

Design and evaluation of a new digital format for reading illustrated tales: *Correpalabras*

Diseño y evaluación de un nuevo formato digital de lectura de cuentos ilustrados: *Correpalabras*

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Abstract

This research designs and evaluates a digital format for reading tales in which the text moves at a speed that each child can regulate according to his or her reading ability. The format, called *Correpalabras*, is a digital application that tries to promote reading at home using the mobile phones of parents. To carry out the empirical evaluation of the format an initial prototype was designed and validated individually with 36 students in second grade of primary education. Then an improved prototype was developed and a pilot test focused on 150 public schools was implemented. The results of both evaluations show that the format produces a high level of interest in children, teachers and parents; and generates a positive impact on attention and reading comprehension. The conclusions suggest that the *Correpalabras* format helps to consolidate the reading skills of the second and third grade students of primary education and allows the reading to be perceived as a more attractive experience.

Resumen

En esta investigación se diseña y evalúa un formato digital de lectura de cuentos en el cual el texto se mueve a una velocidad que cada niño o niña puede regular según su capacidad lectora. El formato, denominado *Correpalabras*, consiste en una aplicación digital que busca promover la lectura en el hogar aprovechando los teléfonos móviles de los padres de familia. Para la evaluación empírica del formato se diseñó un prototipo inicial que fue validado individualmente con 36 alumnos de segundo grado de educación primaria. Después se desarrolló un prototipo mejorado y se implementó una prueba piloto focalizada en 150 colegios públicos. Los resultados de ambas evaluaciones muestran que el formato produce un alto nivel de interés en los niños, docentes y padres de familia, y genera un impacto positivo en la atención y comprensión lectora. Las conclusiones sugieren que el formato *Correpalabras* ayuda a consolidar las competencias lectoras de los alumnos de segundo y tercer grado de primaria y permite que la lectura sea percibida como una experiencia más atractiva.

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Introduction

Attention, fluency and reading comprehension

Attention seems to be a key factor in the cognitive process of reading and understanding a text because the human ability to attention has its limits. When one is learning to read, decoding takes up a substantial proportion of the reader's resources at the expense of comprehension; on the other hand, as far as expert readers are concerned, many actions are so automatic that they hardly imply any cost of attention (Jamet, 2017). The early development of reading fluency is a basic skill for primary school students in order to acquire an adequate reading competence (Calero, 2014). Those who have reading difficulties are prone to make an excessive number of regressions, which are leaps backwards or to the left to check details or verify some words (Iñiguez, 2016). The act of reading slow results in easy lack of concentration, which in turn renders comprehension more difficult (Mendieta, 2013).

Children who make more errors in terms of accuracy and read more slowly are prone to have worse reading comprehension scores, forming a vicious circle: good readers become better readers and bad readers become worse readers (Autón & Suarez, 2011). In order to prevent reading difficulties, it is recommended to work systematically and intensively with playful and multi-sensory elements, which helps children to be fluent readers and to decode automatically, so that they can allocate their cognitive resources to higher processes such as comprehension (Gonzales, Cuetos, López & Vilar, 2017).

A study conducted by Valdés (2013) on the link between the level of reading comprehension and the reading habit -defined as pleasure in reading and reading frequency- found that those students who obtained high levels of comprehension had not necessarily developed good reading habits; that is to say, they did not very much like reading voluntarily, frequently or in their free time. This research concludes that

although comprehension is essential for the development of reading habits, motivation and pleasure for reading also play a key role.

The emotional or affective component of reading is essential in order for children to deploy their cognitive potentialities. According to Ferrés (2000), there is an inverse correlation between motivation and effort: the higher the motivation, the lower the effort the relevant task will take. This emotional dimension of reading is very important today. Many children who are training or consolidating their reading competences clearly reject written texts. However, they do not reject written texts because they cannot read but because they do not like to read. It is found both in urban and rural areas that students are often distracted when they read and, when asked about the text, they show that they have not understood it, either because they do not remember it or because they had something else in mind while reading (Aparicio & Mamani, 2011).

Colomer (2005) warns that there is a gap between what children are able to understand orally and what they are able to read for themselves. This author argues that good stories for first-time readers start from simple narrative forms but use resources that help children go further in their literary competence. Regarding the relevance of using narrative texts to encourage children to read, it is stated that fiction literature might help them understand each other better thanks to their emotional bond with such stories, which often include characters and situations that are not always found in everyday life (Oatley, 2016).

Reading at home and digital applications

The development of reading automation is linked not only to the school environment, but also to reading at home, which is a privileged place to consolidate reading competences. According to Corchete-Sánchez (2014), parents understand the behaviour of their children better than anyone understands, know how to

interpret their reactions in any circumstance and can link reading to moments of leisure and fun, all of which allows reading for pleasure to take root better and see it as a daily activity.

According to Jamet (2017), the time allotted to reading written texts makes it possible to predict the child's level of reading very effectively and his/her progress throughout his/her school life; therefore, the more one reads, the better one reads and the greater one's progress is. This factor hinders the development of reading competences in children because in most households there are no conditions conducive to acquiring good reading habits. In Peru, a study showed that about 50% of families have no more than 10 books in their homes (Pontificia Universidad Católica de Perú, 2015).

Writing and reading formats have undergone radical changes over time. According to the United Nations Educational, Scientific and Cultural Organisation (UNESCO, 2016), the new types of texts that are emerging with technology require broadening the concept of strategies for understanding, which will appear in increasingly diverse contexts and using resources that will often be beyond what is considered a canon.

With regard to digital reading applications, research (Wooten & McCuiston, 2015) points out that children who use them show increased understanding of content compared to those who read traditional texts, and that this type of technology supports the development of vocabulary, reading motivation and active engagement by the reader. A study by Jiménez-García & Martínez-Ortega (2017) on the use of a reading application in an illiterate population highlights the fact that -unlike children- adults learn to read more easily because their attention system is more mature; this suggests that children's applications should use resources that draw and maintain the reader's attention.

The way in which the interface of reading applications for children is designed is a key factor for their effectiveness. Alaaamri, Greuter

& Walz (2014) designed a new reading application that included several interactive functions: dragging and dropping objects, choosing correct images to unlock pages, giving feedback to actions, using sounds and colours to reinforce rights or wrongs, being able to create new stories with the same characters and scenarios, etc. This way, the child reader could intervene in the story and link the content with visual elements to increase the enjoyment of the story and reinforce its comprehension.

Given that many parents and teachers are concerned about the excessive amount of time their children spend in front of a screen, hybrid applications have been developed, adding physical elements or real games to digital reading. In these cases, according to Linke, Kothe & Alt (2017), the challenge is to design an application that still focuses on history and images, just like traditional illustrated books, and that links the story to tangible and playful elements in order to motivate proper reading.

How to design a reading application that focuses on the text more than on the use of interactive visual resources and playful elements that can distract the child? We believe that a format we call *Correpalabras* would be a possible alternative. Within the framework of this new reading mode, the mobile phone would be placed horizontally and the text would appear in the bottom of the screen at a pace that can be controlled by the child according to their own reading ability. Still images illustrating the story would appear at the top and they would change each time the text gets to a full stop or to the end of a specific sentence. Word pace would be controlled by touching the screen: the right side to accelerate and the left side to slow down. The innovative appearance of this format is that interactivity is directly linked to the text and not to visual or sound resources, nor to playful objects linked to the original story. The aim is to make the text more attractive without adding elements other than those that already exist in any illustrated book: words and still images. It is also a readable format that can be easily adapted

to any short story for children. The application would promote reading illustrated stories at home by taking advantage of the parents' mobile phones. According to Peru's national household survey, 90.9% of the families have at least one member with a mobile phone and 79.6% of the population connected to the Internet does so through one (Gestión, 2018).

The purpose of this research was to develop a prototype of the *Correpalabras* format and to evaluate it with children from grade 2 and 3 of primary education and teachers from public schools in Lima. The aim was to measure the acceptance and interest generated by the format and to analyse its possible impact on certain basic reading competences, especially if it helped to draw the reader's attention on the text and if it made the story easier to understand.

Method

Prototypes and phases

The *Correpalabras* format was evaluated in two consecutive phases. In phase one, a prototype for mobile phones was developed with a 282-word story -entitled *Los Globits*- specifically created for the format (figure 1). This initial version of the application made it possible to increase word pace by touching the screen, but such pace could not be reduced. If a child accelerated too much in the text, they had to start the story again. Additionally, the texts scrolled over the background images and not over a white stripe, which sometimes made reading difficult. Despite these limitations, it was decided to conduct an experimental validation of the prototype. An improved version of the application was developed for phase two, which allowed for increasing and decreasing the text pace, as well as pausing and returning to the beginning of each independent paragraph or sentence. Additionally, all the texts were scrolled over a white stripe to make it easier to read. This



Figure 1. First *Correpalabras* format prototype.

new prototype (figure 2) included 11 stories on various themes and characters, classified into three levels of length: between 50 and 100 words, between 100 and 200, and between 200 and 400. All the stories were aimed mainly at children from grade 2 and 3 of primary education.

Participants

Two public schools from Lima city participated in phase one, with a total sample of 36 boys and girls from grade 2 of primary education, including one student with different skills. In the phase two, a pilot test that focused on 150 public schools located in different provinces of the Lima region was implemented. 3,912 children and 31 primary education teachers took part in this process.



Figure 2. Second *Correpalabras* format prototype.

Instruments

Two instruments were used in phase one: an observation guide for the test facilitators and a questionnaire to be answered by the children themselves after using the format. The guide was aimed at identifying each child's level of attention or distraction when reading and at calculating the time it took them to read the entire story. The questionnaire aimed at determining the level of satisfaction with the format and its possible influence on reading comprehension. Ten questions were asked about the story to evaluate this last element: two of them measured the ability to locate literal information and eight questions measured the ability to infer information. The questions were formulated according to the model proposed by Boccio & Gildemeister (2016) and the Ministerio de Educación (2009).

In phase two, the number of downloads, both of the application and the stories, was monitored to measure their level of acceptance among children and their parents, who had to lend their telephones to their children so that they could read the stories at home. At the end of the intervention, an online survey was conducted among the teachers who participated in the process to gather their impressions and opinion on the possible influence of the format focusing on four variables: a) reading attention, b) reading fluency, c) reading comprehension, and d) family participation. The questions were formulated following a rating scale from 1 to 5. Additionally, two open-ended questions were included: one on possible special tasks or activities carried out with the application and another on suggestions for improvement.

Procedure

In phase one, fieldwork was done during the first quarter of the school year. The instruments were applied individually. First, the test facilitator explained to each child how the application works using a mobile phone. Each child

Table 1

Level of attention or distraction during reading

Ranges	Average
Very concentrated	52%
Concentrated	26%
Fair	19%
Distraacted	3%
Very distraacted	0%

then began to read the story individually, while the facilitator observed their performance and measured the reading time using a stopwatch. At the end of the intervention, each child was asked to answer the questionnaire.

Phase two was supported by the Regional Directorate of Education of Lima. At the beginning of the process, a working meeting with the authorities and specialists of the provinces involved was held to present the project and explain how to download and use the application, which had been uploaded to Google Play Store¹. They then did the same with the headmasters of the participating schools, who replicated the meeting with classroom teachers. The intervention took place in the last quarter of the school year and lasted eight weeks, during which teachers called parents to explain the *Correpalabras* format and encourage them to download and use the application with their children. Posters and leaflets were distributed in schools to support this goal.

Results

Phase one

According to the facilitators' remarks, the level of attention of a great majority of children when they read remained in the very concentrated or concentrated ranges (Table 1). In relation to the time to read the story, the results

varied from 3 to 15 minutes (the child with different skills did it in 18 minutes). The answers to the self-administered questionnaire show that more than 90% of the children were very satisfied with the reading format (Table 2). On the other hand, an average of 72.5% of correct answers to the 10 questions formulated according to the proposed model (table 3) was obtained in the reading comprehension test between both groups.

Table 2
 Answers referring to the level of satisfaction

Did you like the format?	Average
A lot	77%
Very much	14%
Little	9%
None	0%

Table 3
 Reading comprehension test results

Types of questions asked	Right answers	
	Group A	Group B
1. Identifies explicit data from the text	81%	70%
2. Recognises sequences of facts or actions	81%	80%
3. Deduces causal relationships or purpose	75%	65%
4. Deduces comparison and contrast relationships	31%	40%
5. Deduces the meaning of words using the context	93%	95%
6. Deduces the central theme of the text	100%	85%
7. Deduces the main idea of a paragraph	75%	55%
8. Deduces qualities or flaws of the characters	81%	80%
9. Deduces the story's takeaway message	43%	65%
10. Deduces the text's purpose	87%	75%
Subtotals:	74%	71%
Average:	72.5%	

Phase two

The monitoring of the implementation of the pilot test in schools registered a total of 3,912 application users and 32,876 downloads of the stories. However, the number of downloads among the 150 targeted schools was quite irregular: some had more than 200 users and others less than 10. The results of the online survey of 31 teachers on the format's potential on four variables indicated very positive ratings (table 4). The open-ended question referring to an eventual task or special activity performed with the *Correpalabras* application obtained affirmative answers in 77% of the teachers. However, 50% only organised a workshop or an information day with the parents. The other 50% did carry out a special pedagogical activity with their students; for example, drawing characters, describing images, producing texts, organising exhibitions, analysing contents, and doing paraphrasing and comprehension exercises, among other things. The final question on the suggestions for improvement of the *Correpalabras* application obtained several answers that can be classified into three groups: a) include questions or reading comprehension activities, b) facilitate accessibility by developing a tablet or PC version, and c) increase the number of stories with topics of local or regional interest.

Discussion and conclusions

We are currently witnessing the emergence of a rituality that is different from that of the

Table 4
 Teacher perception format's impact

Variables	Average score on a 5-point scale
Reading attention	4.25
Reading fluency	4.29
Reading literacy	4.03
Family participation	3.74

printed book, which involves thinking of different ways of feeling or experiencing reading itself (López & Moreno, 2017). According to the two evaluations carried out, the *Correpalabras* digital application has certain attributes that would help improve the reading skills of children from grade 2 and 3 of primary education -aged 6 to 9- who belong to a generation very familiar with touch screens and mobile devices. Let us look at the main findings of the investigation.

Unlike other reading applications that use multiple interactive or playful resources, the *Correpalabras* format is limited to combining still images with scrolling text and the user can control the pace thereof. Compared to a printed or digital page that presents blocks of text, the application allows the user to discover each word in a progressive way, in specific doses. This would explain why the attention of 78% of children fell within the concentrated or very concentrated ranges on evaluating the first prototype.

The high level of attention to the text would have generated, in turn, a positive effect on reading comprehension, which obtained an average of 72.5% of correct answers in the relevant test. In Peru, only 46.4% of children from grade 2 of primary education obtain a satisfactory reading result (Unidad de Medición de la Calidad, 2017).

The time spent by children reading the 282-word story varied greatly from one another: from 3 to 15 minutes (it took the child with different abilities 18 minutes to read it). These results suggest that controlling the text pace makes the *Correpalabras* format appropriate for users with reading difficulties and also for those who already have a good level of reading automation. This would make it easier for children to become what UNESCO (2016) calls self-regulated learners, being capable of knowing, choosing, using and evaluating their own reading strategies.

On evaluating the second prototype, the pilot test had a large number of users (3,912) and downloads of stories (32,876), which would reflect the educational community's interest in the format. However, while some schools achieved more than 200 users, others had less than 10; this suggests different levels of commitment by teachers and headmasters to the project's dissemination in their respective schools.

The possible impact of the *Correpalabras* format on attention, comprehension and reading fluency was rated by teachers with more than 4 points out of 5, but its effect on family participation obtained a lower average: 3.74. This result could be explained by certain comments that mentioned the limitations of some parents' mobile phones that prevented them from downloading the application and the stories.

With regard to eventual pedagogical activities performed by teachers using the application, less than 50% performed a special activity with their students; most just informed parents and recommended them using the application with their children. This may be explained by the natural reluctance of teachers to change their pedagogical practices. It could also be because the second intervention took place at the end of the school year, which is not an appropriate time to introduce educational innovations.

The teachers' suggestions to include reading comprehension questions or activities in the application embody the prevailing idea in the educational community of considering comprehension as the main indicator of a good reading experience, leaving aside aspects linked to the pleasure and enjoyment of texts *per se*. On the other hand, the suggestions to develop tablet or PC versions would be explained by the excessive size of the application and the stories, making it difficult to download them to old mobile phones or mobile phones with little available memory. It also expresses the perception that tablets and computers are potentially more educational

resources than mobile phones, which are often linked to leisure activities. Finally, the suggestion to include stories dealing with local or regional themes would show that they want contents that are closer to their daily reality.

Although the *Correpalabras* format was evaluated positively in both stages, in future versions of the application it would be advisable to include the capacity to delete the stories already read so as not to overload the memory of the telephones. Consideration should be given to the possibility of including stories written by the children, teachers or parents themselves in order to achieve a greater level of involvement and commitment of the entire educational community. On the other hand, it is clear that the format requires an articulated work of authors, illustrators and designers. Writing and illustrating is not enough, it is necessary to imagine a visual and textual discourse that works synchronously and harmoniously. We believe this task resembles more the work of a scriptwriter than that of a writer.

Finally, the question arises as to whether the skills learned through frequent use of the application are transferable. To what extent will children who acquire a good level of reading competence using the *Correpalabras* format be equally competent when reading a printed book or text on another support? It would be necessary to conduct a comparative and longitudinal study in order to answer this question.

Notes

1 The *Correpalabras* app can be found and downloaded free in Google Play Store. It works on smartphones running the Android operating system.

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