TEACHERS, PUPILS AND PARENTS' PERSPECTIVES ON A PEDAGOGICAL APPROACH TO STRENGTHENED READING FLUENCY THAT USES TOUCHSCREEN COMPUTER TABLET TO READ-ALOUD, RECORDING AND SHARING

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Abstract

Oral reading fluency involves being able to read with accuracy, automaticity, and oral prosody to access to the meaning of texts. Improving pupils' reading fluency is crucial for the elementary school. Various resources are available to help teachers achieve this quest, in particular educational recommendations and research results that focus on the effects of different forms of interventions. The goal of this paper is to introduce a tool to improve the assimilation of a pedagogical approach created by two experienced second-grade teachers. This approach implies 1) regular appointments with the pupils to set goals and challenges; 2) let the children practice, reading aloud, recording themselves on a touchscreen computer tablet and sharing the recordings with their teacher and parents. After eight months of use, 4 teachers, their 88 pupils and 12 of their parents were invited to participate in interviews in which they were questioned about their experience of the use of the tool and its effects on the students. The analysis shows that the pedagogical approach is reliable and that the participants feel that it has a positive impact on the pupils' motivation and learning. It allows to identify strengths and weaknesses. This provides arguments for a larger implementation and for further research on its impact.

Keywords: classroom app, interventions, reading fluency, touchscreen computer tablet.

1. Introduction

Oral reading fluency involves being able to read with accuracy, automaticity, and oral prosody (e.g., Aldhanhani & Abu-Ayyash, 2020; Kiefer & Christodoulou, 2020), all these abilities converging toward comprehension (e.g., DiSalle & Rasinski, 2017). It is one of the key skills that children must acquire through learning-to-read according to the work of the national reading panel (NRP, 2000), a world reference on learning to read and its implication for reading instruction.

In this context, elementary teachers need resources to help their pupils to improve on oral reading fluency, as reading-aloud is necessary (Gibson, 2008) but not sufficient. Different resources are available. Aro & Lytyynen (2016) offered a description of approaches stem from the pedagogical tradition. These approaches aim at increasing the amount of supervised reading practices with a variety of methods, including group-based method (method of instruction in which reading aloud is realized in small groups) and peer-tutoring (a variety of approaches in which students are placed in pairs and practice reading aloud to others). Rasinski (2005) outlined four principles that underlie effective fluency instruction: 1) children should have the

opportunity to listen a fluent reader reading for them; 2) children needs feedback when they read-aloud; 3) children should focus their attention on reading in meaningful text; 4) Children need to have a lot of opportunities to read.

Synthesis of research and meta-analysis on fluency interventions on elementary student with learning disabilities are available (for example, Chard, Vaughn & Tyler, 2002; Schwab, Seifert & Gasteiger-Klicpera, 2013; Steven et al., 2014, Lee & Yoon, 2017). The last of which was conducted by Hudson, Koh, Moore & Binks-Cantrell (2020). They identified the characteristics of efficient intervention on oral fluency for struggle readers, through the review of 16 studies published between 2000 and 2019. Their findings reveal that repeated reading of texts (see Samuels, 1979) strengthened oral reading fluency. Generally, repeated reading is completed by other components as peer coaching, teacher modelling, phrase drill, error correction, feedback on prosody, verbal cueing, goal setting, echo reading (a student repeats a sentence that has just been read by a fluent reader), choral reading (all students in the class repeat a sentence that has just been read by a fluent reader), listening passage preview, question answering on comprehension, phonic or vocabulary intervention. The most effective interventions in their review were realized one-on-one, not in group, and with a trained model, not with a peer coach. The synthesis reveals that prosody is relatively neglected on the studies, as compared to rate and accuracy. However, Calet, Guttierez-Palma and Defior (2017) showed that supporting children prosody has a superior impact on automaticity and oral prosody than supporting automaticity by encouraging them to read faster. The works mentioned above stress the importance of carrying out repeated readings of the same texts. It should be noted that several studies (e.g. Therrien, Kirk & Wood-Groves, 2012 and the meta-analysis of Zimmerman, Reed, & Aloe, 2021) have compared the progress of students who have practiced fluency by repeating the same reading several times, with that of students who have done non repeated-readings. This work shows relatively similar progress for both. It should nevertheless be borne in mind that studies of this type are rare and that these results remain to be confirmed today.

Some interventions based on the use of specific software support reading fluency. A few of them target interventions at a perceptive level, for example, saccadic training consisting in training children with a software that stimulates their eye movement to gain accuracy and improve reading fluency (Dodding et al., 2017). Most of them propose reading activity gamification (see Massler et al., 2019, for a list). But these software tools are difficult to find, do not exist in all languages, are sometimes difficult to use in the classroom, sometimes not even known by the teachers and sometimes due to the lack of appropriate equipment.

Some research also shows that the use of touchscreen computers tablets can be interesting to train fluency. As early as 2012 (the first touchscreen computer tablet was made in 2010), Thoermer and Williams published a text intended for elementary school teachers to show them that touchscreen computers tablets could be a very interesting object for presenting texts to be read aloud to students. Musti-Rao, Lo and Plati (2015) evaluated the impact of using a touchscreen tablet computer application on reading fluency. The application in question leading children to quickly read isolated words. The results of the study show a positive effect of the interventions on the reading of isolated words, but not on the fluency in reading text and had a positive effect on student engagement. Minze and Park (2021) conducted a study in which a few children with reading difficulties in mid-primary received fluency training through a touchscreen computer tablet. During this training, they do repeated readings of a text and received feedback regarding their performance. The results indicated progress in fluency and a change in students' posture towards reading. These progresses are even better when the use of the touchscreen computer tablet is combined with peer-assisted instruction (Mize, Bryant & Bryant, 2020). Overall, these studies therefore seem to show a positive effect of using this type

of tool. This effect seems robust with regard to motivation and remains to be confirmed with regard to progress in fluency, in particular in tasks which deviate from those performed during interventions.

The interest of the touchscreen computers tablets can be explained by the fact that they allow reading aloud to be recorded. This opens up interesting possibilities in terms of self-assessment. Self-assessment seems to benefit the development of fluency skills. Indeed, Duffey (2015) reports the results of a mixed research which shows that using rubrics to self-assess fluency helps students improve motivation and performance. Arens, Gove and Abate (2018) reports a study in which children had the opportunity to record themselves reading and listening to themselves again. The results of this study show significant progress made by the students in fluency. Özenç and Ferhat (2022) made more or less the same observations when they evaluated the impact of a method of teaching reading based on self-evaluation. Indeed, they noted a positive effect of this method on reading fluency. Ness (2017) offers a possible explanation for understanding this phenomenon. She points out that introducing a recording facility for self-assessment allows children to discover how they "sound" when reading and allows them to put in place appropriate strategies to be prouder of their performance.

While all of this research shows that the use of a touchscreen computer tablet is promising, it is clear that little information is available on how teachers can use them to support their students. A few targeted apps are referenced, but not always available in different languages. And educational scenarios using this kind of tool certainly remain to be described.

Ultimately, the involvement of parents also seems to determine part of the progress of students in fluency (e.g. Sénéchal, 2006; Zambrana et al., 2015), resources are also available to increase this involvement. For example, Rasinski and Stevenson (2005) have shown that pupils who have benefited from interventions aimed at working on fluency at home with their parents, progress more than children who have not benefited from such intervention with their parents. Despite this kind of resource, parental involvement remains an important issue in many communities.

2.The Present Study

This study originates in a research/practice partnership. A school board was interested in developing a tool to help teachers take ownership of an approach developed by two experienced teachers (Caroline Naud and Isabelle Paradis), providing excellent results according to their evaluation dashboard. This approach consisted mainly in having the students read aloud books they chose among several presenting an appropriate level of difficulty, in having them multiple record using a touchscreen computer tablet until they were satisfied of their reading, then to share it with their teachers and parents through a classroom application.

In the present paper, we will present the tool developed, and qualitative data collected through interviews with the actors involved in the use of the tool: the teachers, the pupils, and their parents. A close look on a way to approach fluency training is provided along with the testimonies of these users on its strengths, its weaknesses and its relevance. These testimonies provide helpful information to widely implement this approach.

2. Methodology

3.1 Participants

Four experienced (> 10 years) Canadian second-grade teachers, inhabitants of the French-speaking province of Quebec participated in this study. These four teachers are women, all four of whom hold a bachelor's degree in preschool and primary education. They all teach in rural areas. In Quebec, the education ministry uses two indicators to qualify the socio-economic

status of schools: an index of socio-economic background, which takes into account the proportion of children whose mother does not have a diploma and the proportion of parents who have no job, and a low-income index. With regard to socio-economic background, the schools that participated in the study were in the 6th and 7th deciles. This means that the environments in which the study took place include a relatively large number of families whose mother does not have a diploma or whose parents don't have a job. For the low-income index, they were between the 2nd and the 6th deciles. This means that the environments in which the study took place are varied in terms of family income.

The 88 second-grade pupils (mean age: 7 years old) of the four teachers, and 12 of their parents participated too in this study. In Quebec, pupils generally attend one year of kindergarten, which curriculum is geared toward fun activities and global development. Mandatory school begins at 6 years of age. The first two years are mainly dedicated to fundamental learning (reading, counting). As far as reading is concerned, the first year is mainly concerned with systematic learning of reading (letters, alphabetical principle, etc.); the second year is primarily dedicated to reading automation, crucial skills to learning in subsequent years.

3.2 Material

Each participating group (1 group = a teacher and his/her pupils) received a box called "«Fluency Box»" composed of:

-Nineteen children books to be read aloud, classified according to their difficulties (the principles for the categorization are explained further in the paper).

-One touchscreen computer tablet[2] with a free voice-recording application[3], and a free classroom application[4] to share files (picture, audio, video) between the teachers, the pupils, and their parents. When sharing a file, the participant chooses who can see it.

-A headphone with a microphone

-Instruction sheets that presents the pedagogical approach.

3.3 Interventions to train fluency

The pedagogical approach presented in the instruction sheets alternates fluency assessment (to define incentive, advices and encouragements) and autonomous training (figure 1).
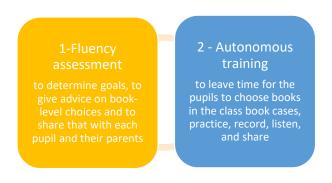

Figure 1: Pedagogical approach of the interventions with the «Fluency Box».

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[2] an Ipad ©

[3] Voice Record Pro ©: https://apps.apple.com/ca/app/voice-record-pro/id546983235

[4] See Saw © : https://apps.apple.com/us/app/seesaw-class/id930565184

Fluency assessment

For the fluency assessment, the teacher and a pupil listen together to a recording made by the student from a book in the «Fluency Box». For each book included, an evaluation grid is provided containing the text of the book, so that the teacher can mark the passages on which the pupil experiences difficulties while reading or with certain words. The books are categorized according to difficulty levels (we used an *ad-hoc* categorization developed by the research team (author, Isabelle Desbiens, Carol-Ann Ménard, Caroline Naud, Isabelle Paradis and Sonia St-Gelais), and inspired by the Ministère de l'éducation du Québec, ND). The books in the «Fluency Box» and all the books in the classroom book cases were sorted into 4 categories:

- The books of the green level are composed of 8 to 20 pages. On each page, there are mainly declarative sentences, close to spoken language, made up of 5 to 6 words. These sentences contain repetitions, frequent and easy to read words. Images illustrate the text. The fonts used are quite large and easy to read. The texts deal with subjects familiar to children (animals, family, sport, friends).

- The books of the blue level are composed of 20-28 pages. These pages contain one or two sentences. These sentences contain less than 10 words, have a syntactic and lexical structure close to spoken language. Each page is limited to the description of an action. The words are easy to read. The fonts used are large. The texts deal with familiar themes for children.

- The books of the red level contain less than 7 sentences per page. These sentences are simple and made up of less than a dozen common words. Themes are no longer necessarily familiar to children.

- The books of the yellow level contain less than 11 sentences per page. The sentences are organized in paragraphs and longer than in the previous level. They use less frequent words and they use syntactic structures generally reserved for writing.

After the listening of the recording, the teacher asks questions to ensure the understanding of the text. Then, he provides incentives or advice. We choose to express them in terms of challenges. They concern first the adequacy between the level of difficulty of the book and the actual skills of the children. The adequacy is considered as good when the pupils read with a good prosody and rhythm and has a good understanding of the text. It is considered inadequate when the pupils failed at reading with a good prosody and rhythm or at understanding the text. When the adequacy is good, the pupil is encouraged to choose books of the same level, or higher, in the book cases of the classroom, to realize his/her autonomous training. When there is no adequacy, the pupil is encouraged to choose books in a simpler level.

The teacher provides then possible supports which have been determined by the research team through an analysis of theoretical knowledge on reading fluency acquisition (mainly the ones exposed in the first section of this contribution) and through a collection and a sharing of the most efficient practices of the professionals involved in the research team. Two categories of incentives and advice are highlighted:

-general incentives and advice, useful for each pupil whatever their initial skill level: choosing books of adequate difficulty that arouse interest; taking the time to record while reading aloud, and listening; never losing sight of comprehension, even while concentrating on reading fluency; taking every opportunity to read.

-specific encouragement, advice, and challenges, depending on the need of each pupil: using para-textual information; reading more than once if necessary; concentrating on punctuation; using the index finger to follow the text; ensuring that all words are processed

while reading; treating the narrative structure of what is being read; monitoring comprehension, and acting when necessary; make sure that word read is the word written.

Autonomous training

During autonomous training, the pupils have to choose a book among the classroom book cases, that fit their actual fluency skills and their interest. They have to read it aloud, while recording with the tablet computer, and following the incentives and advice given by their teacher. After reading, they have to heard the recording. If they are happy with the recording, they can share it with their parents and teacher. If not, they can proceed to another recording the next day. Parents and teacher can comment the recording, provide new incentives and encouragements. When the teacher consider that incentives and advice are fully integrated by the pupil, he proposes him or her a new assessment phase, to provide new incentives and new advice and eventually determine a new adequate level of difficulty for the books.

The teachers received a half-day training to learn how to use the material and the instructions. It was delivered in October. The data collection occurred in May-June of the same school year.

3.4 Data collection

a. Individual teacher interviews. The teacher individual interviews were realized at the end of the school year (May-June), at school. They were structured around 8 questions. 1) Can you tell me in detail how you use of the «Fluency Box» in your classroom? 2) Can you tell me about your pupils' progression this year in terms of reading fluency? 3) Can you describe your pupils' involvement with the «Fluency Box»? 4) Can you describe the involvement of your pupils' parents in relation to the «Fluency Box»? 5) What do you consider as helpful in relation with the «Fluency Box» implementation? 6) What do you consider as a weakness of the «Fluency Box» implementation? 7) What could be changed for a better use of the «Fluency Box»? 8) Can you share some significant and concrete situations in relation with the use of the «Fluency Box»? The author of this paper conducted the interviews, wrote a detailed report, and submitted it to the teacher for validation or completion.

b. Pupils group interviews. Interviews were conducted in each class, during school hours, in the presence of the teachers. They were structured around 4 questions. 1) Can you tell me how you used the «Fluency Box» in the classroom and what you did, at home, regarding your recordings (sub-questions draw attention on the different steps planned for the use of the «Fluency Box»)? 2) What do you like the most about the «Fluency Box»? 3) What did you dislike the most about the «Fluency Box»? 4) Do you have advice to give to improve the «Fluency Box», for the years to come? The group interviews were conducted by the author of this paper, recorded, and transcribed by a trained student.

c. Parents individual interviews. Every parent that participated in the project received information and was invited to contact the research team if they wished to share their feelings about the project. Thirteen parents contacted the research team and were interviewed by phone. They were asked the following questions: 1) Can you tell us about what you know on the use of the «Fluency Box», at your child's school? 2) How do you personally perceive the project? 3) Did you take notice of your child's recording? 4) Did you consult the teacher's comments? 5) Did you comment the recording? 5) What are your feelings about this project? 6) Can you suggest improvement? Each interview was summarized in a detailed written report by the interviewer: the same trained student that transcribed the classroom interviews.

3.5 Data Analysis

Applied thematic analysis was chosen for data analysis (Guest, McQueene & Namey, 2013). Analysis was realized jointly by the author of this paper and a trained student, using NVivo software. We imported data sources (transcription of the interviews with children, and the reports of the interviews with teachers and parents). Then, we labelled each source with the participants who produced them. After that, for each data sources, we used specific code to label the answer to each question of our interview guideline. Finally, we use an inductive thematic treatment of each question to be able to summarize participants' feedback and highlight the views shared by the teachers as well as those that would not be shared.

From our interviews guidelines and our objectives, we reported our analysis and results in 4 points: 1) The actual use of the approach; 2) its strength; 3) its weakness and the improvement proposed; 4) its impact as perceived by the users.

4. Results

4.1 The actual use of the pedagogical approach

The actual use of the approach in the classroom globally complied to what was expected.

The book level progression, the iterative structure of the approach, the realization of the initial interviews resulting in the formulation of advice or incentives, the use of the planned strategy list to help children, the use of tablet computers to record, the sharing of the recordings through the classroom application, the comments provided through the same application by teachers and parents were all confirmed by the actors interviewed.

In every classroom, the «Fluency Box» was used daily and each child read at least 5 books for recording purpose. However, two variations of its use were reported.

1) For one group, the teacher found that the headphones were difficult to manage. For the other group, the children did not like the noise the microphones were making when rubbing on their clothes while they were recording. So, these two groups did not use the headphone (which is to say that the recordings and the listening were done using the internal speakers and the internal microphone of the touchscreen computer tablet);

2) The parents' involvement in the process differed from one group to another. One teacher gave the parents access to the application around Christmas time, as planned. Two teachers preferred to wait until February to give access. One teacher had not yet given the access when the interviews occurred (at the end of May) but planned to do so in the following days.

Some unplanned uses were reported.

1) Every teacher used the recordings as the main component to assess the reading skill and complete their grade book. Both parents and teachers appreciated that unexpected use, as the recordings provided a tangible trace of the pupils' progression of reading skills.

2) Several pupils, parents and teachers reported that some pupils frequently borrowed the tablet computers or cell phone at home to continue to practice reading aloud and occasionally shared these home recordings with the specifically designed application. Teachers and parents considered this as an indication of the pupils' motivation to practice fluency with technology provided.

4.2 Strengths of the pedagogical approach

The four teachers who participated in the project underlined strength of the approach. For them, there is a convergence around the idea that having a common space to comment on what the children are doing was very beneficial as it provides a common stance on the children's

challenges and how to support them. They also underlined that the possibility of hearing each pupil recording when they want was user-friendly. The method used to assess the initial fluency skills of children (an interview with a standard guideline) was considered as very useful to get a precise view of the pupils' actual level. In the case of our research, the school board hired a substitute teacher on a few occasions to work with the pupils in class while the teachers were conducting these interviews during school hours. The teachers reported that the approach provided opportunities for the parents to discover strategies to support their children when reading (e.g.: helping them choose books at an appropriate level). Finally, they maintained that the approach was an excellent way to ensure that pupils actually read books and developed an interest in reading: they reported that most pupils read more books during the project than they did prior to it.

Most of the parents had feedback regarding the strengths of the project. Some pointed out that the applications were user-friendly for them and their children. Others emphasized the fact that the approach gave opportunities to follow closely the children's progress, which lead to a better school-family partnership. Some parents stated that their child had pleasure sharing their recording and feel proud about it. This idea of pleasure, toward the approach or reading in general was mentioned spontaneously mentioned by 6 parents.

As far as the pupils were concerned, they were delighted to have the opportunity to use a tablet computer independently. They mentioned that this chance to listen to their own voice was a great source of improvement, although hearing it at first was disappointing.

4.3 Indicators of improvement

The teachers indicated that the reading fluency assessment tools provided should be improved. They were constructed for a narrative book whereas the relation between local and global meaning is genre specific. Then, they proposed to create a vulgarization sheet explaining to the parents what they could do to support their child the same way that teachers do in the classroom, to improve consistency of interventions. They wish there were for more books of the simpler level, since they found there was not enough in the classroom bookcase. While they systematically listen to the pupils' recordings, they recommend not listening to the whole recording systematically, but rather to excerpts taken at several passages in the book. According to them, the reading is sufficiently homogeneous in a recording that one is not required to listen to everything. It saves time. Finally, the classroom application used produces too many notifications in its standard configuration, and teachers suggested that their number be decreased.

As the teachers did, the parents also thought that a guideline explaining how parents can support their child reading would be very useful. Several parents indicated the difficulties in configuring the app in a chosen language and relate to having missed the information to access their child's recording, which shows that the means implemented to inform parents and assist them in handling the software are important to ensure their participation.

As far as the pupils are concerned, they noted some technical issues to be addressed to make the devices more user-friendly: to have bigger shortcut icons to control the apps, to ensure that the microphone is sufficiently close to the headphone to prevent it from scratching on the clothes which produces noise and provide them with the possibility to name their audio-files using a voice command. They explained that they would appreciate having more books (in the box and in the classroom book cases) for each level, but especially for the more complex ones. Some pupils did not use the headphone. They recorded themselves at the back of the classroom without headphones. Those who did this stated that the noisy environment made the recording and rehearsal difficult. In the meanwhile, pupils who used the headphone do not mention that.

In one classroom that does not use the headphone, teacher made an acoustic booth with cardboard and foam, and pupils appreciate that.

4.4 Perceptions on the impact of the approach

The teachers noticed that most of their pupils had a better progression in reading fluency than did other groups of students they had during their career. Progress was not consistent overtime. Some students progressed very quickly, then stagnated. Others stagnated for 3 months before making rapid progress. They noted that some pupils needed to go back to a previous level before moving forward. This backtracking has helped to unlock some difficulties. Three pupils spontaneously decided to go back to a previous level. Unfortunately, the approach failed to help one pupil, in one group, who kept the same skills throughout the year.

The parents noticed their child's progress in reading fluency. While most of them made a relation between the project and the progress, one parent mentioned not being sure of this project/progress relation. Word used to qualify the progress were fluency, clarity, volume, rhythm. Some pointed out unexpected but positive consequences of the project: increase in self-confidence; increase in the taste for reading; increase in the capacity to made relation between the different readings.

The pupils did not elaborate spontaneously on the consequences of the project. When questioned, they explained that the challenges provided by their teachers helped them to improve their reading fluency. Others made a connection between their improvement in reading fluency the project.

5. Conclusion

In this contribution, we have presented a tool designed to help teachers assimilate an approach to developing their pupils' reading fluency skills. Developed by two experienced teachers, this approach uses educational technologies and involves giving the pupils challenges related to their skills, letting them practice reading aloud, recording themselves, and listening and sharing the recordings. Material needed have a moderate cost (about 1000 Canadian dollar per group).

Like many previous studies, this approach uses repeated readings of texts (as what the results of the meta-analysis by Hudson, Koh, Moore & Binks-Cantrell, 2020, suggest). The interest of the approach proposed in this article is to offer a motivating scenario to the pupils to produce these repetitions: they must repeat themselves as much as necessary to transmit a recording of which they are proud to their teachers and to their families. Firstly, this introduces a self-evaluative dimension to the work of fluency that the students, as well as the teachers, have found to be determining, according to our data. The value of self-assessment of reading aloud has already been highlighted in research (Duffey, 2015; Arens, Gove & Abate, 2018; Özenç & Ferhat 2022; Ness, 2017) and probably explains a significant part of the positive experience of the experiment which the participants share. Then, communicating the recordings to the family offers opportunities for parents to get involved and previous research showed how important this lever is (Rasinski & Stevenson, 2005; Sénéchal, 2006; Zambrana, 2019). In the case of our study, the incentives and advices that the teachers gave to the students were communicated to the parents. Our results show that parents, teachers and students found it facilitating because it allowed them to agree on common goals.

The approach uses targeted feedback, offered by a fluent reader, as proposed by Rasinski, 2005). Here, feedbacks are provided by the teachers or the parent, and the feedback provided by one is known by the others. The approach uses a touchscreen computer tablet, as several research on fluency interventions. As mentioned in the introduction to this article, some works that use touchscreen computers tablets do so to make use of specific fluency training

applications (Thoermer & Williams, 2012, Musti-Rao, Lo & Plati, 2015, Minze, Bryant & Bryant, 2020; Minze & Park, 2021), while others use them instead for recording (Arens, Gove & Abate, 2018; Özenç & Ferhat, 2022; Ness, 2017). Our study is in the tradition of the latter and go further by highlighting the possibilities offered by information sharing between school and home through a classroom application.

The data collected indicate that the approach can be realistically implemented. It allows parents and teachers to share opinions and contributes to the development of children's reading fluency skills. Of course, the approach is not solely about using a touchscreen computer tablet to record, listen and share. Our data highlight the conditions that need to be met to ensure that the approach is consistent with what we have described:

-Teacher training is needed to enable teachers to use a variety of strategies to support pupils' reading fluency skills. In our project, this support took the form of challenges, incentives, and guidance that can be provided depending on the children's current skills.

-Support to teachers within the classroom is essential. In our project, teachers identified two elements that they felt crucial: support in taking ownership of the interview process with students and support in determining the difficulty level of books in the classroom bookcases.

The data indicate that the approach can be improved. Teachers found that the application sent a large amount of notification and advised to address this problem by adjusting the notification settings. They also suggested limiting listening to pupils' recordings to a few clips, as they felt this would not affect the quality of the feedback they could give, and would free their time to focus on other aspects of their pupils' success.

The parents recommend that they be better informed about how the app works and especially how they can help their children. In the project, some parents did not use the app. Whatever the reason, we need to find a way to remedy this problem.

Pupils drew attention mainly on two points.

1) They need a calm and quiet space to practice reading aloud. So, the conditions to ensure this must be meticulously planned and different solutions emerged (use of the closed headphone, an acoustic booth, a designated space).
2) They were not sufficiently aware of the progress they were making. Therefore, feedback should emphasize this progress more to help the pupils identify it.

For this research, we decided to begin by ensuring that the approach could be implemented and by gathering the perspectives of the actors on this implementation. This contribution ensures it, although the point of view of the parents remain to be more representatively assess, as a few of them responded to our solicitation. Now that the conditions for this feasibility are more precisely defined, further research is needed to objectively assess the impact of this proceeding on the fluency skills of children. Such research would allow us to determine if the progress noted by teachers and parents can be measured and associated to the approach implemented.

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