birth of Dali / when Dali was born”). The task included four items with for each, two slots to complete. The score corresponded to the number of slots correctly filled in by the student (maximum score = 8; $\alpha = .72$). The second task (“Information access”) focused on the use of*

headings as an aid to access relevant information. In this task, students were presented with a question followed by four potential title suggestions. In addition to having to identify the question's key words, students were asked to choose the title in which the answer to the question was most likely to be found (maximum score = 8; $\alpha = .65$). In the third task ("Extract and integrate"), students had to answer a series of questions by looking for the answer in short texts of about 135 words, consisting of two paragraphs. To do so, they had to first underline the relevant information in the text (maximum score = 4) and then formulate a written answer based on this identified information (maximum score = 4) (maximum total score = 8; $\alpha = .82$). Finally, in the fourth task ("Construct response"), students had to assess five proposed answers in terms of relevance and sufficiency with respect to a question. More specifically, they had to highlight the keywords of the question, to identify the correct answer and to explain why the other four proposals were incorrect (e.g., for the question "*In which city was Coluche (a French humorist) born?*", the answer "*Coluche was born in Paris*" is correct but the answer "*Coluche was born in 1944*" is incorrect because it indicates a date and not a location). The task included four items and students received a score from 0 to 6 for each item (i.e., 1 point for each correct relation plus 1 for the correct identification of the keywords of the question) (maximum total score = 24; $\alpha = .83$). The dependent variables were the scores for each of the four tasks.

Note that although the 'purposeful reading component' task was similar to some of the practice tasks given to the experimental group, it did not contain items that had been previously presented to the students in either condition.

3.3.2.2. Integrated purposeful reading task. A holistic, integrated task was administered to measure whether students could use the skills targeted in the Purposeful Reading training program without guidance on how to use them. Indeed, the task did not contain any explicit indication of the strategy to be used and was therefore considered as a measure of students' ability to use their skills in a more naturalistic reading activity. It included a document consisting of several sections with subtitles and illustrations (see Figure 1). The document came with six questions involving different requirements: two were "locate questions", two were "comprehension questions" and two were "integration questions". For "locate questions", students had to find a single explicit piece of information located in a single paragraph of the document. For "comprehension questions", they had to make inferences to integrate several pieces of information from the same paragraph. Finally, for "integration questions", students had to compare or integrate several pieces of information from different paragraphs of the document. The text remained available while answering the questions. Students had a maximum

of 10 minutes to answer the questions, i.e., a moderate time pressure based on informal pilot testing. The total score was the number of correct answers (maximum = 6; $\alpha = .62$).

Le tour du monde

Doc 1. Le tour du monde en avion solaire



Ils l'ont fait ! Les 2 pilotes de Solar Impulse 2 ont terminé leur tour du monde à bord de cet avion fonctionnant à l'énergie solaire. Presque 1 an et demi après le départ, l'engin s'est posé à Abu Dhabi, aux Emirats arabes unis (Asie). Il en était parti le 9 mars 2015. Pendant leur périple, les pilotes ont parcouru 43 000 km, en se relayant à chaque étape. Le voyage n'a pas été facile. Comme il n'y avait qu'une seule personne dans l'avion, elle devait rester vigilante (attentive) et ne pouvait dormir que 20 minutes d'affilée. Le but de ce défi ? Montrer que l'on peut faire un voyage avec l'énergie du Soleil comme seul carburant. « C'est un exploit dans l'histoire des énergies renouvelables », a dit Bertrand Piccard, l'un des pilotes, après avoir atterri.

« Solar Impulse 2 a fini son tour du monde ! »
Article paru sur www.monquotidien.fr, le 28 juillet 2016, © Playbac Presse ;
Mon Quotidien – pour les 10-14 ans - 10 minutes de lecture chaque jour ;
www.monquotidien.fr

Doc 2. Le tour du monde en croisière



C'est le « voyage d'une vie », un rêve à la Jules Verne : les plus grandes compagnies de croisières embarquent chaque année des milliers de passagers pour un tour du monde au rythme des océans en 60 ou 80 jours, voire plus.

« C'est juste magique de faire le tour du monde sans prendre l'avion et découvrir les pays par la mer. Et, tout cela, depuis un hôtel très confortable. Nous avons renoué avec les tours du monde il y a cinq ans et ils ont beaucoup de succès », résume le président de Costa Croisières France [...]. Pour ce tour du monde avec Costa, il faut déboursier un minimum de 15 000 euros par personne.

« Faire le tour du monde en 80 jours et plus, ou le succès des croisières au long cours »,
Article paru dans l'Express,
le 30 septembre 2015.

Doc 3. Le tour du monde de la famille Paulin

Une parenthèse de 11 mois...
Nos motivations sont on ne peut plus simples, profiter de la vie en famille sans passer notre temps à courir, découvrir et faire découvrir à nos enfants les merveilles de notre belle planète, couper pendant 11 mois avec la routine.
L'idée a germé en 2010, quelques mois avant la naissance de notre dernière fille. Avoir une famille, c'est bien, mais il nous manquait un grand projet, une grande aventure, quelque chose qui nous lie tous les cinq, qui nous mette un peu en difficulté pour mieux nous rassembler, qui nous donne simplement le plaisir de nous découvrir, de découvrir les autres, de partager avec eux. [...]
L'autre aspect de cette parenthèse, c'est de mettre de côté, pendant un an, notre vie au rythme un peu trop élevé et de prendre le temps d'être ensemble et de se découvrir. Trop de personnes disent : « Je ferai telle ou telle chose plus tard », ou encore « Si j'avais 10 ans de moins, je ferais ça ». Pour nous, la vie c'est maintenant !



Extrait du blog de Sébastien Paulin, Les PAUPAU voyageurs, © Sébastien Paulin.

Figure 1: Example of document presented during the integrated purposeful reading task.

The five tasks (four “purposeful reading component” and one “integrated purposeful reading”) were grouped together in a workbook. Three versions of the workbook with comparable content were created: one for the pre-test, one for the immediate post-test and one for the delayed post-test. The order of distribution of these workbook versions was balanced across classes.

3.3.3. Associated measures.

Different associated measures were administered in order to 1/ verify the homogeneity of our experimental and control groups at the pre-test, and 2/ examine the impact of these associated skills on the “purposeful reading component” and “integrated purposeful reading” measures and on the possible progress made by the students on these measures after the intervention.

3.3.3.1. Written word identification. The standardized test "La Pipe et le Rat" (Lefavrais, 1968) was used to assess students' written word identification skills. In this task, students had a maximum of three minutes to silently read three pages of single words and to underline as many animal names as possible (around half of the words were animal names). The dependent variable was the difference between the number of correctly underlined animal

names and the number of incorrectly underlined words). The test manual did not include any reliability index for this measure. However, the scores obtained by our sample of children were within the norm for their chronological age (see Lefavrais, 1968).

3.3.3.2. Reading comprehension. The test "La Forme Noire" ([*The Black Shape*], Maeder, 2010) was used to assess the students' level of reading comprehension. "La forme noire" is a standardized test used by psychologists and speech therapists to diagnose reading comprehension difficulties. It consists of a narrative text (522 words) followed by 15 multiple-choice comprehension questions. The text and questions are presented on separate sheets. Students first read the text silently at their own pace and then answer the questions from memory, without the opportunity to reread the text. Performance is the number of questions correctly answered (maximum = 15; $\omega = .60$).

3.3.3.3. Strategy knowledge. A shortened version of the strategy knowledge questionnaire developed by Ayroles (2020) was used to assess students' strategy knowledge (i.e., metatextual knowledge) and control skills (i.e., planning, regulation, and evaluation) during a purposeful reading task. The questionnaire includes 10 items in which students are presented with a situation (for example: *Your teacher asks you to read a text to answer a question. Before you start looking, what do you do most often to quickly find the answer in a text?*) followed by a series of possible strategies. Students were asked to identify which strategy they think was most appropriate in this situation. The total score is the sum of the correct answers (maximum = 10, $\alpha = .60$).

3.4. Procedure

The procedures for the administration of pre- and post-test measures, associated measures and intervention program are described in the following sections.

3.4.1. Pre and post-test measures.

Participants took the pre- and post-tests in whole classes, in sessions led by the researchers in cooperation with their usual teacher. Each session lasted for about an hour. Students first completed the "integrated purposeful reading" task (10 minutes maximum), then the first ("Task model") and second ("Information access") "purposeful reading component" tasks (20 minutes), and finally the third ("Extract and integrate") and fourth ("Construct response") "purposeful reading component" tasks (20 minutes). Students were granted a short break between each task. During the tasks, the experimenters and teacher made sure that all students were progressing normally. If necessary, they repeated the instructions to the students

individually, using the example given for each task. A delayed post-test (5 weeks after the end of the intervention) was planned but could not take place due to the health crisis related to the COVID-19 pandemic.

3.4.2. Associated measures.

The associated measures were collected in a single whole-class 45-minute session, run by the experimenters in cooperation with the students' usual teacher. Students first completed the reading comprehension test (about 15 minutes), then the strategy knowledge questionnaire (also for about 15 minutes), and finally the written word identification test (5 minutes).

3.4.3. Training programs

The two training programs were implemented concurrently by the teachers in their classrooms at the rate of one module per week (each module being composed of 2 workshops of 45 minutes each), over a period of five weeks.

Each workshop followed the principles of explicit instruction (Gauthier et al., 2005, 2007): (1) presentation of the learning objective (5 minutes); (2) modelling: during which the teacher showed an example of how to carry out the exercise (5 minutes); (3) guided practice: during which students worked in pairs and received corrective feedbacks from their teacher (10 minutes); (4) individual practice: during which students worked in autonomy and still received corrective feedbacks from their teacher (15 minutes); and (5) the final objectification phase in which students are expected to make explicit what was worked on and identify the essential skills and knowledge to be retained (5 minutes). The times indicated for each step were indicative for the teachers, as modifications could be made to adapt to the daily constraints of a class (bearing in mind that a 5-minute margin was already considered). Nevertheless, the researchers insisted that teachers respect the maximum time of 45 minutes per workshop, that they favor individual work, and that they interact strongly with the students to ensure that everyone understands and applies the instructional objective of the workshop.

Teachers received a one-day training session and were presented the content of the program and instructions to be implemented three to six weeks before the experiment began. During the training session, the principles and organization of the intervention and a detailed example of one workshop session was presented for each of the training programs. Participating teachers had the opportunity to discuss the contents and activities to be presented both during the session, in the subsequent preparation period, and throughout the implementation.

4. Results

Informal examinations of logbooks and email communication indicated that the participating teachers complied with the content and organization of the training sessions, with the exception of one teacher who cancelled her participation due to a lack of time to prepare. The data from the corresponding class were excluded from the analyses.

4.1. Group homogeneity

To ensure group homogeneity at pre-test, we compared their mean scores on the associated measures (Table 2). The experimental and control groups did not differ significantly in terms of reading comprehension skills ($t(1, 137) = -.688, p = .49$) and strategy knowledge ($t(1, 136) = 1.378, p = .17$). A rather low level of strategy knowledge (rated out of 10) was noted for all participants. Finally, participants in the control group scored significantly better than those in the experimental group on the word identification test ($U = 1863, p < .05$). Both groups, however, were in the standard range for their grade level (Lefavrais, 1968).

Table 2. Means (*sd*) on associated measures for the two groups of children at pre-test.

Group	Reading comprehension (range: 3-15)	Strategy knowledge (range: 0-9)	Written word identification (range: 16-91)
Experimental	8.70 (2.55)	3.98 (1.71)	50.02 (17.06)
Control	8.39 (2.61)	4.41 (1.98)	57.61 (20.10)

4.2. Effect of the intervention on the “purposeful reading component” tasks

Table 3 shows the descriptive statistics for each of the four tasks comprised in the measure of “purposeful reading component”, at pre- and post-tests. Appendix B features the correlations between the four tasks for each condition.

To measure the effect of the intervention on each purposeful reading component, mixed model analyses were run using JASP software program with Time (pre- vs post-tests) and Group (experimental vs control) as fixed factors and participants and classes as random factors. Students’ scores in written word identification, reading comprehension and strategy knowledge were also entered in the models as well as their interactions with the Time factor. The dependent variables were the scores of the four tasks comprising the pre- and post-tests. In these analyses,

significant Time*Group interaction is considered as evidence of the expected training effect (see Table 3).

Table 3. Descriptive statistics in pre- and post-tests (*sd* in parentheses) and significance of the Time*Group interaction for the four “purposeful reading component” tasks.

Task	-test	Control	Experimental	Time*Group interaction
1. Task model (range: 0-8)	Pre	4.55 (2.05)	4.45 (1.70)	<.001
	Post	4.14 (2.35)	5.99(1.70)	
2. Information access (range: 0-8)	Pre	3.85 (2.27)	4.17 (1.98)	<.001
	Post	3.24 (1.74)	5.41 (2.22)	
3. Extract and integrate (range: 0-8)	Pre	4.24 (2.38)	3.77 (2.20)	<i>ns</i>
	Post	3.52 (2.04)	3.62 (2.27)	
4. Construct response (range: 0-24)	Pre	9.46 (7.01)	8.73 (5.97)	<.01
	Post	9.70 (6.83)	12.2 (7.30)	

Concerning the first task (“Task model”), the effects of Time ($F(1, 132.51) = 1.53, p = .22$) and Group ($F(1, 7.11) = 5.31, p = .054$) were not significant. However, a significant Time * Group interaction was observed ($F(1, 131.85) = 24.89, p < .001$). Post-hoc analyses did not reveal any significant difference between the experimental and control groups at pre-test ($t(136) = .34, p = .74$) but a significant difference at post-test ($t(134) = -5.32, p < .001$, Cohen’s $d = .93$). There was also a significant difference between pre- and post-test in the experimental group, ($t(78) = 8.15, p < .001$, Cohen’s $d = .91$) whereas no such difference was found in the control group ($t(55) = -1.24, p = .22$). As regards the associated measures, we observed significant main effects of Written word identification ($F(1, 131.33) = 14.63, p < .001$) and Reading comprehension ($F(1, 129.15) = 15.87, p = .02$) but a non-significant effect of Strategy knowledge ($F(1, 128.46) = 1.46, p = .22$). However, none of these associated measures significantly interacted with the Time factor ($F(1, 133.78) = .43, p = .52$; $F(1, 131.97) = .17, p = .68$; and $F(1, 131.33) = .18, p = .68$, respectively).

Concerning the second task (“Information access”), the effects of Group ($F(1, 7.12) = 5.01, p = .06$) and Time ($F(1, 131.89) = .07, p = .89$) were not significant. However, a significant interaction Time * Group was observed ($F(1, 131.7) = 20.92, p < .001$). Post-hoc analyses did not reveal significant difference between the experimental and control groups at pre-test ($t(137)$

= -.89, $p = .37$). However, at post-test, students in the experimental group outperformed the students in the control group ($t(134) = -6.11, p < .001$, Cohen's $d = 1.07$). Finally, there was a significant difference between pre- and post-test in the experimental group, ($t(79) = 4.43, p < .001$, Cohen's $d = .50$). The difference was also significant in the control group ($t(55) = 2.31, p = .03$) but in terms of performance loss (from $M = 3.85; SD = 2.27$ to $M = 3.24; SD = 1.74$). Finally, we observed a significant main effect of Written word identification ($F(1, 129.5) = 22.44, p < .001$) but not Reading comprehension ($F(1, 127.23) = .26, p = .61$) nor Strategy knowledge ($F(1, 125.69) = .03, p = .88$). None of these associated measures interact significantly with the Time factor ($F(1, 133.69) = .01, p = .91; F(1, 131.33) = .001, p = .97$; and $F(1, 130.4) = .01, p = .91$, respectively).

Concerning the third task ("Extract and integrate"), there was a non-significant effect of Group ($F(1, 6.58) = .03, p = .87$) and a non-significant effect of Time ($F(1, 131.1) = 1.59, p = .22$). Moreover, a non-significant interaction Time * Group was observed ($F(1, 130.91) = 2.3, p = .13$). The main effects of Written word identification ($F(1, 129.63) = 26.56, p < .001$) and Reading comprehension ($F(1, 127.16) = 6.59, p = .01$) were significant but not the effect of Strategy knowledge ($F(1, 125.73) = 1.08, p = .3$). However, the interaction between Strategy knowledge and Time was significant ($F(1, 129.66) = 5.70, p = .02$). The other interactions between Written words identification, Reading comprehension and the Time factor were not significant ($F(1, 132.82) = 1.96, p = .16$ and $F(1, 130.56) = 2.12, p = .15$ respectively).

Finally, concerning the fourth task ("Construct response"), the effects of Time ($F(1, 133) = .62, p = .43$) and Group ($F(1, 6.74) = .27, p = .62$) were not significant. However, a significant interaction Time * Group was observed ($F(1, 133) = 7.41, p < .01$). Post-hoc analyses did not reveal significant difference between the experimental and control groups at pre-test, $t(137) = .66, p = .51$ nor at post-test ($t(137) = -1.61, p = .11$). However, there was significant difference between pre- and post-tests in the experimental group ($t(82) = -4.58, p < .001$, Cohen's $d = .50$). In contrary, no difference was found in the control group ($t(55) = -.31, p = .76$). Finally, the main effect of Written word identification was significant ($F(1, 127.1) = 52.12, p < .001$) but neither those of Reading comprehension ($F(1, 126.62) = 1.5, p = .22$) nor Strategy knowledge ($F(1, 126.62) = 2.36, p = .13$). None of the interactions between these associated measures and the Time factor were significant ($F(1, 133) = 1.23, p = .27; F(1, 133) = 1.11, p = .29$; and $F(1, 133) = .25, p = .62$ respectively).

4.3. Effect of the intervention on the integrated purposeful reading task

To measure the effect of the intervention on the integrated and unguided purposeful reading task, the same type of mixed model as for the “purposeful reading component tasks” analyses was run but with the score on the ecological purposeful reading task as the dependent variable.

The results did not reveal significant effects of Group ($F(1, 6.14) = 2.54, p = .16$), Time ($F(1, 132.2) = .54, p = .46$), nor a significant interaction between Group and Time ($F(1, 132.01) = .76, p = .39$). Thus, although the trend is consistent with our expectations (see Table 4), the data do not support any conclusion regarding the effects of the intervention on this task. Finally, all the main effects of Written word identification ($F(1, 132.66) = 43.82, p < .001$), Reading comprehension ($F(1, 129) = 6.77, p = .01$) and Strategy knowledge ($F(1, 128.02) = 4.59, p = .03$) were significant but these factors did not interact significantly with the Time factor (respectively $F(1, 134.05) = .004, p = .95$; $F(1, 131.63) = 1.72, p = .19$; and $F(1, 130.68) = .17, p = .68$).

Table 4. Descriptive statistics in pre- and post-tests (*sd* in parentheses) and significance of the Time*Group interaction for the “integrated purposeful reading” task

Task	-test	Control	Experimental	Time*Group interaction
Integrated task (range: 0-6)	Pre	2.92 (1.42)	2.93 (1.21)	<i>ns</i>
	Post	2.90 (1.26)	3.16 (1.30)	

5. Discussion

The objective of this study was to design and test an instructional program for the teaching of purposeful reading skills to 5th grade students. The program was designed following current theories of purposeful reading (Britt et al., 2018) and implemented by teachers in their usual classrooms following the principles of direct instruction. This program was compared to an active control condition in which teachers implemented a controlled training program focused on reading comprehension and writing production. The progress of the two groups of students were contrasted through their performance in various tasks.

Students in the experimental group improved their performance in the first (“Task model”), second (“Information access”) and fourth (“Construct response”) criterion tasks to a

greater extent than students who took the active control program. In addition, effects sizes were medium to large, which is quite encouraging in the context of intervention studies (Kraft, 2020) and given the relatively short training period (7 hours over 5 weeks) and considering that the intervention program was delivered by the usual teachers and not the researchers (e.g., Jacob, 2017; James-Burdumy et al., 2012). Interestingly, we also observed that for these measures, students benefited from the program regardless of their initial level in written word identification, reading comprehension and strategy knowledge. Regarding the third task (“Extract and integrate information”), there was no change over time regardless of the condition. Regarding the integrated purposeful reading task, the observed pattern was consistent with our expectations but failed to yield a statistically reliable effect.

The results suggest that the “extract and integrate” task (Task 3) was less affected by training, and perhaps more dependent on students' general comprehension skills. Indeed, the task required students to answer location and integration questions without any further cue. For instance, the demands of the questions were not made explicit, nor were the participants explicitly invited to reflect on those demands. In other words, Task 3 was rather similar to the integrated task, which the intervention also failed to affect to a significant extent. The lack of a sizeable effect on more integrated tasks may be a consequence of the focused, segmented instructional approach used in the intervention. During the first four modules, the students in the experimental group were trained on independent skills. Thus, they may have missed an opportunity to use the skills in a more integrated way. Dreher and Sammons (1994) also noted that children who had been taught information-seeking strategies failed to transfer their knowledge to varied tasks if they did not receive “*systematic guided practice in the actual use of books*” (p. 311). Primary school students may generally have “*difficulty generalizing what they have learned and reusing it in another situation*” (Coutelet & Rouet, 2004, p. 27, our translation). The final, “integrative” training module may not have been sufficient to let the students build a transferable skill. Indeed, as Coutelet and Rouet (2004) rightly noted, “*it is the accumulation of experiences that allows students to abstract the 'rule'*” (p. 27). The lack of effect on the integrated task may also be explained by the large difference in format and complexity between the tasks presented in the last training module and the task administered as an integrated purposeful reading activity. Finally, unlike the practice sessions the assessment sessions involved a 10-minute time constraint. In sum, there may have been an excessive gap between the training and the evaluation tasks, which prevented students from generalizing the use of the component skills. As a partial compensation, the associated measures did not interact

with condition or time, suggesting that despite its limited effectiveness the program was suitable to students with a range of related skills and knowledge.

The present study entails several limitations that limit the scope of our conclusions. First, we compared the experimental condition with an active control condition in which students received an intervention focused on writing skills. Our study demonstrates the value of training students, but not the value of specific instructional approach that was used. A more interesting comparison would be between two alternate approaches to training comprehension skills, to find out exactly what works and what does not. This sets the stage for future intervention studies. Second, the participating classes were expected to switch conditions and carry out the alternate training program after the first post-test. A second post-test was planned after the conditions would have been switched across groups. However, the complete design could not be implemented due to a national lockdown period. Thus, we can only report short-term outcomes of an incomplete design here. This might have reduced the opportunity to detect possible effects on the integrated task. Regarding this task, our study involved a single study task based on a set of documents, i.e., an admittedly limited assessment of students' skills. Future studies should consider a broader set of measures, perhaps by including tasks directly generated by teachers as part of their classroom practices. Third, we were not able to implement a formal quality control procedure beyond our regular but informal communication with the participating teachers. Gathering systematic data about the actual implementation is important since there may be a gap between the resources provided, the instructions for use and their actual implementation (e.g., Horner et al., 2019). For instance, some of the teachers pointed out that the workshops were sometimes too dense and difficult to carry out in 45 minutes only. However, we could not formally check that they had actually implemented all the different times relative to the explicit instruction approach (Gauthier et al., 2005, 2007) or that they indeed provided appropriate feedback to their students. On-site observation and systematic debriefing may have helped build upon teacher experience but also provide information about quality of implementation that can affect the students' progress (e.g., Blase et al., 2012). All these elements must be considered in further research into innovative teachers-led interventions.

In spite of these limitations, several instructional implications may be drawn from our results. First, the study yielded valid, usable educational resources to teach students the various skills underlying purposeful reading. In the present study, we focused on children at the end of primary school and, as a result, we focused on some aspects of the purposeful reading components, such as building an appropriate task model and accessing relevant information using textual organizers. However, such a purposeful reading training program would also

benefit from being implemented later in the curriculum, e.g. in secondary school. For this age group, in addition to working with longer (and multiple) documents, we could consider targeting other types of purposeful reading skills, such as the ability to integrate information from multiple documents or to assess the reliability of information read (see for example Pérez, 2018). Second, this study demonstrated the benefits of a simple intervention implemented by regular teachers in their usual classroom contexts. A mounting criticism of educational research is that innovative interventions were often led by researchers in highly controlled settings, with low replicability and a limited practical impact, if any (Jacob, 2017; James-Burdumy et al., 2012). The present study brings encouraging results regarding the possibility to develop effective programs that require a minimal amount of professional development. As a result, this study goes beyond the simple validation of a pedagogical intervention but also puts in perspective the researcher-teacher interactions and the appropriation of research devices by the teachers (see Bressoux, 2017 or Bryk, 2015, for discussions of this point). It seems that the initial training of the teachers, the many discussions between the teachers and the experimenters that followed, as well as the clear and systematic structure of the workshops, may have facilitated the teachers' appropriation of the intervention. In addition, informal teacher feedback suggested that, overall, the pupils enjoyed the content of the sessions and the homogeneous structure that enabled them to build capacity.

References

- Ayroles, J. (2020). *Apprentissage de la lecture fonctionnelle chez l'enfant : Des processus impliqués au développement de ressources pédagogiques* [Learning of task-oriented reading in children: From the processes involved to the development of instructional resources]. University of Poitiers. Doctoral dissertation in Psychology.
- Ayroles, J., Potocki, A., Ros, C., Cerdán, R., Britt, M. A., & Rouet, J. F. (2021). Do you know what you are reading for? Exploring the effects of a task model enhancement on fifth graders' purposeful reading. *Journal of Research in Reading, 44*(4), 837–858.
- Blase, K. A., Van Dyke, M., Fixsen, D. L., & Bailey, F. W. (2012). Implementation science: Key concepts, themes, and evidence for practitioners in educational psychology. In B. Kelly & D. F. Perkins (Éds.), *Handbook of implementation science for psychology in education* (p. 13-34). Cambridge University Press.
- Brand-Gruwel, S., Wopereis, I., & Walraven, A. (2009). A descriptive model of information problem solving while using internet. *Computers & Education, 53*(4), 1207-1217.
- Bressoux, P. (2017). Practice-based research: Une aporie et des espoirs. *Education Didactique, 11*(3), 123-134. <https://doi.org/10.4000/educationdidactique.2870>
- Britt, M. A., Durik, A., & Rouet, J. F. (2022). Reading contexts, goals, and decisions: Text comprehension as a situated activity. *Discourse Processes, 59*(5-6), 361-378. DOI: 10.1080/0163853X.2022.2068345
- Bryk, A. S. (2015). 2014 AERA distinguished lecture: Accelerating how we learn to improve. *Educational Researcher, 44*(9), 467-477. <https://doi.org/10.3102/0013189X15621543>
- Cataldo, M. G., & Cornoldi, C. (1998). Self-monitoring in poor and good reading comprehenders and their use of strategy. *British Journal of Developmental Psychology, 16*, 155-165. <https://doi.org/10.1111/j.2044-835X.1998.tb00915.x>
- Cerdán, R., Gilabert, R., & Vidal-Abarca, E. (2013). Self-Generated Explanations on the Question Demands are not Always Helpful. *The Spanish Journal of Psychology, 16*. <https://doi.org/10.1017/sjp.2013.45>
- Cerdán, R., Pérez, A., Vidal-Abarca, E., & Rouet, J. F. (2019). To answer questions from text, one has to understand what the question is asking: Differential effects of question aids as a function of comprehension skill. *Reading and Writing*. <https://doi.org/10.1007/s11145-019-09943-w>

- Cerdán, R., Gilabert, R., & Vidal-Abarca, E. (2011). Selecting information to answer questions: Strategic individual differences when searching texts. *Learning and Individual Differences, 21*(2), 201-205. <https://doi.org/10.1016/j.lindif.2010.11.007>
- Clarke, P. J., Paul, S. A. S., Smith, G., Snowling, M. J., & Hulme, C. (2017). Reading intervention for poor readers at the transition to secondary school. *Scientific Studies of Reading, 21*(5), 408-427. <https://doi.org/10.1080/10888438.2017.1318393>
- Coutelet, B., & Rouet, J.-F. (2004). Apprendre à chercher dans un texte : Effets d'un entraînement à 8 et 10 ans. *Enfance, 56*(4), 357-386. <https://doi.org/10.3917/enf.564.0357>
- Delgado, P., Vargas, C., Ackerman, R., & Salmerón, L. (2018). Don't throw away your printed books: A meta-analysis on the effects of reading media on reading comprehension. *Educational Research Review, 25*, 23-38.
- Dreher, M. J., & Sammons, R. B. (1994). Fifth graders' search for information in a textbook. *Journal of Reading Behavior, 26*, 301-313. <https://doi.org/10.1080/10862969409547853>
- Dunlosky, J., & Rawson, K. A. (2012). Overconfidence produces underachievement: Inaccurate self-evaluations undermine students' learning and retention. *Learning and Instruction, 22*(4), 271-280.
- Gauthier, C., Bissonnette, S., & Richard, M. (2007). L'enseignement explicite. In V. Dupriez et G. Chapelle (Eds.), *Enseigner* (pp. 107-116). PUF.
- Gauthier, C., Mellouki, M., Simard, D., Bissonnette, S., & Richard, M. (2005). Quelles sont les pédagogies efficaces ? Un état de la recherche. *Les Cahiers du Débat, 3*-48.
- Gough, P. B., & Tunmer, W. E. (1986). Decoding, reading, and reading disability. *Remedial and Special Education, 7*(1), 6-10. <https://doi.org/10.1177/074193258600700104>
- Gurgand, M. (2018). *Expérimentation scolaire : Du laboratoire à la classe*. Collège de France, Paris.
- Horner, R. H., Ward, C. S., Fixsen, D. L., Sugai, G., McIntosh, K., Putnam, R., & Little, H. D. (2019). Resource leveraging to achieve large-scale implementation of effective educational practices. *Journal of Positive Behavior Interventions, 21*(2), 67-76. <https://doi.org/10.1177/1098300718783754>
- Jacob, B. (2017). When evidence is not enough: Findings from a randomized evaluation of Evidence-Based Literacy Instruction (EBLI). *Labor Economics, 45*, 5-16. <https://doi.org/10.1016/j.labeco.2016.09.006>

- James-Burdumy, S., Deke, J., Gersten, R., Lugo-Gil, J., Newman-Gonchar, R., Dimino, J., Haymond, K., & Lui, A. Y. H. (2012). Effectiveness of four supplemental reading comprehension interventions. *Journal of Research on Educational Effectiveness*, 5(4), 345-383. <https://doi.org/10.1080/19345747.2012.698374>
- Kaakinen, J. K., & Hyönä, J. (2010). Task Effects on Eye Movements During Reading. *Journal of Experimental Psychology: Learning, Memory and Cognition*, 36(6), 1561-1566. <https://doi.org/10.1037/a0020693>
- Kaakinen, J. K., & Hyönä, J. (2014). Task relevance induces momentary changes in the functional visual field during reading. *Psychological Science*, 25(2), 626–632. <https://doi.org/10.1177/0956797613512332>
- Kaakinen, J. K., Lehtola, A., & Paattilammi, S. (2015). The influence of a reading task on children's eye movements during reading. *Journal of Cognitive Psychology*, 27(5), 640-656. <https://doi.org/10.1080/20445911.2015.1005623>
- Kobasigawa, A. (1983). Children's retrieval skills for school learning. *Alberta Journal of Educational Research*, 29(4), 259-271. <https://eric.ed.gov/?id=EJ292100>
- Kohnen, A. M., Mertens, G. E., & Boehm, S. M. (2020). Can middle schoolers learn to read the Web like experts? Possibilities and limits of a strategy-based intervention. *Journal of Media Literacy Education*, 12(2), 64-79.
- Kraft, M. A. (2020). Interpreting effect sizes of education interventions. *Educational Researcher*, 49(4), 241-253. <https://doi.org/10.3102/0013189X20912798>
- Lefavrais, P. (1968). *La Pipe et le Rat [Pipe and rat, reading test]*. Edition et Applications Psychologiques.
- Lenhart, A. (2015). *Teens, Social Media and Technology Overview 2015*. Pew Research Center.
- Leu, D. J., Kinzer, C. K., Coiro, J., Castek, J., & Henry, L. A. (2017). New literacies: A dual-level theory of the changing nature of literacy, instruction, and assessment. *Journal of Education*, 197(2), 1-18.
- Llorens, A. C., & Cerdán, R. (2012). Assessing the comprehension of questions in task-oriented reading. *Revista de Psicodidactica*, 17(2), 233-251. <https://doi.org/10.1387/Rev.Psicodidact.4496>
- Maeder, C. (2010). *La forme noire : Test de compréhension écrite de récits 9-12 ans [The Black shape : a reading comprehension test for 9-12 year-olds]*. Ortho Edition.

- Mason, L., Tornatora, M. C., & Pluchino, P. (2013). Do fourth graders integrate text and picture in processing and learning from an illustrated science text? Evidence from eye-movement patterns. *Computers & Education*, *60*(1), 95-109.
- McCrudden, M. T., & Schraw, G. (2007). Relevance and goal-focusing in text processing. *Educational Psychology Review*, *19*, 113-139. <https://doi.org/10.1007/s10648-006-9010-7>
- National Reading Panel. (2000). *Report of the National Reading Panel: Teaching children to read: An evidence-based assessment of the scientific research literature on reading and its implications for reading instruction*. National Institute of Child Health and Human Development, National Institutes of Health.
- Ng, C., & Graham, S. (2017). Engaging readers in the twenty-first century: What we know and need to know more. In C. Ng & B. Bartlett (Eds.), *Improving reading and reading engagement in the 21st Century: International research and innovation* (pp. 17-46). Springer.
- OECD (2019). *PISA 2018 Results (Volume I): What students know and can do, PISA*. OECD Publishing, Paris, <https://doi.org/10.1787/5f07c754-en>.
- Palinscar, A. S., & Brown, A. L. (1984). Reciprocal teaching of comprehension-fostering and comprehension-monitoring activities. *Cognition and Instruction*, *1*(2), 117-175. https://doi.org/10.1207/s1532690xci0102_1
- Paris, S. G., Cross, D. R., & Lipson, M. Y. (1984). Informed strategies for learning: A program to improve children's reading awareness and comprehension. *Journal of Educational Psychology*, *76*(6), 1239-1252. <https://doi.org/10.1037/0022-0663.76.6.1239>
- Pérez, A., Potocki, A., Stadtler, M., Macedo-Rouet, M., Paul, J., Salmerón, L., & Rouet, J-F. (2018). Fostering Teenagers' Assessment of Information Reliability: Effects of a Classroom Intervention focused on Critical Source Dimensions. *Learning and Instruction*, *58*, 53-64. DOI: 0.1016/j.learninstruc.2018.04.006
- Potocki, A., Ros, C., Vibert, N., & Rouet, J.-F. (2017). Children's visual scanning of textual documents: Effects of document organization, search goals and metatextual knowledge. *Scientific Studies of Reading*, *21*(6), 480-497. <https://doi.org/10.1080/10888438.2017.1334060>
- Radach, R., Huestegge, L., & Reilly, R. (2008). The role of global top-down factors in local eye-movement control in reading. *Psychological Research*, *72*(6), 675-688. <https://doi.org/10.1007/s00426-008-0173-3>

- Rouet, J.-F., & Britt, M. A. (2011). Relevance processes in multiple document comprehension. In M. T. McCrudden, J. P. Magliano & G. Schraw (Eds.), *Text Relevance and Learning from Text* (pp. 19-52). Information Age Publishing.
- Rouet, J.-F., & Coutelet, B. (2008). The acquisition of document search strategies in grade school students. *Applied Cognitive Psychology, 22*, 389-406.
<https://doi.org/10.1002/acp.1415>
- Rouet, J.-F., Ros, C., Goumi, A., Macedo-Rouet, M., & Dinet, J. (2011). The influence of surface and deep cues on primary and secondary school students' assessment of relevance in Web menus. *Learning and Instruction, 21*, 205-219.
<https://doi.org/10.1016/j.learninstruc.2010.02.007>
- Salmerón, L., Strømsø, H. I., Kammerer, Y., Stadtler, M., & Van den Broek, P. (2018). Comprehension processes in digital reading. In S. Barzilai, J. Thomson, S. Shroeder, & P. van den Broek (Eds.) *Learning to read in a digital world* (pp 91-120). John Benjamins.
- Salmerón, L., García, A., & Vidal-Abarca, E. (2018b). The development of adolescents' comprehension-based Internet reading activities. *Learning and Individual Differences, 61*, 31-39.
- van Dijk, T. A., & Kintsch, W. (1983). *Strategies of discourse comprehension*. Lawrence Erlbaum Associates.
- Vidal-Abarca, E., Maña, A., & Gil, L. (2010). Individual differences for self-regulating task-oriented reading activities. *Journal of Educational Psychology, 102*(4), 817.
<https://doi.org/10.1037/a0020062>
- White, S., Chen, J., & Forsyth, B. (2010). Reading-related literacy activities of american adults: Time spent, task types, and cognitive skills used. *Journal of Literacy Research, 42*, 276-307. <https://doi.org/10.1080/1086296X.2010.503552>

Appendices

1.2. Appendix A: Organization and contents of the purposeful reading training program.

Instructional objectives	Workshop	Type of practice task
Construct a mental representation of the question	Workshop 1: identify key words of the questions and the type of information to be found	<p>Students underline the key words of the question</p> <p>Students circle the interrogative word and check the answer proposal that indicates the type of information requested by the question.</p>
	Workshop 2: relate the question's key words to the type of information to be found	Students underline the thematic words contained in the question, circle the interrogative word and complete the gap-fill sentence linking these 2 elements.
Organize your reading	Workshop 1: Identify the relevant title (avoiding false clues)	<p>Students identify the title relevant to the question posed from a list. To do this, they must:</p> <ol style="list-style-type: none"> 1. Underline the key words of the question 2. Circle the title they think is relevant.
	Workshop 2: Rephrase the question to identify the relevant title	<p>Students identify the relevant title without a perfect match between the key words of the question and the relevant title.</p> <p>To do this, they have to:</p> <ol style="list-style-type: none"> 1. Identify the key words of the question by underlining them 2. Find synonyms and write them down 3. Circle the title they think relevant to find the answer
Transform the information read into a response	Workshop 1: Identify relevant information, avoiding false clues, in a single paragraph	<p>Students identify relevant information, paying attention to false clues, to be able to formulate an answer. To do this, they have to:</p> <ol style="list-style-type: none"> 1. Underline relevant information in the text 2. Formulate a written response

	Workshop 2: Identify and integrate relevant information from multiple paragraphs	Students identify and integrate relevant information from multiple from several paragraphs. To do this, they have to: <ol style="list-style-type: none"> 1. Underline relevant information in the text. 2. Compare it to each other and to the question 3. Formulate an answer
Evaluate the quality of the response	Workshop 1: Evaluate answer accuracy	Students identify the correct answer from a list of possible answers and, for incorrect answers, identify what is wrong with them. To do this, they have to: <ol style="list-style-type: none"> 1. Underline the key words of the question. 2. Circle the interrogative word 3. Indicate for each answer whether it is correct or not by linking it to an appropriate justification
	Workshop 2: Assessing the adequacy of the response	Students identify the correct answer from a list of possible answers and, for incorrect answers, identify the error made. To do this, they have to: <ol style="list-style-type: none"> 1. Underline the key words of the question. 2. Circle the interrogative word 3. Indicate for each answer whether it is correct or not by linking it to an appropriate justification
Become autonomous in the search for information	Workshop 1: Find information in a text using headings	Students complete an information retrieval task using the following steps: <ol style="list-style-type: none"> 1. Underline the key words of the question and circle the interrogative word 2. Circle the title(s) that seemed relevant 3. Read the selected paragraph(s) and underline the relevant information 4. Write a response 5. Reread the question and evaluate the quality of the answer
	Workshop 2: Find information in a text using headings	Students complete an information retrieval task using the following steps: <ol style="list-style-type: none"> 1. Underline the key words of the question and circle the interrogative word 2. Circle the title(s) that seemed relevant 3. Read the selected paragraph(s) and underline the relevant information 4. Write a response 5. Reread the question and evaluate the quality of the answer

1.3. Appendix B: Correlation matrix of the four direct application tasks for Control and Experimental Condition.

Correlation Matrix for the Experimental Condition

	Task1- Pre	Task2- Pre	Task3- Pre	Task4- Pre	Task1- Post	Task2- Post	Task3- Post	Task4- Post
Task1-Pre	-							
Task2-Pre	.39	-						
Task3-Pre	.39	.29	-					
Task4-Pre	.41	.39	.45	-				
Task1-Post	.51	.25	.39	.34	-			
Task2-Post	.36	.33	.22	.46	.39	-		
Task3-Post	.32	.24	.42	.42	.47	.27	-	
Task4-Post	.37	.30	.45	.66	.38	.34		-

Note. Significant correlations are in bold.

Correlation Matrix for the Control Condition

	Task1- Pre	Task2- Pre	Task3- Pre	Task4- Pre	Task1- Post	Task2- Post	Task3- Post	Task4- Post
Task1-Pre	-							
Task2-Pre	.29	-						
Task3-Pre	.57	.56	-					
Task4-Pre	.49	.49	.52	-				
Task1-Post	.37	.34	.48	.61	-			
Task2-Post	.35	.55	.51	.66	.43	-		
Task3-Post	.43	.06	.50	.37	.21	.21	-	
Task4-Post	.50	.29	.39	.67	.36	.31	.39	-

Note. Significant correlations are in bold.

1.4. Appendix C: Excerpts from the student workbooks for the purposeful reading training program (adapted from French).

Purposeful reading: Module 1 –Workshop 1

Participant code:

Workbook

Exercise 1

- In pairs (then alone)

Instruction: Underline the theme words of the following questions:

How many teeth are there in the jaw of a great white shark?

Where did the solar plane land?

Exercise 2

- In pairs (then alone)

Instruction:

1. Circle the interrogative words in the following questions.
2. Check the suggested answer that indicates the type of information requested.

How many teeth are there in the jaw of a great white shark?

- A number*
- A place*
- A way*
- A date*

Where did the solar plane land?

- A quantity*
- A period*
- A place*
- A cause*

SUMMARY SHEET

To know what to look for, I need to identify the _____
 _____ of the question and the _____
 _____ to know what I need to find to answer it.

The type of information to be found can be (*cross out incorrect statements*): a place, a name, an animal, a time, a date, a food, a number, a verb.

Purposeful reading: Module 1 –Workshop 2

Participant code:

Workbook**Exercise**

- In pairs (then alone)

Instruction:

1. Underline the topic words and circle the interrogative words in the questions below.
2. Make the connection between these two items by completing the corresponding fill-in-the-blank sentences.

Where do Léa's grandparents live?

Find _____ which corresponds _____

What is the terminus of line 5 of the Paris metro?

Find _____ which corresponds _____

SUMMARY SHEET

Once I have identified the **theme words** of the question and the **type of information** I need to find, I must (*circle the correct statement*):

- a) Copy the question in my notebook
- b) Make the connection between the theme words and the type of information to find
- c) Reread the question aloud