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## iLearnTest – framework for educational games

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### Abstract

Games are a part of human life since ancient times, present not only at childhood but throughout most of our adult life. A growing area of research focuses on the development of games for teaching and learning in various areas of expertise. These are called serious games. They intend to capture the attention, to motivate and to encourage user engagement through the use of recreational and entertainment elements, thus facilitating the learning process. This article describes iLearnTest, a framework for developing serious online games which are capable of supporting education of several subjects, allowing for a suitable training of participants, thus preparing them to meet the job market needs. This paper describes the architecture of the framework, the structure of the game and presents some results from performed experiments as to validate the overall approach.

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### 1. Introduction

For a long time now, games are a part of human life. They are present not only in our childhood, but throughout adulthood. Over the past few years, studies have shown that the use of games, as a complement to traditional learning, is much more efficient than just using the traditional teaching method (Thirty, Zoucas, & Silva, 2011) (Schneiderman, 2004). Games can be effective educational tools, since they are fun, they motivate the user, facilitate

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learning and increase the storage capacity of what was taught, exercising the mind and intellectual thoughts. When games are used in this context, they are defined as serious games (Kapp, 2012).

Besides engaging and fun, serious games give the user the opportunity to learn theoretical concepts at their own pace, receive a score for their performance and conduct practical exercises as a game, improving and supplementing their learning process in a specific area. Serious games are the subject of increasing interest (Kapp, 2012) (Mitchell & Savill-Smith, 2005) (Mayer, 2014), and consequently, new technologies have emerged to assist in the development of such games.

There is already a good amount of solutions out there for game development, but they are rather generic when it comes to developing specific serious (e.g. educational) games, not coping with structure reusability when only its (learning) contents change. Examples of platforms that allow the creation of 2D games for diverse platforms (web, mobile devices, computers) are **Stencyl** (Stencyl, 2014), **Construct 2** (Construct2, 2007) and **GameSalad** (GameSalad, 2011). These systems provide a “drag and drop” interface to facilitate game development using a set of building blocks, assisting users with no programming skills. Even so, there is the option of coding new features and complex behaviors for more advanced users. **Unity** allows building 2D and 3D games for web, desktop, consoles and mobile devices platforms (Unity 3D, 2014). From the moment you open the Unity editor, the user can instantly import any type of resource and create content for complex worlds with building blocks.

The main benefit of these frameworks is to allow the development of games without writing code. However, they come with a steep learning curve, and without “templating” for reuse, that is, the game developer has to rebuild everything from scratch when changing the teaching subject.

## 2. iLearnTest

The iLearnTest is a framework to build games more easily, not intended to replace traditional teaching, but instead to provide an additional option to help the educational process, thus increasing the interest of the students to the subject being learned.

The iLearnTest contains several features that makes it attractive to teachers and students:

- Provides a set of game templates that facilitate the game construction;
- Separates the game content from the game implementation;
- Incorporates challenges to promote the engagement of students;
- Allows students to learn at their own pace;
- Gives feedback about the score achieved and the correct and wrong answers in each game so that students can aspire to get the highest score on the next attempt.

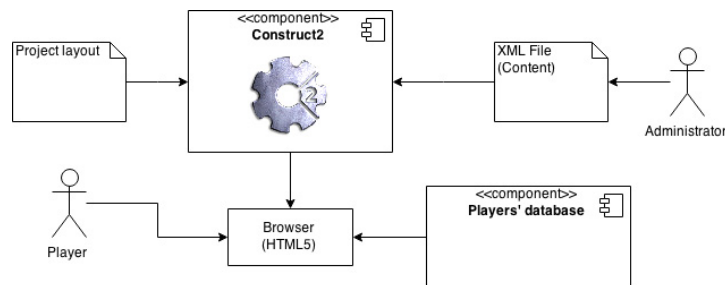


Fig. 1. Architecture of the iLearnTest.

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