FRI-ONLINE-1-ERI-07

GAMIFICATION OF THE CLASSROOM: A QUIZ-LIKE GAME WITH STRATEGIC CHOICES AND PLAYER INTERACTION[10]

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Abstract: The paper presents a model for classroom activities which employs several gamification elements – quizzes, teamwork, competition, game rounds, points, penalties and rankings. Students work in teams and can choose the type of questions to which they want to respond. Unlike traditional quizzes, they can also use special cards, which allows for role playing and direct interaction between the participating teams. The game rules and the conduct of the game are explained in details and a template spreadsheet for the game board is provided.

Keywords: Teaching, Classroom games, Gamification, Education

INTRODUCTION

Motivating students and engaging them in classroom activities has been a challenge for tutors of all levels of the educational system and probably will remain so in the foreseeable future. The success of this task depends at least partially on the personality traits of the tutor, yet researchers in the field of education have been looking for a general set of rules and prescriptions about the design of the classwork, which can be used with success by any teacher. The view about how to approach working with students has evolved during the years and usually has been embedded in the more general understanding of the structure of social relations, shaped by the dominant norms, values and the overall institutional setting. Technology also plays a role, and this role has become ever more visible with the accelerated development of the information and communication technologies. This development has been a driver for change not only because it creates new opportunities, but also because it affects the way in which the younger generations access, process and transmit information. In this context, a concept that is not entirely new – incorporating game elements in classroom activities, the so called "gamification", has enjoyed an increased interest both in theory and in practice in the last decade.

EXPOSITION

Gamification in the classroom

The inclusion of game-based elements has the potential to make students more involved in educational activities and eventually improve their academic achievement. Game playing could cater to some basic human needs such as self-assertion, expression of creativity, awareness of one's progress and social relatedness. Under the right circumstances it can replace extrinsic with intrinsic motivation and attach study information to emotion-laden events, which in turn can affect positively memorization (Kaplan et al., 2012). A large body of research has been published since the early 2010s to evaluate empirically the effects of gamification in education. There have been several attempts to summarize and systematize the results from the primary research in several aspects – cognitive, behavioural and affective.

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[10] Докладът е представен на конференция на Русенския университет на 13 ноември 2020 г. в секция „Образование – изследвания и иновации" с оригинално заглавие на български език: ИГРОВИЗАЦИЯ НА ОБУЧЕНИЕТО – ПРИМЕРНА ИГРА С ВЪПРОСИ, СТРАТЕГИЧЕСКИ ИЗБОР И ВЗАИМОДЕЙСТВИЕ МЕЖДУ УЧАСТНИЦИТЕ.

The cognitive aspects refer to knowledge acquisition and learning such as memorization, understanding, the ability to transform information and the application of concepts to various contexts. The behavioural aspects concern participation in the educational activities, teamwork, organisational skills, leadership, conflict resolution and decision-making. The affective aspects include motivation, satisfaction, confidence, recognition and curiosity.

Vlachopoulos and Makri (2017) survey articles, published in peer-reviewed journals between 2010 and 2016. They filter the publications for the use of an appropriate methodology to 123 papers, of which the majority apply quantitative methods (experiments or quasi-experiments) and some – qualitative methods. The survey includes games, simulations and game-based elements in learning applied to a wide range of subject areas in the higher education setting. The authors find generally positive cognitive, behavioural and affective outcomes with small exceptions. According to them, the main problem with the implementation of games and simulations in the classroom are the high costs of designing them.

Dichev and Dicheva (2017) review 51 empirical studies, conducted mostly at the university level and published in 2014-2015, which meet certain criteria. The cognitive, behavioural and affective outcomes of gamification on learners are inconclusive, with some results reporting positive, while others negative effects.

A more recent meta-analysis (Sailer and Homner, 2020) examines only primary studies (totalling 38) which apply quantitative statistical methods and use control groups in experimental or quasi-experimental designs. The authors find statistically significant, but small effect of gamification on behavioural, cognitive and motivational learning outcomes.

There are variety of reasons why it is difficult to establish the effect of gamification on learning outcomes. The people, writing about it, come from different fields, have different research backgrounds and employ diverse methodologies for their empirical observations without coherent theoretical base and the use of clear and unambiguous terminology. The studies include a plethora of approaches regarding the application of game elements – in traditional classes, in online classes, in hybrid forms of traditional classes with web-enhanced technologies. There is also the question whether gamification replaces or supplements the usual way of conducting classes. Another point for consideration is that the tutor can use simulations, games or only game design elements in the teaching process, which may all have the same goal, but retain some differences nonetheless.

Game design elements can refer to the game dynamics (what are the constraints and the narrative), the game mechanics (how the game moves forward – by chance, feedback, competition, etc) and game components (which are specific instances of mechanics and dynamics) (Dichev and Dicheva, 2017, p. 9). The specific components are added in order to incentivize the learning process by adding intrinsic motivation for participants and can come in various forms (Nah et al., 2014). It is reasonable to assume that gamification's success will depend not only on the number of the components used, but also on their exact selection and the way they are combined. In many cases gamification is implemented through its most superficial features such as badges, experience points and leaderboards, which are easy to implement and resemble traditional student assessment (Wiggins, 2016, p. 21). It is more difficult to design deeper gamification with game dynamics and mechanics that includes challenges, strategic player interaction, choice, risk-taking, role-playing, etc., that would make the learning process more interesting and engaging, allowing the students to gain knowledgeable experience without the fear of failure (Dichiev and Dicheva, 2017, p. 10).

And while a general framework for the use of game-based learning in the classroom would be helpful from the logistic point of view, the immediate application of gamification in the classroom has no formula for success. It is contextual, depends on the skills, flair and creativity of the educator and is just as much about knowing the science behind it, as it is a process of trial and error and of artistic discovery. So, trying to assess the educational effects of gamification in general would be really too much. The right question is not whether it works in principle, but whether a particular game design would work in a given context of the named discipline and the students who study it.

A quiz-like game with strategic choices and player interaction

The report describes a quiz-like game, where students play in teams, that uses both competition and cooperation in the game dynamics[11]. Teams consist of 3-4 people and gather points mostly by answering questions. The team with the most points wins (after the questions have been exhausted or the class has ended). The rationale of the game is that instead of simply asking the students to answer, it sets them against other teams and the pursuit of victory contributes to the intrinsic motivation of the students to participate and be more engaged in the learning process. At the same time, the game encourages participation and teamwork, because a team can provide only a single answer. Under these circumstances, team members with differing opinions will have to justify their position to other members of the group, thus creating a favourable environment for authentic discussions, which could benefit students not only with respect to knowledge on the respective topic, but also with respect to their soft skills such as decision-making, leadership, cooperation and conflict resolution.

The game mechanics uses both choice and luck to progress in the game. The ability of teams to choose creates a sense of agency and control, while luck brings an element of mystery. Students can exercise their choice by selecting the question type (true or false, multiple choice, and open-ended question respectively for 2, 3, and 4 points) and the question number for that particular type. They have a time limit to provide their answer.

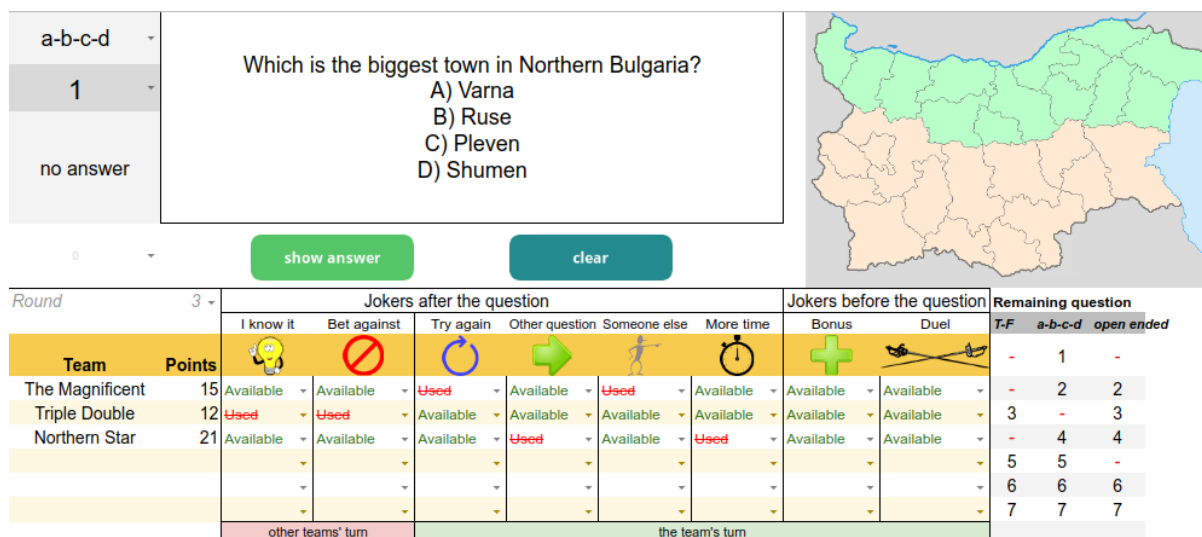| Team	Points	I know it	Bet against	Try again	Other question	Someone else	More time	Bonus	Duel	T-F	a-b-c-d	open ended
										-	1	-
The Magnificent	15	Available	Available	Used	Available	Used	Available	Available	Available	-	2	2
Triple Double	12	Used	Used	Available	Available	Available	Available	Available	Available	3	-	3
Northern Star	21	Available	Available	Available	Used	Available	Used	Available	Available	-	4	4
										5	5	-
										6	6	6
										7	7	7

Fig. 1. A view of the gameboard

Teams do not compete on knowledge alone. They can also score points by strategic interaction with other teams by betting against them or challenging them. This adds to the game-like design and is implemented through the availability of jokers. The use of jokers adds an additional sense of agency for the players, because they decide (constrained by the rules of the game) whether, when and how to play them. The logic of the game allows some jokers to be played before the question is asked, while others – only after the question has become known. Some jokers can be invoked when it is the team's turn, whereas others can be used only if it is the turn of another team, but each joker can be invoked only once[12]. The jokers are the following:

- "I know it". When the team wants to give an answer to a question for another team.

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[11] A Google Sheets template for the game is available at http://bit.ly/quizlikegame2020 and its usage requires a Google account. Access to the template is read-only, so it must be copied with "File -> Make a copy". The buttons trigger a Google script, which must be authorized to run properly.

[12] A more detailed description about the use of the jokers – when they can be used and how they can be combined is given in the "readme" sheet of the template.

- "Bet against". The team bets that one of the other teams will not be able to provide a correct answer to the question.
- "Try again". The team can answer again to a question, once it has already given a wrong answer.
- "Other question". On seeing a question, the team can select another question from the same type.
- "Someone else". On seeing the question, the team may select one of the other teams to answer.
- "More time". The team can ask for additional time to provide an answer.
- "Bonus". The team gets additional 2 points if the provided answer is correct.
- "Duel". The team challenges another team and they both answer the question.

The game rules make provision for special questions to keep all the teams involved for the duration of the whole round and during the game run in general. As teams take turns to answer questions, a team might get distracted and not pay attention to the questions and the answers when it is the turn of other teams. In order to avoid slack and keep teams alert, the game designer or the tutor can include special questions, which require that the team answers several questions that already have been asked. The team will get the respective points only if it answers successfully all of these previous questions. Which exactly will they be, is decided by one of the other teams (past questions are market with "-" on the gameboard). As it is in the other team's interest to select more difficult past questions, its members would also benefit from following the game closely. This game element also leads to periodical revisions of already covered material and its better memorization.

Another type of special questions are designed to involve all the teams at the same time. These are questions, whose answers allow for approximation (e.g. the year of an event, where the answer, closest to the year, wins) or they set a task (and the first team to fulfil it properly wins, e.g. a matching and order exercise).

The game was tested in the fall semester of the academic 2020/2021 with first-year students from the bachelor program "Economics" at the University of Ruse during the seminar classes in "Economic history". It is best implemented in a hybrid setting where the traditional classroom is enhanced with multimedia technologies. The gameboard is projected on a screen and is visible for all teams. Unfortunately, at this time there is not enough data to test quantitatively the learning effects from the game on the students, but they appeared to be involved and generally expressed their preference for the gamification of the seminar exercises. The game was also tested in an online classroom, but the technological logistics was more clumsy and complicated and this resulted in less satisfaction in such a setting. Probably another reason for this was that the lack of face-to-face interaction took away from the intensity of group discussions and decision-making.

CONCLUSION

The gamification of education needs a sound theoretical base and would benefit from a unified methodology of research. A generalized framework of working principles will make it easy to implement it in practice. Such a framework can be generated by the systematization of empirical studies on which elements work and which don't. But what gamification needs even more are specific designs, games applied in context, which can then be fed into such studies. It needs a step away from abstract theorizing and discussions about statistical significance and effect sizes. It needs games that can serve as examples that can be copied, modified and examined in different settings. Only then can the evolutionary process of their practical application filter out the successful ones. The current report makes a small contribution to such a pool of games with a versatile proposal that with slight modifications can be used across a wide range of fields.

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