WHAT ARE THE MAIN THEMES TO CONCEPTUALIZE A NICE READING TECHNOLOGICAL SUPPORT FOR CHILDREN?

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Abstract

In this world of information and knowledged, where everything seem connected, there is a notable and growing interest of children in relation to technologies, conveying information in a fast, dynamic and visual way, often incorporating videos, gifs, sounds or images. Contents are often neglected, in concise messages. On the contrary, a book requires time and attention from the reader. Consequently it increases the disinterest by reading books and the meeting with consecrated authors. The present study born from this problematic, in order to verify what should be the key concepts to consider in the development of a technological application (app) to reading support, particularly in the case of children. Through interviews with educational professionals we obtained the data to elaborate a concept map – using Leximancer –, in which we found three main themes (Consultation, Curiosity and Reading), representing the most important concepts in the proposal and development of the intended app. Motivation for reading should always be a main issue, being essential that children be attracted by the curiosity to consult texts through a technological support. This paper proposes the key concepts, or requirements, that must be taken into account in the development of a new technological prototype for reading support, toward children.

Keywords: Reading, Technology, Literacy, Children Education

1. Introduction

We live in a period in which new information technologies (IT) are increasingly common in everyday life. The same happens in the involvement of IT with reading, changing the way we search, consulted and absorb information. The creation of reading habits is an important process to develop as a child, in order to stimulate an aptitude for reading that leads in the future, for understanding and critically analyzing what is written, as a method of assimilating information.

Nowadays, literature is often renegade to the background by children. Since authors and classical texts do not attract their attention, often leading to this activity being mistakenly interpreted as insipid. It is important that the technology offer something that is not available in traditional forms of teaching [1], so it is necessary to promote the habit of reading through a less usual format, in order to make it more interesting and fun for those involved.

Children tend to spend more of their time exploring new technologies when they allow for greater interactivity, as well as when they allow a multisensory experience, involving image, sound and movement [2] . Computerization facilitates access to reading sources, which can be more easily encouraged at school, in the library, or even at the disposal of children, who can spontaneously engage with them in this way and on their own initiative. In this way, is essential understand the characteristics and tools necessary for the convergence of technology with reading, in order to contribute to an improvement in the quality of the technological supports available and that allow support and encouragement to read.

In this study, we intend to verify and analyze the concepts considered important by professionals in the area of education, through the vast experience gained by them in teaching and in relationships with children and finding what should be the key concepts for the development of a technological application of support to read. This enables us to find a conceptual model providing a precise alignment between the fundamental characteristics for the

preservation of the quality of reading activities and the renewal of this process through the inclusion of technology. We also aim to contribute to the definition of requirements for the elaboration of future technological prototypes of reading support, through the themes and concepts found with the realization of a concept map according to the opinion and the vision of the education professionals.

Childhood and child development

Children undergo a process of extensive cognitive growth between birth and adulthood, are naturally very active, experimentalists, thinkers and learners. According to Flavell [3], there are some aspects that influence children to focus more on one activity compared to another, and have found that they give preference to an activity if this will please you more, if it takes longer to fully realize and exceed the expectations you have created. The same study reports that children's ability to process information increases with age, allowing children to think about more things simultaneously, and that the ability to develop activities in a certain area is directly influenced by experience gained in that area.

Language and words play a key role in child development and consequently in learning. It is natural to exemplify and explain with words when questioned by children about their various curiosities, leaving the words, often associated with the image of a question or situation lived. Likewise, words are also linked to emotional feelings and state, so the way we teach and transmit words to children, has an elementary role in understanding them, and should always be communicated with explicit devotion and meaning, so that the children receive them in the same way. "*In addition to teaching the meaning of words to children, children learn what the words are. They learn what words mean and what they are from us: from the environment we create and from the people that we are*" [4] .

Words become more meaningful and more objective in social relationships, when we need them to give shape to a thought, since we begin with children to use them for this purpose, making them fundamental for insertion into a social group or community. As Whitehurst & Lonigan [5] point out, a child's semantic and syntactic abilities become more important as they learn to read when the child is reading for meaning than when the child is only learning to intonate unique words, making it possible in the future to understand, decode and assimilate the narratives of the stories read.

The use of information technologies in literacy teaching

The opportunities offered by the use of technological devices in education are immense, even knowing that many children already have and use these devices at home in their daily lives. Making it easier to target this habit of teaching literature, by implementing various pedagogical activities in Tablet's, computers or even Smartphone's. This possibility has already been verified by several authors, who carried out teaching activities, taking advantage of the new technologies that we currently have.

One of these authors is Falloon, which used iPads in teaching [6] , collecting data for 6 months using these devices in class about 90 minutes per week. It was possible to verify that the design and the content of the applications is primordial to motivate the participation of the children, something that we could already predict, but in this way was clearly demonstrated through the interactions of the children involved. The importance of this conclusion is apparent when we look at the various applications available, where design and content are often highlighted. n terms of content it is still denoted that it is fundamental to have easy-to-understand objectives and instructions, a clear path with what is intended, as well as a good combination of practical and learning elements and interactive parameters.

We understand the need for the objectives to be easy to understand, so that we can motivate the participation of children in these learning activities, taking advantage of the interaction that technology provides us to maintain and stimulate this same participation, and may even become spontaneous on the part involved in accessing them in their own devices. In concluding that there is greater participation if there is a well defined path, it was interesting that Falloon verified whether this position is influenced by the competition that the activities can originate among the children.

Hutchison, Beschorner & Schmidt-Crawford conducted a study on the use of ipads in literature teaching [7], the experiment was carried out with the help of a teacher and lasted for 3 weeks. First, they established learning objectives and then selected some applications according to their nature, involving activities of reading, drawing, understanding and logic. It was verified that due to the experience already acquired by the students with technological devices used in the day to day, navigation was facilitated, allowing them to proceed without the teacher's help. This is in fact a very important issue, considering that if we do not need to spend a lot of time to explain navigation and use issues, we will have more time and focus for the different activities.

On the other hand, it is necessary that the children can develop these activities alone so that they are as autonomous as possible and allowed to foment new aptitudes. It was also demonstrated that exercises with iPads brought more collaboration among students, and may have influenced the fact that they are developing activities in pairs. The authors of this study emphasized that these tools should be used to assist in curricular integration rather than technological integration, allowing for progress in literature teaching. It is understood the position taken by the authors, when mentioning that the focus should be the learning of the diverse curricular subjects instead of being the development of technological competences, since in this last scenario we would be neglecting fundamental areas of the education, which need new approaches involving new technologies.

In another study, with children between 4 and 5 years, during 7 weeks in two schools [8], the authors found that IPads were used as teaching tools, selecting applications that require reading, listening, writing and speaking. Data were collected through observation and some interviews. Thus, it was again clear that the children became more communicative with each other when using technological devices, namely iPads, and it was regular to question others about the activities developed. The identification of the applications used was facilitated through design, since the children could quickly find the application they wanted. In this study, there was a peculiarity in relation to the teachers involved, who were not familiar with the use of technology, but after that, they became more determined and motivated to integrate information technology in their lessons.

Lynch, & Redpath conducted a study with high school students in Australia [9], using a variety of applications with gamming literacy and interactive e-books, and found that youngsters showed a preference for using iPads compared to traditional books. This conclusion was possible through observation of the various activities carried out and interviews with the participants. In general, children today are very competent in the use of technology.

2. Methodology

In order to answer our research question, it was necessary to define a research strategy, as well as the adequate methods to collect and analyze the data [10]. For the data collection, we opted for a qualitative method, through interviews to obtain data that allowed us to develop a prototype suitable to the object of study. Although there has been an analysis of several studies on the implementation of technology in education and in literature, with very relevant information, some data are only possible through interviews, in direct contact with the intervenient in the area of education [11].

The aim is to obtain practical and realistic answers. In this sense, we developed precise questions that allow a pragmatic approach to the answers, providing satisfactory results for the development of the prototype. All the answers were given by people familiar with the object of study, the demonstrated willingness to participate in it and after defining the most important issues for the subject.

There are three interview structures, which can be structured, semi-structured or unstructured [12]. The structured ones have previously defined questions, in the semi structured ones the questions can be altered in the course of the interview and in the unstructured questions are defined according to the interviewee. In order to compare and analyze the data obtained in the interviews, we chose structured interviews, thus ensuring that the answers are directly related to the questions posed, and there is only difference in the interviewees [11]. The questions put to the interviewees were as follows:

What are the most important points that a technological support for reading should have?

What weaknesses do you consider to exist in Information Technology (IT) in support of reading?

What do you consider to be the advantages of using IT to support reading?

What do you consider to be the disadvantages of using IT to support reading?

3. Results

For the better unification of the answers obtained, we decided to work the data together through the software Leximancer, which is a content analysis tool, presenting the results visually through a conceptual map, providing the most frequent concepts [13]. Leximancer allows us to compare all the terms used during interviews and to extract related and significant information, presenting them through themes and concepts, with no need for manual intervention [14]. The analysis of the interviews generated a conceptual map with 3 themes, Consultation, Reading and Curiosity (see Figure 1). Within the themes were associated the concepts ease, connection, consulting, books, affective, size, image, increase, decrease, capacity, speed learning, curiosity, reading, access and reading.

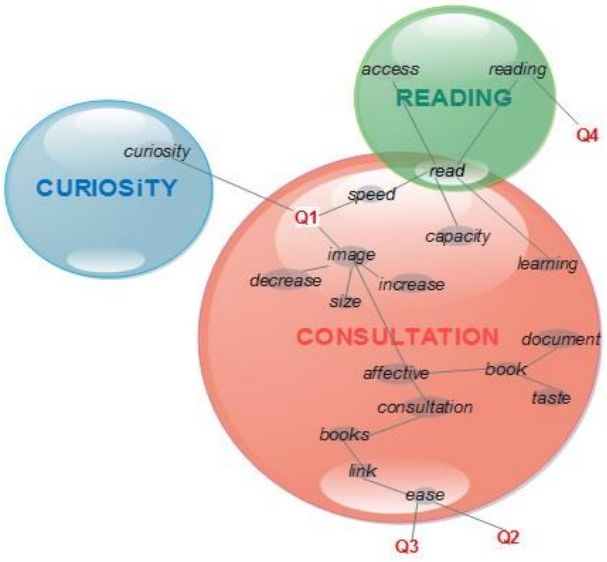

Figure 1 - Conceptual Map (Source: Own elaboration)

The themes are defined by Leximancer who assigns the red colour to the most relevant one, and the name is given by the concept with the strongest correlation [13]. Of the topics identified, the most important is the "Consultation", relating to concepts such as ease, speed, size and image, going in favour with what we analyzed in the literature review, where we verified that there must be a design that allow an easily accessible query [8] and interactive elements [6]. We verify the connection that consultation has with affectivity, books and learning, denoting that the affectivity, provided by the consultation of the books, when made through a technological application, is entirely related to its objectives and instructions, and should ensure a good correlation between practical and learning elements [6]. The affectivity provided by reading will allow the child to be more enthusiastic and willing to re-read [15].

Learning is a concept referred to in the conceptual map, with great importance, including verifying its connection with the concept of reading, considering that it is primordial that technology can support the learning of literature, as well as other curricular materials, rather than only gain new technological expertise [7]. The emphasis given by our interviewees to the theme "Curiosity" is elementary and gains even more strength considering that the children are the target audience chosen for the development of our study.

Knowing that we are all born curious and that curiosity is the engine for acquiring new knowledge, playing a pivotal role for children to become innovators [16], it becomes crucial to provide interactive content through the various interfaces and to provide the possibility of

manipulating the available content in the technological supports, in order to reinforce the curiosity generated [8]. It is also verified that participation in the activities provided by the libraries is often greater when the activity in progress provides curiosity in the participants [17].

"Reading" is the focus and one of the main objectives of the prototype that we intend to develop, its connection to the concepts of access and reading, reinforces that this should be its main priority, enabling reading through technology. This connection also reflects the importance of the technology itself to read the available texts, something possible through tools such as text-to-speech, with the advantage of being able to help children with more limitations to follow reading [6].

The importance of these concepts for literature and technology, can be seen when analyzing the various texts published on these subjects, where they are frequently mentioned, as shown in Table 1.

Table 1 - Concepts and principles about the use of technology in literacy

Themes	Concepts Underlying	Definition	Authors
Consultation	*consultation*	The consultation process aims to facilitate literary development.	Alston-abel et al. [18].
	affective	Pleasure and enthusiasm in reading is key to creating lifelong reading habits.	Strommen et al. [15].
	books	The use of digital books attracts more attention to students.	Willoughby, et al. [19].
	learning	The use of technology in teaching increases the motivation to learn.	Geer & Sweeney, [20].
	ease	The great competence demonstrated by children in the use of technology facilitates the use of digital tools.	Lynch & Redpath, [9].
	speed	Agile and fast access to content is essential.	Beschorner & Hutchison, [8].
	link	The use of interactive elements will develop a greater connection with the child.	Falloon, [6].
	image	Through visual images and symbols, the participation in the activities is increased.	Beck, [21].
	capacity	By using technology in teaching, it is possible to increase learning ability.	Warschauer et al. [22].
	taste	The child's taste for the activity will set the focus on it.	Jonh Flavell, [3].
Reading	*reading*	Reading through digital tools will enhance understanding and engagement with texts.	Hutchison, et al. [7].
	access	Access to technological tools should be easy and spontaneous.	MacArthur, et al. [23].
Curiosity	curiosity	The curiosity provided by technology increases the passion for learning.	Arnone, et al. [16].

Some concepts were merged because the meanings are directly correlated, such as increasing and reducing, being merged with the concept image. Read, which was merged with a reading and document that was merged with the book. We have verified that the relevance of all the concepts found for the object of study discussed here is demonstrated, including its connection with the themes previously discussed in the literature review. Through the labels placed on the conceptual map (Q1, Q2, Q3, Q4), it is possible to identify which concepts best correlate with the answers given in the interviews.

Question 1 is related to the three themes extracted, correlating with the concepts, reading, curiosity and image, allowing understanding that these are the most important points that a technological support of reading support should have.

Question 2 and question 3 have a stronger relationship with the subject of the consultation, appearing correlated with the concept of ease, thus concluding that the weaknesses identified in the current technological supports for reading, can and should be transformed into advantages, namely the ease with which the consultation is made.

Question 4 is the issue with less relevance on the concept map, showing a connection with the theme and the concept of reading, remembering that reading should always be a priority when made through a technological support, with the penalty of being relegated to the background [7].

4. Conclusion

The data obtained allow us to verify that the most important for the people related to the area of education and literature is an application that can allow a quick consultation of books, with the possibility of resizing the image, through an easy connection, and this consultation should be an affective relationship with the book, consequently allowing access to reading and generating curiosity in readers who use a technology to support reading.

The concepts drawn from the interviews should be considered for the development of our and future prototypes, being the mirror of the expectations of professionals in the area of education, benefiting from their experience in contact with reading and with children. With this benefit and according to the themes found in the map concept (Consultation, Curiosity and Reading) and their adjacent concepts, we contribute with the possibility of starting to design a conceptual model for these future technological prototypes. For that purpose, these concepts should be considered as key concepts to define functional and non-functional requirements, as well as the possibility of representing them visually through a use case.

This way we are able to answer our initial question about what should be the key concepts for the development of a technological application to support reading, enphasizing the importance that future studies can make the implementation of the present findings, and verify the impact they have to motivate reading in children.

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