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Attitudes of Secondary School Teachers towards Gamification

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Abstract: The concept of gamification is increasingly being used in the classroom because of its impact on student motivation and engagement. The purpose of gamification is not to exclusively incorporate digital games, but to gamify activities through some game-based elements such as avatars, badges, virtual points, levels, stories, leaderboards, awards, etc. Although it is an approach with great potential, a review of the literature on the use of gamification in education has shown that it is more common in higher education and less common in schools. Since teachers play a key role in introducing innovations in the classroom, their attitude towards gamification is very important. For this reason, a survey was conducted among a sample of secondary school teachers to investigate their attitudes toward gamification. The paper describes a study conducted among teachers at a vocational secondary school where a previous study of gamification among students had been conducted, which showed that students were very satisfied with the use of various game-based elements such as points, badges, leaderboards, and stories. Teachers were asked about the use of gamification in their teaching practice as well as their attitudes towards gamification. The paper analyses the extent to which they are familiar with the possibility of gamification, whether they use game-based elements and/or digital tools for gamification in the classroom, and their reasons for using gamification. The reasons for not using gamification are specifically examined to determine what actions could be taken in the future to increase teachers' adoption of gamification and encourage its use in the classroom.

Keywords: Gamification in education, Game-based elements, Secondary school teachers

Introduction

Nowadays, game-based learning (GBL), serious games, and gamification are used in the educational process (Rugelj, 2015), among other modern approaches based on digital technologies to consider that students belong to the so-called "digital generations" or "Z-generations" (Robertson & Evans, 2020). While it is important to engage students in classroom or face-to-face (f2f) classes, it is even more important to engage students in online or hybrid instructional models, which are becoming more necessary and common today due to the COVID -19 pandemic (Rohman et al., 2020). In this context, the importance of gamification is increasingly emphasized.

Since 2010, the term gamification has attracted considerable attention due to its versatility and has become widely popular. While there is no universal definition of gamification that applies to all fields such as education, marketing, healthcare, etc., it is generally understood as the integration of specific elements and principles of game design into non-game environments. Gamification aims to enhance activities by incorporating game-based elements such as avatars, badges, virtual points, and levels, without being limited exclusively to digital games. (Gibson et al., 2013). Despite the potential for implementing gamification in education at various levels of

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education, such as primary and secondary schools, universities, and lifelong learning programs, a review of the existing literature shows that it is used more often in higher educational institutions than in primary or secondary schools (Vrcelj et al., 2023)

This paper describes a study conducted among teachers in a vocational secondary school. The aim of this ongoing research was to investigate teachers' opinions about the use of gamification in their teaching practice as well as their attitudes towards gamification. In summary, the main contributions of this work were to determine the extent to which teachers are familiar with gamification, whether they use gamification in the classroom, and their attitudes toward gamification. Based on the findings, recommendations were made on how to encourage teachers to incorporate gamification.

Related Work

One of the recent papers (Vrcelj et al., 2023), which conducted a systematic literature review (SLR), examined relevant work on the use of gamification in primary and secondary schools to explore the field and make recommendations for future research. It was conducted in the field of school education because some previous research (Dichev & Dicheva, 2017; Mora et al., 2017; Hamari et al., 2014) has shown that gamification is widely used in higher education, which means that there is a lack of work showing the results of gamification in primary and secondary schools. The research identified the level of education, the instructional model, the subject, the learning and teaching methods and activities used in gamification, the digital tools and elements of game design, the nature and purpose of the research on gamification, and whether and in what ways gamification positively impacts students. Almost all of the 20 studies analyzed in detail were conducted in schools with students, but only 4 of them included teachers. All studies concluded that gamification has a positive impact, especially on student motivation, but also on more successful implementation of learning outcomes. The conclusion is that research on gamification should continue in order to propose appropriate pedagogical and technological frameworks that would facilitate the use of gamification in schools by teachers.

The research described in (Plantak Vukovac et al., 2018) included a survey of teachers about the use of gamification elements in classroom activities and about their attitudes towards gamification in general. The results showed not only that few teachers were familiar with the concept of gamification, but also that some of them expressed a disinterest in using gamification, mostly due to a lack of time to improve teaching methods through gamification.

In their paper, authors Laskowski and Borys (2016) present another study that focuses on the use of the concept of gamification and serious games among teachers, but in higher education, is Most of the respondents indicated that the reason for using gamification is that gamification makes teaching more interesting and increases students' motivation. The most common reason why they would not use gamification and serious games in their classes is that they think gamification is a fashion trend and they do not want to create gamified materials.

Authors Martí Parreño et al. (2016) emphasized that teachers play a key role in introducing pedagogical and technological innovations in the classroom, including gamification, so their attitude towards gamification is very important. The results of the survey they conducted showed that gamification is still a trendy method that only a small percentage of teachers use regularly in their courses, but that teachers' attitudes toward gamification are still positive.

Alabbasi's (2018) study aimed to investigate teachers' perspectives on the use of gamification techniques in online learning. The results showed that teachers are positive about the use of gamification tools in online learning. Most teachers believe that elements of game design improve learner motivation, although some pointed out the possibility of negative effects due to the competitive nature of gamified learning.

It is also worth highlighting the author's own research (Vrcelj et al., 2022) on the implementation of gamification in secondary school computer science classes, conducted among students at the same vocational school. According to the results of the survey, students were very satisfied with the use of various game elements such as points, badges, leaderboards, and stories. Most students found gamification entertaining and would like to use gamification in other subjects, not only in computer science. In order to achieve this, it is crucial that teachers accept gamification, as they are key to introducing innovation in the classroom and their attitude towards gamification is very important. For this reason, this preliminary study was conducted on a sample of teachers from the same vocational high school to investigate their attitudes towards gamification and to lay the groundwork for further research.

Terminological Definition of Gamification

One of the most common descriptions used to define gamification is that it is the application of certain elements and principles of game design in non-game contexts. The concept of gamification was introduced by British programmer Nick Pelling in 2002 (O'Donovan et al., 2013). The goal of gamification in education is to increase students' interest and motivation and to engage them more deeply in the teaching process through the use of various elements of game design (Robertson & Evans, 2020). The use of gamification elements promotes student motivation and engagement in the classroom and even more successful adoption of learning outcomes (Plantak Vukovac et al., 2018; Park & Kim, 2021; Martínez Hita et al., 2021). In the literature, terms such as gamification in education, educational games and learning through games are very often confused with each other. Although the differences between these terms are minor and all have the primary goal of increasing motivation and success in learning through games, it is important to accept that the terms are not synonymous (Santos et al., 2013; Todor & Pitica, 2013).

The term game-based learning (GBL) refers to a learning process that uses digital games to motivate students to achieve specific learning outcomes (Raymer, 2011). Learning through games takes place through playing and developing games while promoting critical thinking and problem-solving skills. Although GBL can encompass a variety of games (today they are mostly digital games), games commonly referred to as educational games or serious games are the most common.

Educational games can be described as interactive, competitive lessons with defined learning outcomes that allow students to have fun while acquiring knowledge (Rugelj, 2015). They differ from other games in that their goal is not just fun, but they contain a clearly defined pedagogical component, i.e., learning outcomes that must be achieved. However, well-designed educational games provide entertainment and have hidden learning content, and learners achieve the required outcomes unconsciously by progressing in the game (Dichev & Dicheva, 2017). Gamification in education refers to the application of elements of game design and game principles in the classroom to increase student motivation and engagement (Fui-Hoon Nah et al., 2014; Osatuyi et al., 2018). Gamification uses mechanics, aesthetics, and thinking from the player's perspective to engage students and promote learning and problem solving (Palova & Vejačka, 2020). It should be emphasized that the big difference between gamification and educational (serious) games is that gamification does not require a complete digital game design. Instead of designing the most expensive educational game, simple, often free, digital tools such as a learning management system (LMS) and quiz tools can be used for gamification (Vrcelj et al., 2021).

Popular digital tools or e-learning platforms that are not exclusively intended for gamification but have the ability to implement game design elements are: Moodle, Izzi Quizzi, Kahoot!, Mentimeter, Math Widget, ClassDojo, Science LevelUp!, PeerWise, etc. (Vrcelj et al., 2020). There are a number of other digital tools that can be used to implement gamification, and it should be noted that many authors develop specific tools or gamified e-learning systems for gamification of the teaching process, such as Math Widget (Jaguš et al., 2018).

As mentioned earlier, gamification uses various elements of game design to increase the motivation and engagement of participants. Each game must contain clearly defined rules that guide the participant to progress in the game and achieve their goals, and these elements are integrated into the gameplay. During the activity, it is possible to combine different elements of game design, such as points, leaderboards, virtual badges, etc. Based on research and review of works (Dichev & Dicheva, 2017; Hamari et al., 2014; Fui-Hoon Nah et al., 2014; Plantak Vukovac et al., 2018), the most common elements of game design used in educational process and learning context are highlighted and described. Points are the simplest form of reward and the most common element in almost all games to provide feedback. Depending on the points earned, users can see opportunities for progress and improvement (Fui-Hoon Nah et al., 2014). Leaderboard is the second most common element of game design and is often used in combination with points. It is also used to motivate students and often emphasizes competition, i.e., it encourages a competitive spirit among students. In practice, only the best results are often presented to avoid demotivating students with lower ranks in further learning (O'Donovan et al., 2013).

Badges are virtual medals awarded as a sign of success, achievement of a level, or recognition for goals accomplished. The goal of digital badges is to encourage students to be more engaged and successful in completing activities. In order for students to win a digital badge, they need to know what conditions must be met. From the teacher's perspective, the earned digital badge can be a proof of achievement, while from the student's perspective, the earned digital badge can be positive feedback (Gibson et al., 2013). According to some research, more than 90% of students believe that using the badge system in their daily learning routine motivates

them and helps them focus in class (Santos et al., 2013). The storyline or story is an element that helps students achieve an ideal interest curve and stay motivated throughout the learning process. The story is conveyed narratively in the game and helps illustrate the applicability of the concepts in real life.

Avatars are graphical representations of players created or self-selected by users in a digital tool. With the avatars created, users introduce themselves to other users in the community. Research shows that students' interests increase after using avatars compared to their interests before using avatars (Todor & Pitica, 2013).

Prizes/rewards are elements of game design that also affect student motivation. The type of reward depends on the complexity of the task and can be tangible or intangible. Analysis of studies has shown that it is better to distribute multiple rewards evenly over a period of time rather than giving one large reward at the very end (Raymer, 2011).

Feedback is a very important element in the learning process as it provides quick feedback on the current level of engagement of the student. Levels/stages are elements used in various game designs to give players a sense of progression. Levels are often grouped by difficulty, so that each successive level requires more knowledge, effort, and skill from users. Challenges are an element whose goal is to encourage the user to complete tasks. It is noted that part of the gameplay study emphasizes a combination of the following three game design elements that are most common in implementation: Points, Badges, and Leaderboards, which is why the acronym PBL is often used in the literature (Dichev & Dicheva, 2017).

Method

The purpose of this research was to investigate teachers' opinions about the use of gamification in their teaching practices. The research determined the extent to which teachers are familiar with the concept of gamification, the frequency of using game design elements, and teachers' attitudes toward gamification. The research methodology is based on a quantitative research method supported by a survey of teachers. By analyzing the data collected, the following research questions could be answered:

Q1: To what extent are teachers familiar with gamification?

Q2: To what extent do teachers actually use gamification?

Q3: What are teachers' attitudes toward gamification?

Study Design and Procedure

The survey was conducted among the teachers at the Civil Engineering Technical School. The study included 28 teachers (33 total, 85% response rate). It is worth noting that during the same school year, a training on gamification and the use of gamified activities was conducted with teachers. The training was delivered by external staff from CARNET (Croatian Academic and Research Network), so it was expected that teachers would be familiar with the possibilities of using gamification. The survey was conducted in February 2023 by sending paper surveys to teachers. The survey consisted of five sections with a total of 33 questions. Some of the questions were adapted from the study conducted by Plantak Vukovac et al. (2018) with a similar population, but there are also some new questions based on recent research on gamification in high schools.

The first group of questions explored the profile of teachers, the second includes questions about familiarity with the concept of gamification, the third group includes questions about the use of gamification in the classroom, while the fourth group explores teachers' attitudes toward gamification. The last open-ended question refers to additional comments about gamification, such as the general impression of the activities and suggestions for future improvements.

Results and Discussion

The Teachers' Profile

The survey was conducted at the Civil Engineering Technical School in Rijeka, with the participation of 28 teachers, where 85% of teachers completed the survey. The survey consisted of several parts, where the first section focusing on the teachers' demographic information. Regarding the age of the respondents, the highest

proportion of teachers (25%, n=7) fell within the age range of 36-40 years old, while the smallest number (only one teacher) was under 30 years old (Figure 1).

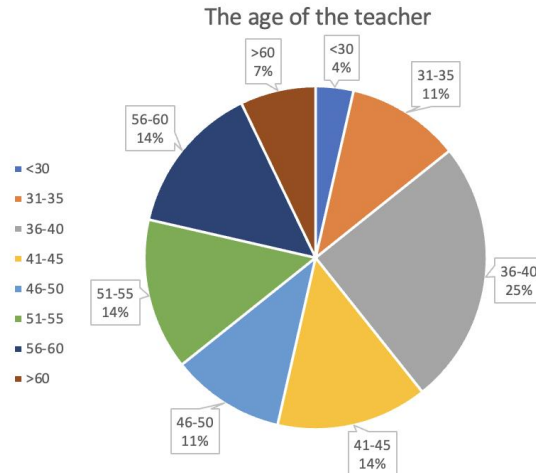


Figure 1. The age of the teacher

Looking at the years of professional experience (Figure 2), it can be noticed that all age groups were represented, and the largest number of respondents (25%, n=7) have between 6-10 years of professional experience, slightly fewer respondents (21%, n=6) had over than 26 years of professional experience, while the smallest proportions were observed among teachers with less than one year (4%, n=1) and those with 21-25 years of experience (4%, n=1).

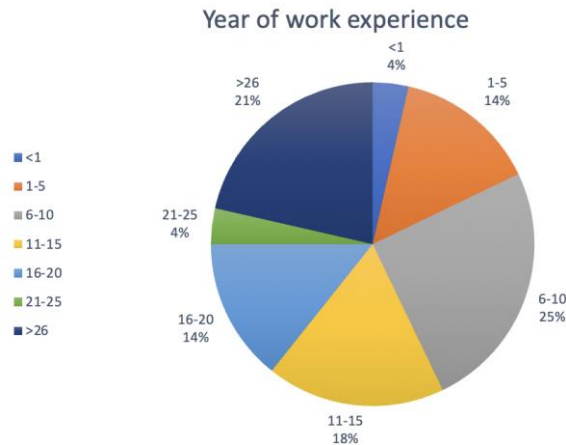


Figure 2. Years of work experience

Number of teachers by teaching fields

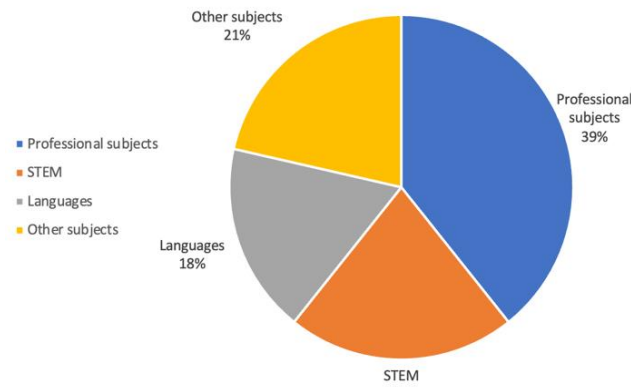


Figure 3. Number of teachers by teaching fields

It should be noted that the respondents are teachers from various fields (Figure 3). STEM (Science, Technology, Engineering, Mathematics) field includes subjects such as Mathematics, Physics, Chemistry, and Biology. Languages include subjects Croatian Language, English Language, and German Language. Examples of subjects included in category vocational subject are Interior Design, Technical Drawing, Architectural Constructions, Road organization, Design geometry, Geodetic survey. Other subjects are History, Geographics, Ethics, Religious education, and Physical Culture. The highest percentage of teachers belongs to vocational subjects (39%, n=11), followed by STEM fields (22%, n=6) and other subjects. The smallest proportion is observed among language teaching subjects (18%, n=5).

Familiarity with the Use of Gamification

The second part of the survey included questions about the use of gamification in teaching. A 5-point Likert scale (0 - not at all, 1 - a little, 2 - moderately, 3 - to a greater extent, 4 - completely) was used to collect data. The goal of the survey was to find out the extent to which teachers are familiar with the concept of gamification and what game design elements and digital tools they use in the classroom to apply gamification. When asked about familiarity with gamification in the classroom for motivating students, most of the respondents (57%) believe they are moderately familiar with the possibilities of gamification for the purpose of motivation.

Regarding familiarity with elements of game design, about one-third of respondents (35%) indicated that they were familiar with the concept of elements such as points, badges, avatars, etc., while another third indicated that they had limited or no familiarity with such concepts. Regarding the last questions in the first section about familiarity with using digital tools and platforms for gamification, 21% of respondents indicated that they were completely or somewhat familiar, while 25% indicated that they were little or not at all familiar. However, most teachers (54%) believe they are moderately familiar with the use of digital tools and platforms for gamification (Figure 4).

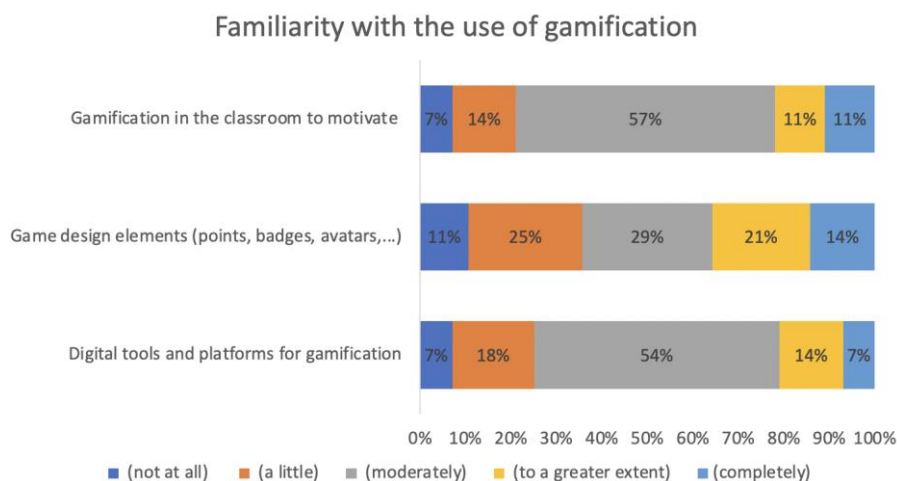


Figure 4. Familiarity with the use of gamification

Application of Gamification in Teaching

The third part of the survey addressed whether teachers use gamification in learning and teaching. For the questions related to the application of game design elements and the use of digital tools and platforms, respondents were asked to choose one of the offered answers on the scale: 0 - never, 1 - rarely, 2 - sometimes, 3 - often, 4 - always.

In terms of the type of game design elements used, most respondents (35%) indicated that they use points to a significant or great extent. The next most common element in terms of frequency of use was leaderboards (25%). Very low results were obtained for application design elements such as badges, where 82% of respondents indicated that they do not use this element of game design at all; an even lower result was obtained for the use of avatars, where 86% indicated that they do not use them. Only two respondents (4%) indicated that they use avatars and badges, and only three (7%) use stories in their lessons (Figure 5).

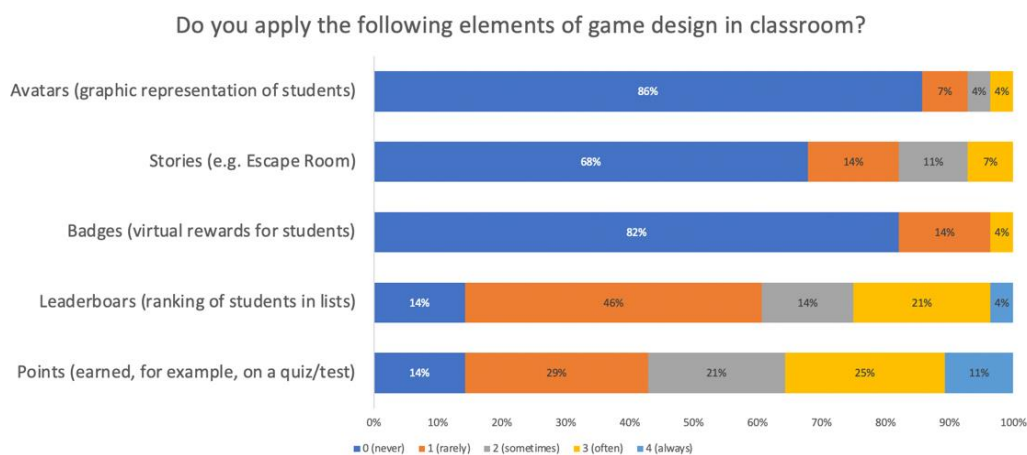


Figure 5. Using game design elements in the classroom

The study also looked at what digital tools or platforms respondents use to implement gamification in the classroom (Figure 6). It was found that the majority of teachers (39%) use the digital platform Loomen, which already includes features such as quizzes, Million Games, Memories, etc. The digital tool Kahoot! was used more frequently or very frequently by 22% of the respondents, while Quizziz was used very frequently by 18% of the participants. It is noteworthy that 64% of respondents indicated that they did not use any application to create quizzes or tests. A slightly smaller number of respondents (11%) use Genially in their teaching, but 75% of respondents do not use this platform at all.

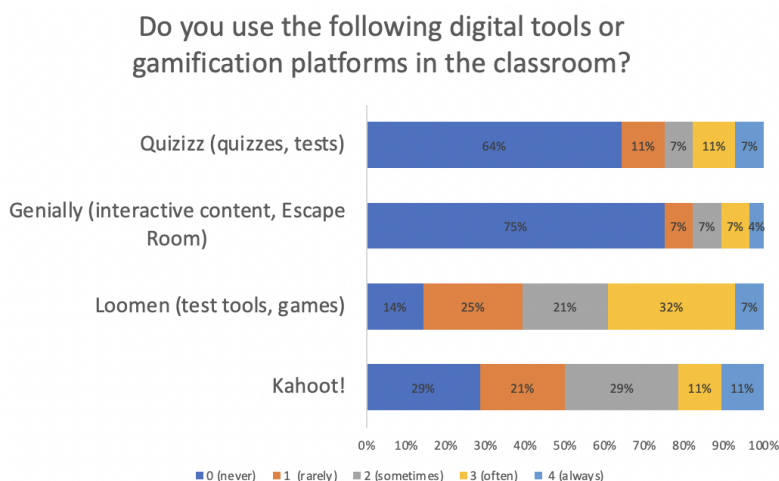


Figure 6. Using digital tools or gamification platforms in the classroom

Teachers' Attitudes towards Gamification

The fourth section of the survey examined respondents' attitudes toward gamification. A 5-point Likert scale was used to collect data (0 - strongly disagree, 1 - disagree, 2 - neither agree nor disagree, 3 - agree, 4 - strongly agree). The statements were divided into four parts that addressed teachers' attitudes toward using gamification in the classroom (Figure 7), teachers' attitudes toward motivation and encouragement in using gamification (Figure 8), teachers' views on the reasons for not using or insufficiently using gamification in the classroom (Figure 9), and teachers' views on factors that would encourage them to use gamification in the future (Figure 10).

Regarding attitudes toward using the gamification in the classroom, the results showed very positive responses (Figure 7), with 57% of participants agreeing or strongly agreeing that gamification increases student interest in the subject. In addition, a significant majority of 67% confirmed the competitive approach to assignments when gamification is used. Regarding the impact of gamification on student attendance and enthusiasm for class, 47% of respondents strongly agreed that gamification noticeably increases students' desire to participate joyfully in class. Most teachers (68%) neither agree nor disagree with the statement that students get better results by using gamification. However, when asked if gamification contributes to better understanding of subject matter, a

significant proportion of respondents (49%) strongly agreed that it does. Similarly, a majority (61%) confirmed that gamification does indeed boost students' motivation to learn to a great extent. It is worth noting that only one teacher held a strictly opposite opinion: this respondent disagreed with all statements that gamification has a positive impact on students.

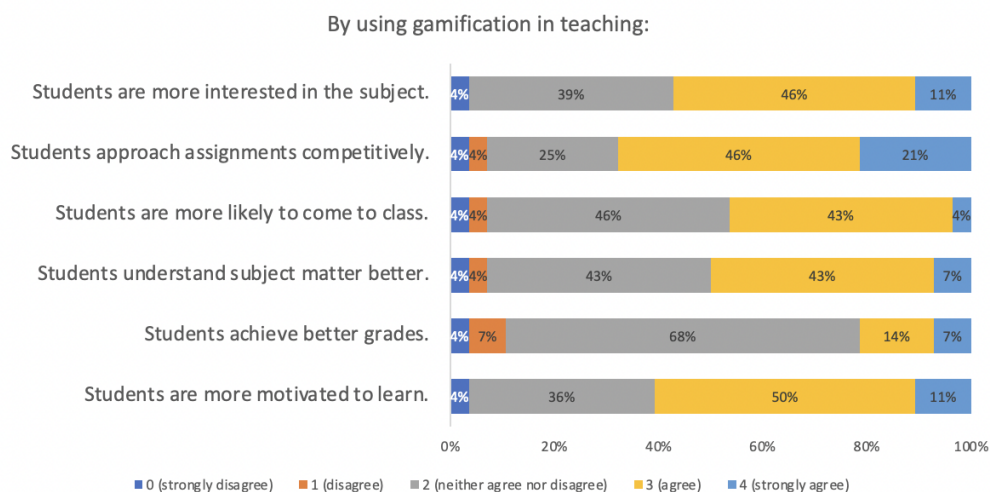


Figure 7. Attitudes toward using gamification in the classroom

The next part of the survey focused on teachers' attitudes toward motivation and encouragement in the use of gamification (Figure 8). It is important to highlight that teachers in all statements expressed a strong desire to use gamification, agreeing or strongly agreeing that they want to achieve a higher quality of teaching (69%), increase student engagement (86%), make the subject more attractive and interesting for students (82%), achieve a better quality of teaching (78%), modernize teaching (82%). Of the five statements presented, only in one statement related to the modernization of teaching, two teachers express hesitation about modernizing their teaching practices.

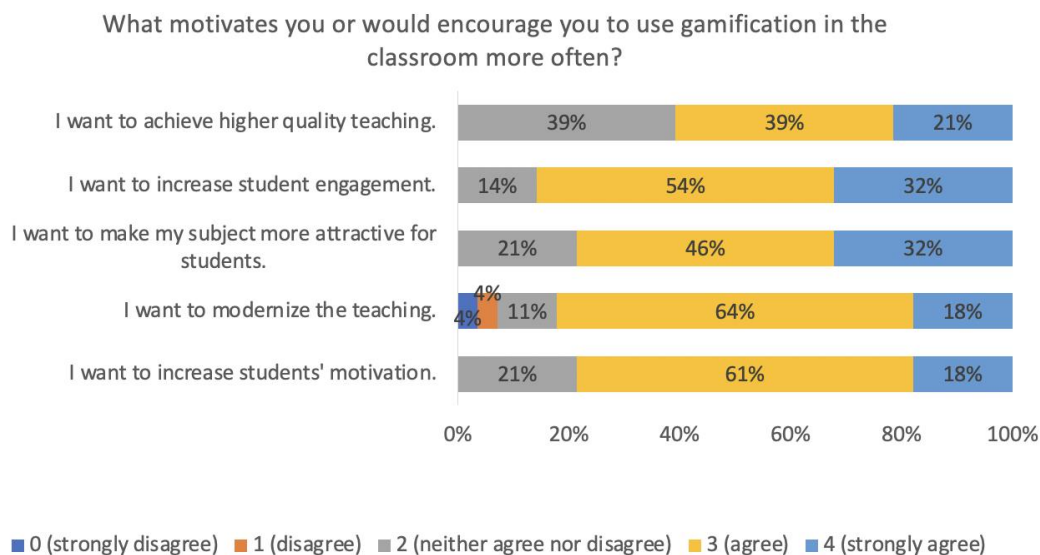


Figure 8. Attitudes toward motivation and encouragement in using gamification

When asked about the reasons for not using or insufficiently using gamification in the classroom (Figure 9), the majority of teachers (36%) stated that they cannot devote enough time to creating and implementing gamification activities. Additionally, 18% of teachers expressed a lack of knowledge about creating gamification activities. A slightly smaller number of respondents (11%) believed that gamified activities are not beneficial to students. Only one teacher believed that using gamification in the classroom is an expression of frivolous teaching. It is worth noting that none of the respondents cited a lack of support from supervisors as a barrier to using gamification in the classroom, and only 15% of teachers felt that gamification was only a passing trend.

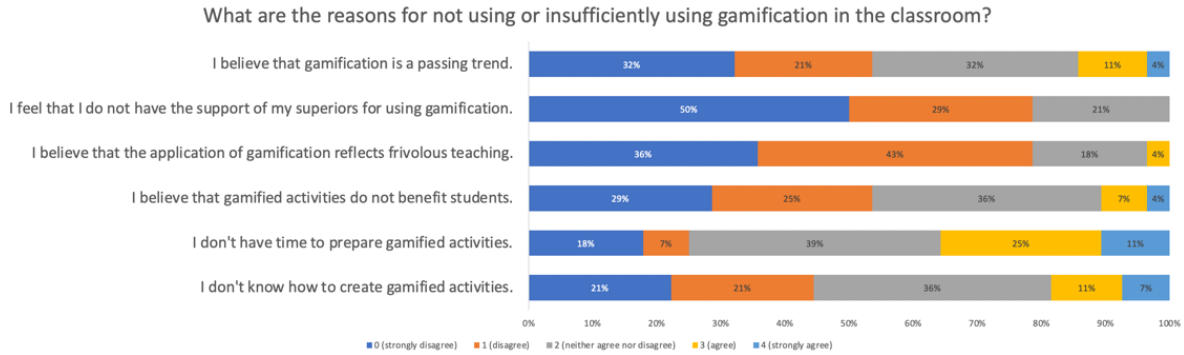


Figure 9. Views on the reasons for not using or insufficiently using gamification

The final question on the survey asked teachers about the factors that would motivate them to use gamified activities more frequently in their classrooms (Figure 10). The largest percentage of respondents (78%) indicated that more free time would encourage them to incorporate gamification into their teaching. In addition, 68% of respondents believed that more available digital tools/platforms would encourage and motivate them to use gamified activities. The same number of respondents believed that adequate computer equipment would motivate them to implement gamification activities.

In addition, 57% of respondents said they would be motivated to use gamification more if they received training or workshops on how to use and create gamification activities. In addition, more than half (72%) indicated that an expert mentor would be helpful in overcoming difficulties and further motivating them to use gamification.



Figure 10. Views on factors that would encourage them to use gamification

Teacher's Comments

In the last part of the survey teachers were given the opportunity to express their additional comments regarding gamification. There were only a few comments which were all positive:

“Gamification help to give students feedback faster.”

“I consider gamification useful when students need to increase their motivation, and it will certainly become part of my teaching.”

“I like to use gamification to get more students' attention.”

Discussion

This study was conducted to answer the research questions Q1: To what extent are teachers familiar with gamification? Q2: To what extent do teachers actually use gamification? Q3: What are teachers' attitudes toward gamification? To summarize the findings related to research question Q1, the second part of the survey showed that the majority of respondents were only moderately familiar with gamification and that only one-third of

them were familiar with game design elements such as points, leaderboards, and badges. Teachers' knowledge of digital tools and platforms for gamification is also insufficient.

To investigate the actual use of gamification in the classroom (Q2), the third part of the survey examined the extent to which teachers use the most common game design elements and popular digital tools and platforms for gamification in the classroom. It was found that teachers use points and leaderboards, which is positive, but on the other hand, they should be encouraged to use other elements such as avatars, stories, and especially badges. A combination of points, badges, and leaderboards (PBL) is very commonly used for gamification and has been shown to be successful in literature (Dichev & Dicheva, 2017). Regarding the use of digital tools and platforms, the most popular tool is Kahoot! and the most popular platform is Loomen (Vrcelj et al., 2021). The Loomen digital platform is the Moodle version of the learning management system (LMS) used in Croatian schools. It already includes features such as quizzes and games (e.g., Memory, Millionaire), and teachers who are familiar with this LMS should be encouraged to use it more for gamified classroom activities.

The most extensive part of the questionnaire dealt with teachers' attitudes toward gamification to answer Q3. It asked what teachers thought about the positive impact of gamification on students, and the results were very positive. The majority of respondents recognized the benefits of gamification, especially in terms of students' greater interest in a particular subject and their greater motivation to participate in classroom activities. Teachers also felt that gamification could help them make their subject more attractive to students and increase their engagement in learning. When giving reasons for not using gamification, very few teachers felt that gamification was not useful for students and that it was frivolous teaching. The vast majority stated that the disadvantage was that they did not have enough time or did not know how to prepare a gamified activity. Of particular importance was the final question of the study, which sought to explore what elements might help teachers make greater use of gamification. It was found that in addition to more free time, the availability of computer equipment, gamification tools, proper training, and the help of an expert would be helpful.

If we compare this study with similar studies (Plantak Vukovac et al., 2018; Laskowski & Borys, 2016; Martí-Parreño, 2016; Alabbasi, 2018), we can find similarities in the use of gamification and the reasons for using and not using gamification. However, it should be emphasized that the respondents in this work showed a greater interest in using gamification than in (Plantak Vukovac et al., 2018) and did not indicate that gamification is just a fashion trend as in (Laskowski & Borys, 2016; Martí-Parreño, 2016) or the possibility of negative elements of gamification as in Alabbasi (2018).

One of the differences between this study and the studies described in (Plantak Vukovac et al., 2018; Laskowski & Borys, 2016) is that no statistically significant relationship was demonstrated between respondents' age or years of work experience and their knowledge of and attitudes toward gamification. Similarly, the study did not show that there was a correlation between the statements about gamification and the subjects taught by the teachers.

Conclusion

This study is ongoing research on the use of gamification in education, which aims to investigate teachers' opinions about the use of gamification in their teaching practice. Based on a quantitative research method with a survey, data were collected from secondary school teachers. The results of the study revealed the extent to which teachers are familiar with gamification and how they incorporate elements of game design into their teaching. The results showed that most teachers were only moderately familiar with gamification and only a limited number of them were well acquainted with game design elements such as points, leaderboards, and badges. In addition, their knowledge of digital tools and platforms for gamification proved insufficient.

Despite this limited familiarity, the research showed that teachers recognized the benefits of gamification in the classroom. They acknowledged that gamification stimulates students' interest in certain topics and motivates them to actively participate in classroom activities. In addition, teachers saw gamification as a means to make their subjects more attractive to students and to increase student engagement in the learning process.

An important aspect of the study was to explore the factors that might encourage teachers to use gamification more widely. The results indicated that access to more free time, availability of computer equipment, gamification tools, adequate training, and expert guidance would strongly support teachers in incorporating gamification into their instructional practices.

Based on these findings, the conclusion of the research suggests that while teachers at the Civil Engineering Technical School in Rijeka acknowledge the potential of gamification in education, further efforts are needed to improve their familiarity with the concept and implementation of game design elements in the classroom. To improve the integration of gamification in the classroom, it could be beneficial to provide teachers with more resources, training, and expert support. This support could enable teachers to better use gamification as a pedagogical tool, which would ultimately lead to higher student engagement and better learning outcomes.

As with any research, it is important to acknowledge the limitations of the study. The main limitation of the study described is that the study was conducted with a small sample of respondents. The sample of 28 participants is small for quantitative research and may limit the generalizability of the findings. Another limitation is that the study was conducted in one educational institution, and the results may not be entirely representative of all teachers' opinions about gamification in other institutions or regions. In addition, the study could be further expanded by exploring the challenges or barriers teachers face in implementing gamification in their classrooms. Overall, the study serves as a valuable starting point for understanding teachers' attitudes and experiences with gamification and lays the groundwork for future research in this area. Future plans include conducting further systematic research on gamification to propose appropriate pedagogical-technological frameworks that facilitate the application of gamification in schools.

Recommendations

To address the issues highlighted in the survey, here are some recommendations to improve teachers' familiarity with gamification:

- Organize professional training for teachers on gamification to familiarize them with the concepts of gamification and the elements of game design. These trainings can be organized as workshops or online courses and delivered by experts in the field or by educators who have successfully implemented gamification in their classrooms. For teachers who prefer self-paced learning, online resources on gamification can be made available.
- Provide teachers with adequate classroom computer equipment and a variety of easy-to-use gamification tools and platforms. Teachers can participate in practical training and experiment with different gamification tools and platforms. Hands-on experiences will help them understand how to effectively incorporate these elements into their teaching methods.
- Support teachers with both experts and other, more experienced colleagues, and encourage teachers to collaborate and share their experiences with gamification (e.g., success stories and case studies of teachers who have used gamification effectively in their classrooms). This can be done through teacher forums, social media groups, or within the school's professional learning community. One option is to establish a peer mentorship program where teachers who are more familiar with gamification can guide and support their colleagues who have less experience in this area.

By implementing these recommendations, teachers can improve their familiarity with gamification, game design elements, and digital tools, ultimately leading to more engaging and effective learning experiences for their students.

Scientific Ethics Declaration

The authors declare that the scientific ethical and legal responsibility of this article published in EPESS journal belongs to the authors.

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