**BACKGROUND AND RELATED WORK**

Due to the rapid growth of information and communication technologies, the education environment has been enriched with those technologies and become more diversified.

In our days there are many systems that can teach the user on any subject and particular in programming and in software engineering.

Software development can negatively affect the motivation of developers. In Software engineering there are topics that are less interesting or alternatively more difficult to understand, such as requirements engineering, test-driven development, bug reporting and fixing, where the creative aspects of programming fall short [3].

Gamification is defined by Werbach and Hunter as “The use of game elements and game-design techniques in non-game contexts” [5], it means that the term "Gamification" is the use of game elements and design in non-game contexts, can be applied to software engineering.

For example, in-game principals and themes such as acquiring virtual ‘points’ or other currency and completing series of tasks or activities to advance to the next level, may be used in contexts other than gaming to provide fun and stimulation for the learner.

Gamification can also be defined as a set of activities and processes to solve problems by using the characteristics of game elements.

Whilst typical game elements are by no means new, they have indeed become increasingly common in non-game contexts such as websites, digital marketing, enterprise applications and even virtual to-do lists and productivity tools.

One huge area where gamification is highly prevalent, however, is in education [2].

**GAMIFICATION IN EDUCATION**

Gamification is becoming increasingly used in educational settings for several reasons. In short, it ‘makes the hard stuff more fun’, helping to motivate students and make them more engaged with the subject matter.

The gamification theory in education is that learners learn best when they are also having fun. Not only this – they also learn best when they have goals, targets, and achievements to reach for.

Because of the addictive features of video games that intrigue children (and adults) and get them hooked, it’s only natural that we see similar engagement results when these game-based elements are applied to learning materials.

Gamification in learning involves using game-based elements such as point scoring, peer competition, teamwork, score tables to drive engagement, help students assimilate new information and test their knowledge. It can apply to school-based subjects but is also used widely in self-teaching apps and courses, showing that the effects of gamification do not stop when we are adults [6].

These days, many companies use the gamification principle to improve the performance of their employees, in addition to motivating them to expand their knowledge and try to improve all the time.

There are several platforms available that provide a gamification that helps companies assimilate such a culture into the company.

Centrical - A platform that enables a more productive work environment and improves the contributions of all employees in the company's effort.

On this platform, an employee who helps his colleagues wins virtual coins, which he will be able to convert into a prize at the end of each period.

Another example of using gamification to encourage users to help colleagues and participate in discussions can be found on sites like "Stack Overflow" [8].

On these platforms, the user asks a question, and a discussion takes place.

When any user can give feedback, this encourages users who have the necessary knowledge to participate in the discussion and help the questioner.

There are also companies that use the principles of gamification in order to motivate their customers. Examples of such platforms can be found in fitness apps like Adidas Rennig, ASICS Runkeeper, and Appale Watch.

These platforms encourage users to exercise by providing metrics collected during exercise as well as the ability to share performance with friends who use the same platforms and even post accomplishments on social networks.

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