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## Introduction

The school is the space which provides conditions for the learning to happen. Inside of it, the knowledge is presented to the students as disciplines such as: Portuguese, Mathematics, History, Geography and so on. Each one has its role in the construction of the students' knowledge, some being considered easier while others obstacles almost impossible to overcome as the case of Mathematics. The difficulties in learning the contents of Mathematics lead many elementary school students to lose their interest in the studies, to fail the exams and, consequently, to the school failure

According to Magina, Bezerra and Spinillo (2009), researchers and educators report the difficulties experienced by the children to elaborate the concept of fraction. This difficulty, most of the time, is related to the way this content is introduced to the students. Toledo and Toledo (1997) say that both in the textbook and the in the classroom, the rational numbers are introduced by the idea of fraction which is taught in a rigid way through illustrations of situations of a continuous nature which are distributed in  $n$  equal parts, and  $m$  of those parts are colored to represent the fraction  $m/n$ .

The situation becomes worse in the last series of the elementary school when the operations with fractions are considered inside the students' domain, but they can only realize the fraction as two separate numbers by a horizontal trace. According to Merlini (2005, p.3),

With fractions appearances deceive. Sometimes the children seem to have a whole understanding of the fractions but they still do not have it. They use the fractions coherently, they solve some fractional problems, but some crucial aspects of the fractions still escape to them. In fact, the appearances can be so deceivable that it is possible that some students can pass the school without mastering the difficulties and without anyone noticing it.

The construction of knowledge about rational numbers in its fractional form has been shown complex to be understood throughout the educational process. For this reason, this research has the aim to describe the development of an applicative during the research of Iniciação Científica linked to the course of Computer Engineering of the Universidade São Francisco.

## Objective

By facing this issue, it was proposed the development of a mobile application with the objective of helping students of the 6<sup>th</sup> grade of elementary school to learn mathematical content in school and outside it through the use of the cell phone.

According to Brunno Brugnolo (2014), the use of technology can be beneficial in the interactive study of contents, making them more attractive and making students adopt a more participative position.

## Method

For the development of the application "Logicametria", the students of Computer Engineering of the Universidade São Francisco – USF – used the *AppInventor* application, a tool which permits to develop applications for smartphones with *Android* operating system. To store the information of the application such as: students' registration, teachers, time spent in each phase and number of attempts, a data based allocated in an online server using the language *MySQL* and the information management was done by *phpMyAdmin*.

During the development of the application, the students faced some challenges related to the scientific and technological areas such as: the integration of the database to the application and the site and the development of images with several *layouts* to fit the different sizes of the mobile devices.

## Result

The result was the development of a smartphone application called "Logicametria". The application has 25 phases and 6 types of different games. When accessing the application, the teacher has some options to: register, alternate, list or exclude the students; while the participant has access to the games aimed at learning the mathematical contents such as fractions and decimals.



Fig 1 – Home screen

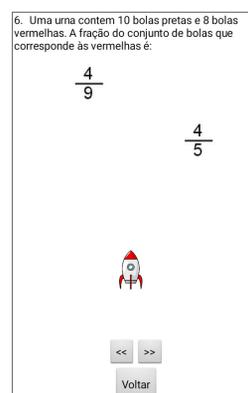


Fig 2 – Game screen example

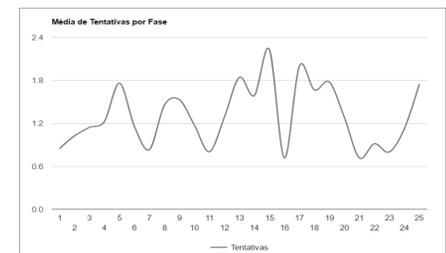


Fig 3. Average plot of attempts

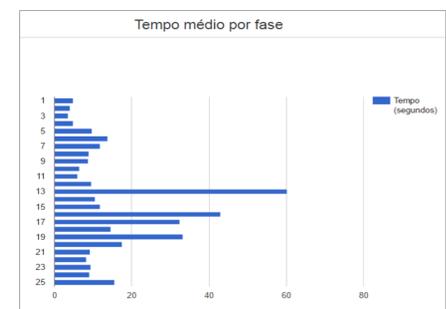


Fig 4. Average Response Time Graph

This research permeates the area of education which demands for technological innovations that may favor the educators' work as well as the students' necessity. Besides that, it is notorious the difficulty that most of the students have with Mathematics and the lack of incentives they have to study at home. We can conclude that the developed application can be useful, available and suitable for the students that need a tool for the appropriation of the contents related to Mathematics and also for the teachers as a new method of evaluation.

For the Computer Engineering students this research allowed the knowledge of a new platform of development with a new programming language, being of great value to improve the programming studies as well as for the reflection of the contents studied during the graduation and applied to the empirical use.

## References

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