How do Slovenian Educators feel about Gamification? Interested to Know More

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Abstract
Research examining teachers' attitudes toward gamification is scarce, although attitudes play a critical role in implementing a new pedagogical approach. The aim of this study was to understand whether Slovenian educators are familiar with the concept of gamification, whether they have experience using it, and what their attitudes are towards its use. A secondary goal was also to construct an instrument that can capture the affective, behavioral, and cognitive components of teachers' attitudes toward gamification. Based on survey results from 103 Slovenian educators, teachers did not have a good understanding of gamification and had difficulty distinguishing it from game-based learning, although more than 60% reported using the principles of gamification at least once in the past year. However, teachers' attitudes toward gamification are quite positive and they expressed an interest in learning more about how to use it in their teaching. They would use it mainly to make learning content more interesting and motivate their students but have concerns that it is difficult to implement and that it would overwhelm them. The main findings of the study show that Slovenian educators lack familiarity with gamification and competencies to effectively take advantage of its benefits but are open and positive about adopting this innovative method to motivate their students.
Keywords: attitudes, beliefs, teacher education, game-based learning, game mechanics.

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Отношение словенских учителей к геймификации

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Аннотация
Исследований, изучающих отношение учителей к геймификации, проводится мало, хотя данный аспект играет важную роль в реализации новых педагогических подходов. Цель настоящего исследования – узнать, знакомы ли словенские педагоги с геймификацией, есть ли у них опыт ее использования и каково их отношение к этому приему. Перед авторами также стояла задача создать инструмент для изучения аффективных, поведенческих и когнитивных компонентов отношения учителей к геймификации. В опросе приняли участие 103 словенских педагога. Результаты показали, что учителя плохо разбираются в геймификации и с трудом отличают её от игрового обучения, при этом более 60 % респондентов хоть раз задействовали принципы геймификации в работе. Отношение учителей к геймификации в целом положительное: они готовы применять эту технологию для разнообразия учебного контента и повышения мотивации учеников. Но у преподавателей есть опасение, что приемы геймификации трудно реализовать и это создает дополнительную нагрузку на них. Результаты исследования выявили: словенские педагоги не знакомы с геймификацией и не обладают необходимыми компетенциями, но они позитивно относятся к использованию этого инновационного метода для повышения мотивации учащихся.
Ключевые слова: отношение, убеждения, педагогическое образование, игровое обучение, игровые инструменты.

Introduction

As motivation and engagement play a crucial role in education (Hughes, 2012; Orhan Özen, 2017), practitioners and researchers alike are looking for ways to foster them. Playing games is an enjoyable and intrinsically motivated activity with great potential in a variety of contexts, so its benefits have long been harnessed, including in learning environments. However, during the last decade, a new phenomenon called gamification has started to become more popular and widespread. With any innovation, be it a new pedagogical approach or another technology, personal factors such as attitude towards the object can mean the difference between its successful introduction or rejection before giving it a real chance. Identifying the perceptions of potential users of gamification in education, namely educators and students, is therefore an important step before thinking of applying the new approach in the classroom.

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Purpose and objectives of the study

The aim of the study was to investigate the attitudes of Slovenian educators towards this pedagogical innovation, to check whether they are familiar with the concept, and whether they have experience of applying its principles in their teaching. Another objective was to construct an instrument that can capture the affective, behavioral, and cognitive components of educators' attitude towards gamification.

Literature review

Gamification is defined as the use of game elements in a non-gaming environment (Deterding et al., 2011), such as marketing, customer service, and education. It is a related, but different concept from game-based learning or learning with educational games (Fisher et al., 2014), with which it is often confused. Unlike the use of games with the aim of providing instructional content, gamification does not include a game, but applies limited features of game elements to change learners' behavior and attitudes (Kim et al., 2018; Landers, 2014), and is therefore well suited to helping students in their learning process in a fun and innovative way.

The most notable game elements that "gamify" an activity are the game mechanics or the functional components that control the user's actions through feedback (Bunchball, 2019). These include points, levels (by achieving a certain number of points), leaderboards (rankings with scores), badges (mark the achievement of specific behaviors), goods (things or services that can be attained, whether virtual or non-virtual), and challenges or quests (give meaning to actions) (Kim et al., 2018). In the educational context, the most commonly used game mechanics are points, challenges, badges, and leaderboards (Majuri et al., 2018; Subhash & Cudney, 2018) because they are easy and quick to implement (for an overview of gamification use in education, see Sajinčič et al., 2019).

Although empirical evidence indicates positive results of using gamification principles in education (Huang et al., 2020; Sailer & Homner, 2020), the successful implementation of a novel pedagogical approach depends not only on its features, but also on teachers' beliefs and attitudes, which cannot be easily changed (e.g., Ertmer, 2005). Attitude, defined as the individual's level of (un)favorableness towards a psychological object (Ajzen & Fishbein, 2000), consists of three interrelated components: affect (emotions towards the object), cognition (beliefs about the object), and behavior (Breckler, 1984). Attitudes can predict and influence behaviors associated with that object (Ajzen and Cote, 2008). Because educators are perceived as role models by their students when introducing new approaches and ICT tools (Istenič Starčič & Lebeničnik, 2020), their attitudes may be critical to their adoption in the classroom (Blackwell et al., 2013).

Until recently, research mainly focused on exploring students' attitudes towards gamification (e.g., Galbis-Córdova et al., 2017), teachers' attitudes towards concepts related to gamification, such as game-based learning (Altuner et al., 2019; Mozelius et al., 2017) or the use of videogames (Martín-del-Pozo et al., 2019), while research investigating teachers' perspectives on gamification in particular is scarce, although teachers would be the ones implementing the new method.

A study on business professors reported on their familiarity with gamification, but participants did not make a clear distinction between gamification and the use of games and were unsure how to incorporate it into teaching. Most had a positive attitude towards gamification and felt it was effective in improving learning (Fisher et al., 2014). Another study collected teachers' opinions about the use of gamification in online teaching (Alabbasi, 2018) and found predominantly positive attitudes and a belief that game elements increase students' interest and satisfaction. Finally, in a study that used three

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items to measure teachers' attitude towards gamification, it was found that although there is a small percentage of teachers who use gamification on a regular basis, they mainly hold positive views about it, especially teachers at private universities (Martí-Parreño et al., 2016).

The literature on this topic therefore needs to be expanded to include educators doing face-to-face teaching at different educational levels and fields. Based on this review, we developed the following hypotheses:

H1: Educators do not differentiate gamification from game-based learning.

H2: Most educators have no experience with using gamification in their teaching.

H3: Most commonly used game mechanics are points, challenges, badges, and leaderboards.

H4: Educators' attitude towards using gamification in education is largely positive.

Methodology

Participants

111 Slovenian educators participated in this cross-sectional study, 103 (71 female) completing the entire survey. Most of them were between 36 and 45 years old (n=40), followed by participants between 26 and 35 years old (n=32), 18 between 46 and 55 years old, 11 over 55 years old, and 2 participants were under 26 years old. 29 respondents had up to 5 years of teaching experience, 16 participants had 6 to 10 years of experience, most had between 11 and 20 years of experience (n=30), 17 had been teaching for 21 to 30 years, and 11 had more than 30 years of experience. Some participants indicated that they worked at different levels and in different areas of education. The most common levels of teaching in the sample were primary, both grade (n=33) and subject level (n=28), and tertiary (higher) education (n=27). Most participants worked in natural sciences, mathematics, and computer science (n=27), humanities and arts (n=21), and general education (n=19).

Materials

For the purpose of a larger study, we developed a questionnaire in Slovenian language to collect quantitative data on knowledge, experience, and attitude towards gamification. Only a portion of the instrument and results are presented in this paper. Unless otherwise stated, items were phrased as statements to which participants rated their agreement on a 7-point rating scale. First, participants reported their demographic data (gender, age group, teaching experience, and educational level and discipline at which they are currently teaching). Two items based on Fisher et al. (2014) were then used to assess knowledge of gamification; in the first, participants self-reported their familiarity with gamification, while in the second they indicated their level of agreement with the false belief that gamification is learning through games. A brief description and examples of gamification and its principles were then presented before the respondents were asked to indicate on a 5-point rating scale from zero to more than ten in how many lessons they had used gamification in the last year. Next, they selected which game mechanics they had already used in their teaching. The bulk of the survey consisted of 32 statements about their attitude towards gamification based on previous literature (e.g., Altuner Çoban et al., 2019; Fisher et al., 2014; Martín-del-Pozo et al., 2019; Mozelius et al., 2017; Noraddin & Kian, 2014). The statements were worded to cover cognitive aspects: (13 statements, e.g., *Students put more effort in group work because of gamification*), affective (12, e.g., *I am worried that gamification would encourage unrest in the classroom*), and behavioral (7, e.g., *I would implement gamification to help students achieve better learning outcomes*)

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components of attitude, and 17 statements were inversely worded. The scale is highly reliable (α=.95).

Procedure

Participants were invited to fill the survey in paper or online format via social media, email, or during a teacher conference in Ljubljana, Slovenia from November 2019 to December 2020. Data were analyzed using R (R Core Team, 2020) and *jamovi* software (The jamovi project, 2021).

Results

Descriptive statistics

Figure 1 shows the distributions of responses to two questions about their familiarity with gamification. While the first item indicated self-reported knowledge (*M*=3.37, *SD*=1.71), the second item was a mis-statement to test participants' actual understanding of the concept, so it should be interpreted in reverse (*M*=4.90, *SD*=1.56). Responses to both questions varied widely; 50% said they do not know gamification well, 24% were not sure and fell somewhere in between, while the rest (27%) were positive about their understanding of gamification, with only 2% confident in their knowledge (Figure 1a). When asked the following question, two thirds (66%) of the sample agreed to some extent with the notion that gamification means learning through educational games, which describes a similar but different concept, game-based learning (Figure 1b). 16% were undecided with their answer and only 18% recognized the discrepancy between gamification and the example given, 6% being completely confident in their assessment. Because there is confusion in distinguishing related concepts, interpreting results should be done with caution.

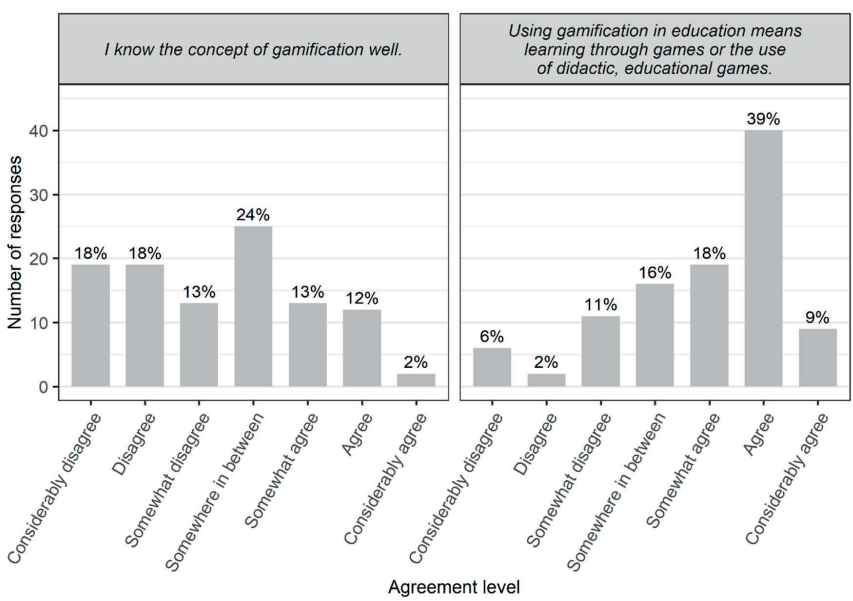

Figure 1. Frequencies of responses to items a) I know the concept of gamification well and b) Using gamification in education means learning through games or the use of didactic, educational games

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After reading an explanation of what gamification and game mechanics are and some examples of their use in the context of learning and education, participants were asked about their experiences with them. 61% (63) educators reported using gamification at least once in the past year. 11% reported using its principles in one lesson, 18% in two to five, 9% in six to ten, while nearly a quarter (23%) reported using game mechanics in more than ten of their lessons. As can be seen in Figure 2, Slovenian educators indicated that the most frequently used game mechanics were points, challenges, and stories. On the other hand, levels, virtual or other types of goods, and avatars were the least preferred mechanics.

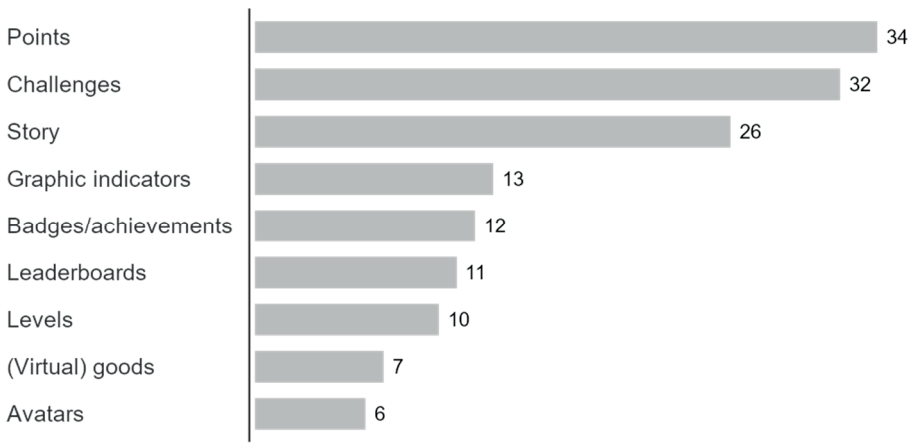

Figure 2. Frequency of game mechanics used in the past year (n=151)

An average score was calculated from the combination of all attitude-related items, and statements that were inversely phrased were reverse coded. Slovenian teachers and educators expressed a fairly positive attitude towards gamification use in educational and learning contexts (*M*=5.04, *SD*=0.94, *min*=1.75, *max*=6.88). As can be seen in Table 1, the desire to know more about gamification in teaching was rated the highest (*M*=5.46, *SD*=1.47), followed by the intention to use gamification to make learning content more interesting (*M*=5.36, *SD*=1.53), to motivate their students (*M*=5.36, *SD*=1.37), and promote their active participation during lessons (*M*=5.34, *SD*=1.49). The positively phrased item with the lowest rating referred to gamification being appropriate for most learning materials (*M*=4.24, *SD*=1.61). On the other hand, respondents least agreed with the idea that they would refuse to implement gamification if students suggested it (*M*=2.27, *SD*=1.28), and they did not believe that using gamification would be a waste of time and resources (*M*=2.40, *SD*=1.29) or that students would not be interested in it (*M*=2.46, *SD*=1.23). The respondents' biggest concerns about gamification were that it would be difficult to implement (*M*=3.83, *SD*=1.54), that it would overwhelm them (*M*=3.40, *SD*=1.53), and that it might encourage too much competitiveness among students (*M*=3.40, *SD*=1.70).

Exploratory factor analysis

An exploratory factor analysis was conducted to uncover the underlying structure of the new tool. Based on the high KMO statistic (0.90) of sampling adequacy and a significant Bartlett's test of sphericity ($\chi 2(496) = 2416.40$, $p<.001$), it was deducted the data were appropriate for factor analysis. Parallel analysis proposed a two-factor solution

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(principal axis factoring extraction method was used with an 'oblimin' rotation as the underlaying factors were likely to be correlated due to their nature), which explained 50.61% of the items' variance and had an r=–.60 correlation between factors.

Factor 1 explains 27.48% of the variance and consists of 15 positively worded items, thus interpreted as *positive attitude*. The second factor comprises 17 negatively worded statements explaining 23.13% of the attitude's variance and is referred to as *negative attitude*. Table 1 shows the item loadings on the two factors. In contrast, a one-factor solution would explain 41.5% of the variance. Regarding item reliability, Cronbach's α with individual item deleted was α<.95 for all items, so they were all retained.

Table 1. Descriptive statistics and EFA results for specific items in the attitude scale.

Item	*M*	*SD*	*Factor loading*		u^2
			PA	*NA*	
30. I would implement gamification in learning activities to motivate students to learn.	5.36	1.37	**0.86**	-	0.20
8. I would implement gamification in the learning activities so the students would participate more actively during lessons.	5.34	1.49	**0.85**	-	0.37
21. I would use gamification in my teaching so the learning content would be more interesting to students.	5.36	1.53	**0.84**	-	0.26
31. Students put more effort in group work because of gamification.	5.04	1.39	**0.80**	-	0.37
24. Gamification makes students put more effort into learning and learning activities.	4.85	1.46	**0.80**	-	0.30
4. I would implement gamification in learning activities to make learning more fun for students.	5.31	1.55	**0.77**	-	0.45
1. Gamification encourages participation of all students, including those that participate less frequently and have difficulty in doing so.	5.06	1.45	**0.76**	-	0.50
29. I want to apply the principles of gamification in my teaching practice.	5.01	1.47	**0.73**	-	0.33
20. I want to know more about the use of gamification in teaching.	5.46	1.47	**0.71**	-	0.48
28. With the help of gamification, students would understand the learning material better.	4.92	1.41	**0.69**	-	0.40
19. I would implement gamification in learning activities so students would have more choice during the course and feel more autonomous in their learning.	4.95	1.47	**0.66**	-	0.62
23. I would implement gamification in learning activities to make students more attentive to the learning content and materials.	5.09	1.45	**0.62**	-	0.46
14. I would implement gamification to help students achieve better learning outcomes.	4.90	1.54	**0.55**	-	0.62
18. Because of gaming mechanisms, students can make mistakes in a safe environment and thus feel more competent in their learning activities.	4.68	1.39	**0.47**	-	0.85
25. Gamification is suitable for most of the learning material I teach.	4.24	1.61	**0.43**	-0.32	0.56
*15. If I would implement gamification, I would have a feeling that it is only a distraction from the learning content.	2.69	1.32	-	**0.75**	0.38

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*11. I am skeptical about the benefits of using gamification in education.	3.07	1.60	-	**0.75**	0.33
*12. If I would be implementing new pedagogical approaches or technologies, it would not be gamification.	3.24	1.62	-	**0.73**	0.39
*2. Gamification of learning content and processes in the classroom is difficult to implement.	3.83	1.54	-	**0.72**	0.61
*6. Using gamification in education would overwhelm me.	3.40	1.53	-	**0.70**	0.66
*16. Gamification makes more sense in a digital/virtual environment than in a classroom.	2.97	1.48	-	**0.67**	0.54
*26. If I would use gamification, I would have a feeling I was wasting time for teaching.	2.66	1.38	-	**0.66**	0.32
*3. I am worried that gamification would encourage unrest in the classroom.	3.10	1.53	-	**0.64**	0.67
*13. I am worried gamification would encourage excessive social comparison with students.	3.34	1.60	-	**0.62**	0.64
*10. Gamification is suitable only for use at lower educational levels.	2.71	1.56	-	**0.62**	0.60
*27. Gamification in education brings more disadvantages than benefits.	2.81	1.44	-	**0.58**	0.41
*5. Gamification promotes only superficial learning.	3.18	1.53	-	**0.57**	0.55
*9. Gamification is not an appropriate method for effective learning and teaching.	2.77	1.52	-	**0.56**	0.53
*17. I am worried gamification would excessively encourage competitiveness between students.	3.40	1.70	-	**0.53**	0.71
*22. If students would suggest implementing gamification in the classroom, I would refuse.	2.27	1.28	-	**0.49**	0.53
*7. The use of gamification in education is a waste of time and resources.	2.40	1.29	-0.44	**0.48**	0.34
*32. I think students would not be interested in gamification.	2.46	1.23	-	**0.35**	0.84
Attitude total score	5.04	0.94			

Note. *-inversely worded items. PA-positive attitude, NA-negative attitude, u^2-uniqueness.

Discussion

As attitudes towards a pedagogical approach can influence the success rate of its implementation (e.g., Blackwell et al., 2013), we wanted to check the opinions of Slovenian educators from different levels and disciplines about the use of gamification in education. Although there have been some studies made on the subject (e.g., Alabbasi, 2018; Fisher et al., 2014; Martí-Parreño et al., 2016), these were focused on a narrow population, an online setting, or used a small number of generalized items to measure attitude. Because attitude is a complex set of affective, cognitive, and behavioral variables (Breckler, 1984), we developed a more comprehensive instrument to measure individual perceptions, which were later combined into an attitude total score by reverse coding items from the negative attitude factor. Furthermore, we examined educators' level of familiarity with gamification and their experiences with its use.

As predicted, educators were not very confident in their knowledge about gamification, most of them believing the term stood for learning through educational games, which is consistent with previous research (Fisher et al. 2014). Although participants were later presented with a description of gamification with examples to ensure equal understanding

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of the concept, the following findings are put into question as we cannot be certain what the respondents had in mind when completing the rest of the questionnaire.

Contrary to our second hypothesis, six out of ten educators have already used gamification to some extent, which is in line with the results of a similar study (Martí-Parreño et al., 2016), but the percentage of teachers who reported having used game elements more regularly was higher in our sample. Points and challenges were the most frequently used game mechanics, followed by stories and graphic indicators of achievement, while avatars and goods were the least common. Our findings partially support the hypothesis based on the results of meta-analyzes that concluded that points, challenges, badges, and leaderboards are the most commonly used game mechanics (Majuri et al., 2018; Subhash & Cudney, 2018).

Consistent with past research, the overall attitude towards using gamification in educational settings was mainly positive (Alabassi, 2018; Fisher et al., 2014; Martí-Parreño et al., 2016), with teachers expressing a strong desire to learn more about it, to make learning content more interesting, to motivate their students, and encourage them to be more active. They were least confident about the compatibility between gamification and different learning materials and were unsure about how to implement it and whether they could handle it or whether gamified lessons would make students overly competitive, concerns also expressed in previous studies. Nevertheless, teachers believed that using game elements in lessons would be worth the investment.

The items in the new instrument were formulated to cover the tripartite structure of attitudes (Breckler, 1984), so three underlaying factors were predicted. However, a two-factor solution was shown to be more appropriate, interpretable as positive and negative attitude. Future studies need to validate the instrument and use it in different settings and with different populations. Nevertheless, this is the first instrument to measure teachers' attitudes towards gamification in a thorough way, covers multiple components, and therefore provides some preliminary information about teachers' needs and desires, while offering advice on how to introduce pedagogical innovations. While this paper presents only descriptive data, further research is needed to understand the relationship between gamification use, attitude, and other variables, whether personal or environmental. A comparison between groups of educators with different cultural backgrounds, experiences, and personalities would give us more insight into the phenomenon, especially because a limitation of this study is its sample. In addition to the small size, another issue is that individuals who have more positive views about the topic are likely to participate, which will bias the conclusions and limit their generalizability.

Conclusion

The results of the study showed that Slovenian educators are open to trying innovative methods to motivate their students and want to learn more about new approaches but do not feel competent enough to include them in their instructional design. The findings not only support the need for better research on gamification and its users, but also show the demand for regular knowledge transfer to the teaching community to inform them in a timely manner about the latest approaches and how they can use them.

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