

Towards Improving Global Comprehension in Third Graders through a Serious Game

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ABSTRACT

Reading difficulties have important implications for emotional and academic development of children. Evidence shows that Mexico has a huge problem regarding reading comprehension in elementary school students. One of my PhD thesis goals is to support improvement of global comprehension (GC), which is a third grade's reading comprehension skill they need to acquire through a serious game (SG).

Categories and Subject Descriptors

K [Computing Milieux]: K.3 Computers and Education; K.3.2 Computer and Information Science Education; H [Information Systems]: H.5 Information Interfaces and Presentations; H.5.2 User Interfaces - *User-centered design*.

General Terms

Design, Human Factors.

Keywords

Reading comprehension, global comprehension, serious games, third graders.

1. INTRODUCTION

The ability to read is a basic requirement for the social and economic demands in today's society. Proficiency in reading literacy is not only one of the principal goals of schooling, but is also one of the main means of learning [1].

The way we read depends on the context of the reading material and our goals regarding it. Reading for general comprehension is reading's most common purpose, and it is the default assumption for the term reading comprehension [2-3]. Reading comprehension goes beyond decoding text meaning, but also the construction of meaning that results from the interaction of the reader with text [4].

Video games represent an opportunity to support of reading comprehension. On one hand, evidence shows that video games encourage the acquisition of cognitive skills improving

comprehension of players [6]. On the other hand, video games are already part of Mexico's popular culture [7].

Nowadays, serious games (SG), a genre of video games for serious purposes, are receiving interest from researchers and the game industry due to their advantages [8]. SG use pedagogical methods to infuse instruction into the game play experience and they are by nature suited to engage the learner and encourage active construction of learning and development skills [9].

According to the above, we are proposing to develop and use SG to improve global comprehension in third graders.

2. PROBLEM STATEMENT

Mexico has a very important problem regarding reading comprehension. The Organisation for Economic Cooperation and Development (OECD) estimates that Mexico would need 65 years to reach the current OECD's average in terms of reading comprehension [10]. Furthermore, results of national education evaluations of Mexican third graders, suggest that one in four students is on the "Under basic" level, which means students do not even have minimum basic skills to comprehend any text, while 56% of them are on Basic level. In addition, results on the region that we are working on are estimated at 22% for third graders who are on the "Under basic" level, while 55% of them only have "Basic" skills [11]. Moreover, [12] applied a test in order to know which reading comprehension skill third graders from Colima, Mexico have more trouble at. The researchers found that the most problematic skill was global comprehension (GC). It refers to the understanding of the general meaning of a text [13]. They also found that GC was also problematic in the rest of Mexico.

Researchers also found that another problem was related to the way students are assessed in reading comprehension. There is a disagreement in Mexico regarding standardized tests that evaluate different skills of reading comprehension, mainly because those tests do not work for students with different contexts in the text [14].

The third problem researchers found is related to technology context, since children have different perceptions and make sense of the world around them differently from adults [15]. Children at different ages interact differently to technological systems due to their varied cognitive and emotional developmental needs, skills, and knowledge [16].

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3. RESEARCH GOALS AND CONTRIBUTIONS

We have divided our contributions into two main parts:

- (1) Design an instrument to assess GC in third graders according their context.
- (2) Design a serious game that improves GC in third graders.

Both contributions are designed to take into account the context where third graders interact [2], [13], [17-18] since this is important for our project.

4. METHOD

4.1 Assessment Instrument for GC

After an extensive literature review, we found that there is no consensus about the number of skills that support reading comprehension [18]. We had to define a construct, which is GC, and its sub-constructs, which are: main ideas, inferences, and contextualization of a concept to be read. We follow some instrument design directions from [17-18], and we used a sample of 803 third graders as a part of our instrument design. We assessed the instrument using Confirmatory Factor Analysis (CFA) getting positive results that validate our instrument [19].

4.2 Designing the SG

For this part, we are using the user center design (UCD) paradigm [20]. At first, we made a contextual study looking for some notes and directions about third graders. Then, when we assessed their skills about GC, we started to design the instruction [21].

After that, with the help of some experts, we started writing the narrative for the game, as narrative creates motivation in students due to factors such as challenge, curiosity and fantasy [22]. The narrative is related with stories, legends and, tales about the cities where the students live in. We created the game mechanic, and a low fidelity prototype in order to conduct some user tests [23].

5. FUTURE WORK

Right now we are working on the medium fidelity prototype of the serious game. We are going to conduct more usability tests in order to know, first, if the interface is easy to use for third graders, then, to know if they understand the game mechanic, and finally to know if they get engaged with the game.

After that, we are going to conduct more user and knowledge testing in order to know if the students will improve their GC. We are going to use a mixed methodology as think-aloud, CFA and confirmatory methods.

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