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An overview of gamification and gamified educational platforms for mathematics teaching

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Introduction

Gamification is widely present in our daily lives and it is becoming increasingly important in 21st century education to enhance students' motivation for learning. Students live in highly technological environment and recently efforts are made to adapt for this in education. Therefore, in this research we consider technology to assist in gamifying learning and to create a gamification editor or platform that offers teachers opportunities to develop or customize their own gamified environment based on their needs. We believe it is important, because currently gamification appears in various educational technology platforms, but designed by their developers and these environments do not always cater for the specific needs of teachers, students or courses. Such gamified environments will be also valuable for mathematics teachers as they can integrate gamification elements with other mathematics related technologies and resources.

What is gamification?

Gamification is defined as “the use of game design elements in non-game contexts” (Deterding, Dixon, Khaled, & Nacke, 2011, p.10). It is present in our daily lives, for instance, we receive points for different activities or rewards in order to increase our motivation. These gamification tools proved to be successful in business, marketing, personal development and there are already some attends to use gamification in education.

Gamification elements

Werbach and Hunter (2012) classify the elements in three categories: dynamics, mechanics and components. Dynamics are no visible game elements, but they impact in the player such as emotions and progression. Mechanics are processes that drive the player through the game, these can be challenges, feedback, or rewards. Finally, dynamics and mechanics happen in the game through components and they are the most visible elements in the game, for instance, achievements, badges, levels, points and leaderboards. Game elements can be integrated since one or more work in order to achieve the others.

Although gamified environments had been created as an integrated system, the selection of each elements is very important in order to motivate and engage all player types. In general, players can be interested in different elements of a game. According to Bartel (1996) it is possible to identify four general kinds of players according to their preferences of the game, achiever, explorer, socializer and killer.

Gamification and motivation

According to some motivational approaches such as the self-determination theory (SDT) (Ryan & Deci, 2000) or Flow theory (Csikszentmihalyi, 2014) a person will experience motivation if the environment satisfies three external needs: competence, relatedness, and autonomy and if the person finds challenges, clear goals, immediate feedback, and balance between skills and challenges in the task. To design a gamified environment to raise the students' motivation, we need to add game elements and to choose activities that drive students through the autonomy, competence and relatedness feelings at the same they experience flow.

Currently, there are some educative platforms with gamification features, which can be used by both teachers and students. Some of them let teachers to create materials or environments with some gamification features, or others offer their materials for a gamified environment. However, these platforms are quite limited and a more general editor to create gamification environment would be desired.

Proposal

The digital poster will introduce a description of the most used gamification elements as well as the connection between them in order to achieve students' motivation. As a part of this research, several educational platforms with gamification features have been reviewed, which will be presented it in the poster through a brief description and a summary of their features. In addition, some recommendations will be offered to help developing a new kind of gamification editor platform; especially focusing on how mathematics teachers can utilize such platforms and how they can combine mathematical software and mathematics resources with gamification elements.

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