

Chapter 1

The Place of Gamification in the Educational Context

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ABSTRACT

Schools are pioneers of innovation in the process of teaching and learning. This study researches and analyzes new opportunities that modern information and communication technologies open up in the field of education and lifelong learning. It uncovers what place gamification in schooling holds, how it affects people, and what students take away from the progressive idea. Thus, it recognizes the possibilities and limits of its implementation in the education process. The author aims to understand better how gamification can be used in educational institutions, its function, and how to apply game principles in this context as successfully as possible. Gamification is often seen as one of the supports for student motivation. Concerning the design of teaching, teaching methods, and educational goals, the learning principles of games can be used innovatively as supplements to classroom teaching, where the curriculum is supported by game elements as important components of the teaching method. It is an inspiration for educators and designers in building gamified learning contexts.

INTRODUCTION

In the new millennium, there has been a remarkable boom in the use of badges, leaderboards, challenges, and other game elements in various software, applications and websites. Digital games are inherently fun and motivating to play without outside pressure. Increasing the performance, efficiency, motivation, and involvement of students in learning can allegedly be achieved through gamification, which uses elements from digital games (such as game mechanics and dynamics) in non-game applications. In connection with thinking about game mechanics in a non-game context, we are talking about so-called “gamifying.”

Therefore, the experience of gamification in our lives is not new. It stems from the spread of offline and online games. People of all ages around the world spend hours playing games without being forced to do so. This concept seems to be permeating economic, political and social contexts due to the growing popularity of digital games among the general public.

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Users' satisfaction depends on their good experience. Research on users of gamified learning environments focuses on understanding their behavior, needs, and motivation through interviews, analysis of surveys, and other methods of feedback. Studies of the motivational potential of educational game principles are still somewhat limited by the development of learning management systems. However, it is necessary to start gaining insight to the preferences and needs of key actors in the learning process, in order to contribute to the development of good gamification practices in education.

Tulloch (2014) argues that gamification is a product of a neglected history of pedagogical improvement, a history of training that is effective but largely ignored, namely the game process that teaches players how to play (so-called tutorial). The author questions the evolving concept of gamification - he does not conceptualize it as a simple set of techniques and mechanics, but as a pedagogical heritage and an alternative framework for training and shaping the participant's behavior, which at the core contains concepts of fun and engagement.

This contribution highlights a shift in the educational paradigm from an instructive (i.e., linear and passive) concept to teaching based on game principles. The purpose of this chapter is to provide a broader awareness of gamification and the possibilities of its use (not only) in schools. The text includes examples that inspire to work with educational game principles in class. The introduction deals with the educational potential of game principles in learning from the perspective of actors in the educational process. It explores how digital games can enter teaching and learning in school, whether educational game principles are compatible with the logic of the dominant educational paradigm, and what their advantages and disadvantages are. Studies on learning with game elements will help to grasp their possible benefits and pitfalls in education. Based on the discussion of the findings, the author recommends to teachers, organizations, and developers of gamified learning environments how they could improve their teaching design in accordance with students' needs and different learning styles.

Insight on gamification in education offers recommendations on how to use game elements in different contexts (e.g., in the classroom, during an excursion or on social media) (Morschheuser et al., 2018; Robson et al., 2015; Toda et al., 2019). The author will also mention examples of good practice and teaching experience simulating the professional training of graduates. After all, Conrad and Tucker (2019) pointed out that the type of player correlates with the performance of individuals in gamified applications, and that the rewards do not guarantee an increase in performance or motivation when playing games. According to the author, adapting gamification based on player types is the first step to personalizing learning.

Chapter Outline

The authors first define the working concepts and the theoretical basis framing the subsequent findings from the research that was conducted in the field of gamification. The interpretation focuses on self-determination theory and its key concept of motivation. The next section discusses the basic components of the gamification approach and the function of game elements in the educational context. It identifies key frameworks and structures of game design thinking. The following part deals directly with game elements in the school environment and illustrates examples of good practice.

The second half of the chapter seriously considers possible difficulties with the implementation of gamification in the educational context. It is necessary to keep in mind that side effects, undesirable behaviors and obstacles may occur. The authors offer recommendations on how to cope with such situations or directly prevent them from the outset. Future research and the personalization of the educational

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process with regard to the experience of users of gamified systems, their feedback, predispositions, preferences and learning styles can also contribute to that.

THEORETICAL BACKGROUND

Based on the theoretical basis of behavioral psychology, anthropology and game studies, the authors propose a model for the design and assessment of playful experiences in educational environments inspired by game design. The theoretical framework of the overview study stems from existing research and practices and underpins the interpretation of presented results, it would be problematic to select a suitable gamification structure without it or to distinguish which of the used game mechanics and principles are desirable to achieve learning objectives and learning outcomes.

According to Gee (2003), digital games convey learning experiences that show how learning and literacy change in the modern world. He names the learning principles of digital games, the application of which is understood by the author as a way of satisfying basic psychological needs according to the self-determination theory (SDT) (Deci & Ryan, 1985). Gamification is “the use of elements of game design to motivate users in nongame contexts” (Deterding et al., 2011, p. 9). Van Roy and Zaman (2017) proposed procedures for effective gamification implementation in online learning system. These heuristics aim to provide autonomous motivation. They propose the following points:

- Not to force users to use a gamified system, so that they feel in control.
- To choose between the offer of suitable options and their number.
- To prepare goals that are challenging, but manageable.
- To incorporate feedback mechanisms that positively inform students about their progress.
- To enable user interaction and foster a sense of belonging.
- To take into account other psychological needs when designing a specific element to support one of them.
- Gamification should facilitate the motivation to achieve goals.
- Students should perceive the online learning environment as open and the gamified system should take into account the personal differences of users and their preferences.

Köse et al. (2019) studied the moderating effects of the user’s conception of the utilitarian-hedonistic purpose of the system on its continuous use. The author included user experience, usefulness, and ease of use of the system as variables. The results show that the concept of the user is an influential aspect determining the continuation of use of the system. Utility and hedonic value are important predictors of the intention to use it (Baptista & Oliveira, 2019). Self-study (online) usually requires stronger inner motivation. Especially in education, gamification techniques are being welcomed as a promising strategy to enhance motivation (Ramirez & Squire, 2015), which is found to be an important determinant of educational success (Abramovich et al., 2013; Buckley & Doyle, 2014; Taylor et al., 2014).

Other researchers believe that it is important to use an expanded inventory of techniques that balance external with internal motivators (Dichev et al., 2014) and to design a gamification system that can be adapted to ensure that all students in the classroom can enjoy the benefits of gamification (Eickhoff et al., 2012; Hamari, 2013; Hamari & Koivisto, 2013). How people perceive game elements is influenced by situational factors. Transferring a game element to a nongame context within the gamification process

can fundamentally change its meaning. For example, in the context of a mobile gamified application, Featherstone and Habgood (2019) found that constructive competition can be achieved through careful game design, and that avatars and videogames provide virtual currency with meaning and value.

SDT is useful for understanding, researching, and designing gamification. According to van Roy and Zaman (2019), game elements can support or hinder the satisfaction of basic psychological needs. In their view, “the design practice of gamified systems generally shows excessive dependence on external motivational regulations” (p. 10). Gamified systems that provide feelings of autonomy, competence, and relatedness are likely to strengthen students’ inner motivation, both by causing and explaining the pleasant, motivating, and engaging experiences gained within them (Deci & Ryan, 2008). Xi and Hamari (2019) examined the relationship between gamification and satisfaction of internal needs. Success and social gamification predicted the satisfaction of the needs of autonomy, competence, and relatedness. Instead, immersion in activity is only related to fulfilling the need for independence. For the same reason, any “future intervention effort that intends to capitalize on the motivational pull of video games should purposely include game features that have the potential to increase need satisfaction” (Peng et al., 2012, p. 192).

When originally external motivational stimuli appeal to the basic psychological needs of the actor, all the more so, external regulations are thoroughly internalized, which leads to autonomous motivation. External regulation, and, by broadening the scope, also the typical implementation of gamification, have the potential to intensify feelings of inner motivation, provided that people perceive them as desirable for their psychological needs. In the educational context, this is associated with various positive educational consequences, such as improved grades and a better understanding of the subject materials (Deci & Ryan, 2015; Ryan & Deci, 2009).

GAMIFICATION IN THE EDUCATIONAL SECTOR

Game Elements in a Learning Environment

Judicial, strategic, and appropriate use of game elements can lead to a learning situation with a high level of active involvement and motivation, which, in turn, creates positive results in the cognitive, emotional, and social areas. Experts appreciate the versatility of gamification used in a classroom lecture, as a homework assistant, as a final exam or as a main learning activity to motivate students to improve their abilities or maximize learning. (Faiella & Ricciardi, 2015, p. 15)

In this section, the author focuses on gamification in an educational context. The reader should gain a better comprehension of how interaction with the gamified system can develop in education before addressing the question of whether gamification works. As such, it provides guidance for researchers, educators, designers, and software developers in building a new generation of gamified educational contexts.

Gamification is identified as one of the technologies that will have a major impact on schools in the world’s most technologically advanced countries (Johnson et al., 2014), and is considered as a new approach that can bridge the generation gap between teachers and students (Kapp, 2007). It is increasingly seen as a possible solution to the declining motivation observed in students. Gamified educational contexts require a user-centered approach, characterized by a focus on students’ needs and wishes.

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Gamification is an approach that uses the properties of games (e.g., their various elements, mechanics, frameworks, aesthetics, game thinking or metaphors) situated outside the virtual world of the game. Its application is recommended in areas of everyday life where boredom, passivity, and repetition predominate to support the desired behavior. Applications of the gamification approach in education aim to improve student motivation and involvement and maximize learning. They are based on the need to arouse students' interest in learning and engage them so that they can have fun, encouraging them to achieve more ambitious goals and comply with the rules.

According to Werbach and Hunter (2012), gamification scenarios can be divided into three categories (Figure 1):

1. **Dynamics:** It forms the highest conceptual level in a gamified system. It contains limitations, emotions, narration, progress, and relationships.
2. **Mechanics:** It is a set of rules dictating the outcome of interactions within a system, while dynamics is a response of users to a set of these mechanics. Mechanics refers to the game elements that drive action forward. These are challenges, chance, competition, cooperation, feedback, resource gathering and rewards.
3. **Components:** They form the basic level of the gamification process. They include achievements, avatars, badges, collections, content unlocks, progress bars, donations, leaderboards, levels, and virtual goods. For example, points (components) provide rewards (mechanics) and create the impression of progress (dynamics).

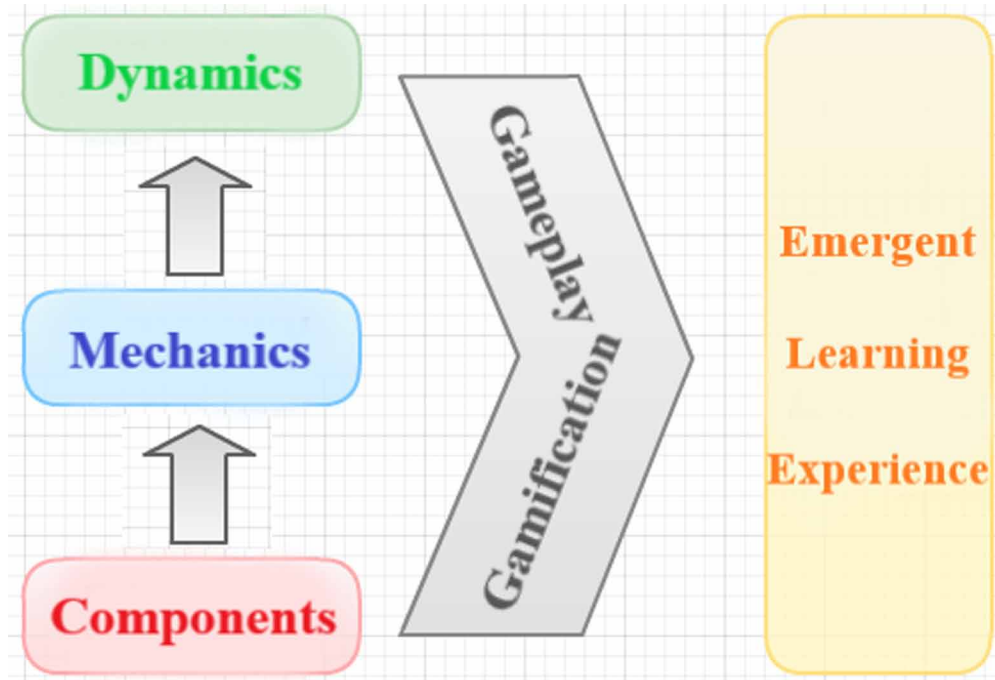
Apostol et al. (2013) identified eight elements of games that are used to gamify teaching, namely rules, goals and results, feedback and rewards, problem-solving, story, player(s), safe environment, and sense of mastery.

Kapp (2012) distinguished those qualities that can only lead to a superficial level of student involvement from those that are most valuable for education. The first group consists of qualities that can only serve as a source of external motivation, such as rewards, points, and badges. In addition, de Sousa Borges et al. (2014) noted that, "in gamification approaches, these elements are not the center of the system, but aim to motivate users to use it" (p. 217). Others form story, challenge, decision making, sense of control, and mastery. Kapp (2012) considered it acceptable to give students a sense of autonomy and competence, if they voluntarily perform tasks for their own improvement. In particular, Kapp considered that, "in order for a game to become an effective learning experience, a combination of several elements is needed which makes it an effective means of education" (p. 50).

Perrotta et al. (2013) combined game mechanics with processes involved in learning. They stated that the gamification of learning is:

- Intrinsically motivating because rules are inputs into a wide range of decision-making processes.
- Fun, because the goals allow the student to see the direct impact of their efforts.
- Authentic, because the imagination provides a compelling background that allows students to experiment with their abilities without suffering the consequences of failure in real life.
- Leading to self-sufficiency, as feedback to students leads to facilitation and correction of performance.
- Experiential, because the social element allows students to share experiences and build bonds.

Figure 1. Game design model of components, mechanics and dynamics (Werbach & Hunter, 2012)
Source: adapted from *gamestudies.cz*, 2013



In addition to remuneration and feedback mechanics, gamified systems should provide a secure online learning environment where students can gain experience without being judged or punished for failure (Hakulinen et al., 2015; Lehtonen et al., 2015).

Apostol et al. (2013) sustained that “the best way for an educational designer or teacher to choose elements of the game is to consider the learning objectives and desired outcomes of the learning process” (pp. 68-69). They recommended it for a course design.

Games in a Classroom

From an early age, people are socially approaching the way they should act in different contexts according to their cultural norms (Giddens et al., 2013). In other words, they socialize or enculturate. Gamification is a guide for individuals to adjust their expectations of how they should behave, while transforming existing culture into gaming and games. However, it can be argued that, by introducing gamification, people are encouraged to start playing even in contexts where the game is culturally inappropriate (van Roy & Zaman, 2015).

In addition, when the typical game behavior “trial and error” (Buckley & Doyle, 2014, pp. 1–14) becomes part of the culture of society, people may also begin to believe that they would try again, if they failed on their first attempt, which may become problematic in sectors such as healthcare or the judiciary. For example, when simulating an operation, the consequences of failure are not fatal and the responsibility for human life is not so burdensome. Thus, the question arises of the compatibility of learning by trial and error with the teaching objectives of a particular field.

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The new line of research develops the theory of educational gamification by combining motivational and learning theories to link gamification with practical education (Landers, 2015; Landers et al., 2015) or creating a framework for integrating gamification with pedagogy (Tulloch, 2014) or psychology of games (Lieberoth, 2015). According to Lieberoth (2015), it may not be the game itself that stimulates the individual, but rather the wrapping, that is the fact that the activity resembles a game. Simply framing an activity as a “game” can potentially change an individual’s behavior. The outputs suggest that engagement and fun increased significantly due to the psychological effects of framing a task as a game but did not really increase any interest or amusement by adding game mechanics to the task once it was framed as a game. Only the wrapping of the activity as a game thus affects the students’ engagement. Other studies report positive effects of gamification on student performance, for example in terms of better grades (Sua & Cheng, 2013) and learning behavior, or in terms of task effort (Barata et al., 2013). Denny (2013) found that adding badges to an online learning tool leads students to contribute more and be more involved than otherwise.

Research from the study of the text further shows that storytelling promotes learning and involvement. For example, compared to interpretive text or newspaper articles, stories are accompanied by better retention, generate more associations, and are more entertaining (Graesser et al., 1994). Another argument for adding a narrative to the game is that it can act as a support scaffold to solve problems during the game (Dickey, 2006). From a cognitive perspective, however, it can be argued that engaging narrative can distract students from the subject matter and, due to limited cognitive capacity, prevents cognitive activity that involves learning (Mayer et al., 2008). McQuiggan et al. (2008) found a negative narrative effect compared to the minimalist story of a digital game, and Cordova and Lepper (1996) reported a beneficial effect when a narrative component was included (specifically mentioning fantasy).

It is essential for students to verbalize their knowledge, as this allows them to integrate new knowledge with their previous knowledge, leading to better retention and higher learning transfer (Wouters et al., 2008). Complementary teaching methods (e.g., discussions and internships) allow students to engage in learning activities that further support the articulation of knowledge. One argument for learning together in digital games is that it supports students in creating knowledge that would otherwise remain intuitive (van der Meij et al., 2011), but research comparing collaboration and solo play is ambiguous. Inkpen et al.’s (1995) observation that team play resulted in significantly higher ratings of motivation and learning outcomes than individual play was not confirmed by van der Meij et al. (2011). Vogel et al.’s (2006) meta-analysis showed that both individual users and groups showed higher cognitive gains in interactive simulations and games than in conventional teaching methods, but the magnitude of the effect for individual users was much larger than for groups.

Positive outcome in the cognitive, emotional, and social areas should also ensure a positive effect on student performance and scores (Connolly et al., 2012; Kapp, 2012; Ke, 2009; Sitzmann, 2011). In particular, Domínguez et al. (2013) suggested that frequent, meaningful, and quick feedback can improve student outcomes as well as motivation. According to these authors, the experience of gamified learning should have timely, frequent, and meaningful feedback.

Lee and Hammer (2011) stated that the game develops problem-solving skills through a comprehensive system of rules that supports active exploration and discovery. They recognized the value of specific challenges that are tailored to the level of players’ abilities and increase in difficulty as their abilities expand. They also emphasize the importance of the “emotional realm,” which refers to all the strong emotions people feel during playtime—such as pride, joy, optimism, and curiosity, but also frustration at failure. From Lee and Hammer’s point of view, games offer the possibility of “reframing failure as a

necessary part of learning” (p. 3), as error becomes an opportunity to try, practice, and improve again. Gamification thus determines the emotional transformation, because there is not so much in the event of a failure at stake; on the contrary, repeated failure allows individuals to learn something more and new. Lee and Hammer also insisted on the social dimension of the gamified environment, which enables students to identify themselves publicly, strengthen social credibility, and gain recognition for achievements that might otherwise remain invisible. From a demographic perspective, it is interesting to find out how the perception of game elements in education differs between men and women, especially in connection with competition and cooperation.

Summary

The use of digital games’ educational principles can make teaching more interesting, attractive and fun for students, but also improve the memorization of the studied material and its use in practice. The games are popular and widespread among students, allowing them to try out any learning scenarios and apply their own problem-solving ideas. Game principles have a positive effect on students’ attitudes towards regular learning, but also towards school. They can affect classroom relationships, where play often encourages students to work together and solve problems together. The game reflects the level of students’ self-concept, their own picture of their performance or the effectiveness of their efforts. It supports the skill of memorizing and learning facts. Their immediate feedback and evaluation, which is independent of the teacher, is very important. Learning the principles and contexts of causes and effects is key. Students gain space for an experiment that would not be feasible in a normal context. The game contains challenges, students have the opportunity to meet them, or make mistakes in them and learn from their own mistakes. Education-based on digital games also offers help to students with special needs, the development of more advanced skills, education in life in the information society (with digital technologies and media education) or the potential of educational games for the modernization of school systems.

CRITICAL POINTS

Lack of Internal Motivation

Students’ own interest in learning and coordinating their studies is proving to be crucial. In his own investigation, the author spoke to a number of teachers, who mostly believe that people themselves must want to use new technological tools, which is associated with their motivation. In accordance with the basic need for belonging, the human factor of the mentor and fellow students has a positive effect on students’ motivation. The author agrees that the implementation of game elements should pursue educational goals. The aim is to stimulate students to regular and continuous preparation by immersing themselves in and continuing their studies. Among the respondents, the presumption of internal motivation of students to actively engage in learning themselves was repeatedly voiced. In order to change their behavior, teachers, as educational designers, apply various strategies. Their statements suggest that they are a compromise of the ideal image of an internally motivated student and the real situation.

Only when game elements make boring activities interesting can they increase the level of inner motivation. When they increase external motivation, the level of internal motivation decreases signifi-

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cantly, which leads to less enthusiasm for work. These results are consistent with SDT (Deci & Ryan, 1985) and research on play (Caillois & Barash, 2001), according to which rewards and incentives reduce a person's intrinsic motivation to perform a task. There is an indirect relationship between rewards and internal motivation. Gamification focuses too much on external motivators, and its effects on motivation are not the same for all students in the class (van Roy & Zaman, 2017).

Van Roy and Zaman (2017) looked at gamification from the perspective of SDT—they show that different types of motivation lead people's behavior differently and point to the importance of satisfying the basic psychological needs of autonomy, competence, and relatedness. Their answers to the research questions “what is gamification” and “how it works” explain that adding game elements as external and unjustified regulations can quite possibly have a detrimental effect on students' internal motivation.

Hanus and Fox (2015) tested motivation by comparing students in two classes. The same curriculum was used in both classes, but only one of them included gamification elements. The results showed that students in the gamified class have a lower level of motivation and a lower score on the final exam. The researchers concluded that the low score in the final exams was affected by levels of intrinsic motivation and that negative effects on intrinsic motivation could be attributed to gamification. Empirical evidence from this longitudinal study is “consistent with the existing literature on the negative effects of rewards on motivation” (Hanus and Fox, 2015, p. 159) and suggests that “providing rewards in the form of badges and coins, as well as promoting competition and social comparison through digital rankings, harms motivation” (p. 159).

Social elements are essential for creating motivational learning with the game. An experiment performed on students of an e-course showed a negative effect of social comparison on motivation and especially that gamification is not an important motivating factor for all, because some students do not like to compete with their classmates (Domínguez et al., 2013). “Some motivational benefits (which otherwise received positive comments) were perceived as negative (such as those supporting competition) and supported the idea that different types of players experience the same benefits differently.” (Hamari et al., 2014, p. 3030)

The effects of gamification are highly dependent on users who use gamified learning environments. Experience from practice emphasizes equal access for students and the possibility of adapting the teaching process to their learning style. Game elements are easy to implement, as they resemble the traditional classroom assessment model, which often leads to their overuse not justified by learning objectives. The goal is to increase student involvement. Engagement can be defined as student attention and immersion in the task. Studies indicate that gamification increases student engagement and course participation (Barata et al., 2013; Hamari et al., 2014). The impact of gamified interventions on involvement varies depending on whether the student is motivated internally or externally (Buckley & Doyle, 2014; Hamari et al., 2014).

Gamification enhances participation especially when students can choose between gamified and traditional teaching methods (Cheong et al., 2013; Domínguez et al., 2013; Mollick & Rothbard, 2014). However, the involvement decreases over time. Once the effect of novelty subsides, students' interest in gamification ceases (Koivisto & Hamari, 2014), and involvement is lost at an incredible rate, if all learning contexts have been gamified (Hanus & Fox, 2015). Some students may oppose “mandatory fun” and view the established reward system as binding (Mollick & Rothbard, 2014).

Side Effects

When designing gamification as an implementation of external regulation, SDT helps understand unwanted side effects. When students are forced to exert external leverage as a way of managing their learning behavior, they are more likely to feel diminished autonomy and perform study activities primarily to receive promised external rewards (e.g., bonus points). In such a situation, controlled motivation can undermine any preexisting autonomous motivation (Cameron & Dwyer, 2005; Filsecker & Hickey, 2014). Students can then begin to attribute their motivation to added external regulations that reduce or even eliminate any initial inner motivation. As a result, feelings of autonomy can be further reduced, which, at the same time, reduces any internal impulse, so that the student's motivation eventually changes from one's own to a controlled motivation (Glover, 2013; Tohidi & Jabbari, 2012).

Some authors point to mixed results (de-Marcos et al., 2014), including cases where no significant difference could be observed between the gamified and non gamified educational context. Although Hakulinen et al. (2013) found small differences in learning behavior between students who were rewarded with badges for doing exercises and those who were not, they found no difference in the marks the students obtained. Implementing gamification in education can even cause side effects. Some studies have found that students performed worse in circumstances involving badges, trophies, challenges, rankings, and levels compared to peers who were not exposed to these game elements (de-Marcos et al., 2014). Nongamified activities were also more motivating than those that became part of the game (Domínguez et al., 2013).

Competitiveness, one of the most used features of games (Vorderer et al., 2003) in gamification (Glover, 2013), as opposed to cooperation, encourages the struggle to be the best, even by cheating. If victory automatically means loss for someone else, it can promote a more self-centered society and selfishness (Simon et al., 2014), and discourage admirable qualities such as volunteering or doing good for people. Although losers may set higher goals for the future, research has shown that they will ultimately be systematically worse than their "winning" counterparts, regardless of their previous competencies (Buser, 2014). The example shows that gamification can obscure its goal and have far-reaching negative effects on those who perform the worst and on the least motivated. Christy and Fox (2014) concluded that the use of rankings in educational settings can lead to a stereotypical threat (i.e., the belief that someone can be judged on the basis of a negative stereotype). Thus, the use of leaderboards in an academic setting may, under certain circumstances, affect the academic performance of different demographic groups differently. Other results show that, although competition against peers is important (contrary to the prevailing understanding), the challenge of overcoming and cope with obstacles is what players value the most, regardless of the type of game (Dichev & Dicheva, 2017).

The importance of keeping students motivated is a long-term challenge for education. This explains the considerable attention that gamification has received due to its motivational potential of students in different teaching contexts. Overall, progress has been made in a student-centered study of the psychological effects of gamification, which can be summarized in the following question: How are students with different personalities, dispositions, and learning styles affected by game elements? For what/whom is gamification effective? However, the educational benefits of gamification in terms of increasing student motivation or linking motivation to learning outcomes are still not well understood.

Although gamification is promoted as a motivational tool, studies measuring its motivational effect are limited, and there is a lack of quality empirical evidence to support general claims about the impact of gamification on students' learning and motivation. Although the implementation of external motiva-

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tion can encourage people in the short term, it also has the potential to deprive them of existing internal motivation (Deci et al., 2001; Tohidi & Jabbari, 2012) and teach users that they should only act if they are rewarded (Muntean, 2011). Most gamified systems rely on external incentives by rewarding activity with badges or encouraging competition. Replacing existing higher-order internal motivation with its external counterpart can potentially harm highly motivated people (Hanus & Fox, 2015).

In an effort to clarify these unconvincing conclusions, some authors have argued that the desired motivational effects are temporary in nature, accompanied by excitement from the newly introduced system, and that they can be attributed to the novelty effect caused by adding digital and/or game elements to the educational context (Attali & Arieli-Attali, 2015; Hanus & Fox, 2015; Koivisto & Hamari, 2014). The ubiquity of gamification can speed up the process, turn the novelty of the technique into mundane, and eliminate the initial excitement. As a result, users will turn away from already boring gamification, which will be the opposite of what it was implemented for (van Roy & Zaman, 2015).

Others report that side effects are more the result of flawed design (Domínguez et al., 2013; Rojas et al., 2013). By simply adding points and rankings to the system, according to this argument, gamification is limited to insignificant pointification without any or, conversely, adverse effects. Similarly, Domínguez et al. (2013) pointed to poor suggestions and the absence of “healthy pedagogy” (p. 9) as the cause of undesirable results. The designers overlooked motivation as a key prerequisite influencing student performance.

Most theoretical research on gamification believes that focusing on points and rewards rather than play and internal engagement may not always meet the goal of desired behavioral change by adapting to students’ intrinsic values (Hansch et al., 2015; Songer & Miyata, 2014; Tomaselli et al., 2015). In their exploratory study, Hansch et al. (2015) explored the motivational potential of gamification in online learning. Through a review of ten platforms and in-depth analysis, they examined how the motivational potential of gamification mechanics and social and interactive elements in online learning can be effectively combined to build a community of students involved. Hansch et al. concluded that the starting point for gamifying online education should be students’ needs, motivations, and goals, rather than a platform-centered approach that seeks to use technical features to achieve some predefined performance indicators.

For example, Pedro et al. (2015) stated that game mechanics implemented in a virtual learning environment had no effect on student motivation and performance. These findings are in line with the conclusions of Koivisto and Hamari (2014), who, in a more general context, showed that women experience a stronger effect when gamification includes social aspects, and men when it involves some kind of competition.

A limitation of gamification may be that it trivializes the subject. Besides, mental work in learning can only be considered a game; some games are more suitable for encouraging the student to deal with concepts, rather than absorbing them. Further, games alone are not enough to increase performance, and learning difficulties cannot be overcome with games alone (Apostol et al., 2013).

Wouters et al.’s (2013) meta-analysis is a contribution to the use and effectiveness of serious games. According to the authors, they are more motivating in education, compared to the study group receiving active instruction, which tries to involve them in teaching. In relation to traditional teaching methods, serious games are more motivating when they are not combined with other teaching methods. However, this does not correspond to the main finding that students learn more when serious games are supplemented by other teaching methods. Therefore, when using serious games, the educator should consider what his or her learning goal is, the students’ motivation or how much to teach the students at the given

time. There is some support for simulation games that acquired knowledge and skills are maintained over time (Pierfy, 1977; Sitzmann, 2011; van der Spek, 2011). So-called sustainable learning occurs when students are still able to properly apply the acquired knowledge and skills in the long run.

The premise that has become the basis for the motivational attractiveness of serious games is based on the high entertainment value of commercial digital games. The results of the meta-analysis did not confirm the hypothesis that serious games would be more motivating than the (so-called traditional) teaching methods used in the control group. The inference of an approach based on the SDT (Ryan et al., 2006) assumes that autonomy supports intrinsic motivation. As a result, conditions that restrict a sense of control or freedom of action can undermine intrinsic motivation (Deci et al., 1999). In serious games, the level of control is doubled: It is applicable to actions and decisions within the game, but also to the educational context, when it is necessary to decide on issues such as the type of game and when to play it. It is relevant to examine whether the variation in the level of student control moderates intrinsic motivation.

In terms of the level of control in the educational context, the fundamental difference between digital leisure games and serious games is that the choice of the type of game to play and how much time to spend is up to the player, as opposed to the learning context, while the game type and playing time are generally defined in the curriculum, in the case of serious games. Within the teaching, it is possible that the lack of control over these decisions weakens the motivational potential of serious games for students who are unable to influence the choice. From an educational point of view, if a designer uses a pop-up screen with a message that prompts the player to reflect on something, such a focus can bring learning, but it is also likely that the intervention will disrupt the flow of the game and subsequently undermine its fun nature. Several dimensions of this issue (e.g., the opposition of learning and acting or freedom vs. control) need to be addressed in order to create truly engaging serious games (de Castell & Jenson, 2003; Wouters et al., 2011).

Key Takeaway

When distributing bonus points and rewards, keep in mind that shortcuts may be created, and students may have false expectations or lose their notion of the meaning of the activity for which they are (arbitrarily) rewarded. Behind activity, they see only the reward, instead of reflecting on what it meant to them and where it moved them. Doubts then arise about the potential to safely simulate a real work environment for instance.

SOLUTIONS AND RECOMMENDATIONS

Personalization is the customization of content and services based on the prediction of what users want, which leads to their higher satisfaction. How would students react if teachers gave them control over the personalization of their studies? Such an approach allows them to choose their own technological tools, team roles, and methods of presenting the results of their work. They can choose from which sources to obtain their information and learn in a way that meets their needs. To a certain extent, students adjust what and how to learn. With the resources available, they have much more power to do what they want. The aim is to help them use (and enjoy) technology for learning. The role of the teacher is to guide stu-

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dents with the help of new tools. What tools they use to work depends on them. Students with specific learning styles use tools that meet their requirements and expectations.

Personalization could find support in artificial intelligence, making it easier for educators to discover specific patterns of behavior, serious mistakes, and traits of students' behavior in game-based learning. McGonigal (2003) further described "extreme networks" that benefit from the power of the collective intelligence of massive and diverse groups of people to solve real-world problems. Similarly, Web-based software can leverage education data to provide immediate feedback to students, recommending additional lessons, sites, and resources that they can use, based on what has helped other students learn. Such a program would analyze the student's learning style and suggest other references, whether to simulations, games, reading or drill concepts, simply what worked for the specific student. The electronic personal assistant can guide the user in the right way to the right information, remind him or her of an appointment in time or predict needs of the person. An educational assistant modeled on this concept would direct students to the activities that would be most beneficial for them at the moment. For example, if a student did well on a project-based learning basis, the software would recommend where to go for research according to his or her preferences. These preferences would arise from the analysis of (educational) data.

FUTURE RESEARCH DIRECTIONS

There is a need to adapt gamified learning and consider how it affects different students and what its effects on the different personality profiles that make up a class are (Barata et al., 2015; Hanus & Fox, 2015). Future research should isolate game elements and evaluate their effectiveness in the teaching/learning process as well as to better understand how they work in a given educational context. It should further clarify how individual game elements relate to behavioral and motivational outcomes, and how to design a gamification system to support and increase intrinsic motivation (Morris et al., 2013). In addition, it should set out the conditions under which gamification affects the performance and scores of individual course participants. The evidence supports the need to create an environment with clear goals, challenges, and authentic stories in which team spirit is strengthened through game mechanics, discussions, and debates. In addition, these gamified environments must meet the student's needs and also suggest that gamification must add an aspect of fun or novelty. Voluntary participation must also be ensured, as research has shown that the effectiveness of gamification is greater when a student can choose. Commitment affects the nature of gamified activity and reduces student motivation (Cheong et al., 2013; Mollick & Rothbard, 2014).

CONCLUSION

Gamification design requires a user-centered approach considerate of students' needs. Gamified systems also target education to create a framework that enables and guides students. Similar systems are automated, and the awarding of prizes takes place from derived indicators, which may not be accurate, lead to patterns of behavior that students would not otherwise replicate or even to a weakening of their autonomous motivation. Gamification thus obscures its goal and can have far-reaching negative effects on learners with the worst performances and on the least motivated (Hanus & Fox, 2015). The use of game elements affects the learning performance of different demographic groups differently, and it is

up to the educator to consider the predispositions of individuals. Students' personality traits need to be considered in the gamification design and offer different learning styles. Teaching with game elements could be suitable for those with insufficient inner motivation who do not like traditional forms of teaching; it also suits competitive types, students with special educational needs, and those who self-study remotely. Others prefer cooperative game principles and team play. However, it may not be pleasant for introverts.

Although teachers believe that teaching with the help of educational game principles would benefit most students playful in nature, there is an opinion among them that it would be particularly suitable for weaker students who need to be attracted to study through play. This also applies to future educators in training who work with students in fields as special and inclusive pedagogy. On the contrary, it could be unsuitable for students who are gifted and exceptionally gifted, because for them the intrinsic motivation is the topic itself, which they enjoy because they understand it. Thus, students' character and their strengths should be taken into account in the course design and different learning or playing styles (e.g., competition, project teaching, simulation, role-playing) should be offered as well. In the hands of modern teachers acting as designers of the educational process lies new possibilities for how to effectively design learning experiences to achieve their teaching goals. Hopefully, some insight will be useful and transferable to other educational contexts for practical purposes and development of gamification.

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KEY TERMS AND DEFINITIONS

Cognitive Apprenticeship: Any learning should be linked to the context in which learners can use the results of that learning. Students need authentic experience, they must test their knowledge in practice at the same time, and it is this practice that further teaches them.

Cone of Experience: The theory reflects the gradual arrangement of teaching methods from direct experiences such as simulations and role-playing to abstract verbal symbols while reading text or counting. Educationally, it is easier for the learners to remember a certain experience during which all their senses are involved.

Distributed Practice: Dividing the educational experience into shorter sections with a time span that will allow learners to think about new knowledge and understand it. The next sections give room

to recap what the learners forgot between them. Repetition will make it easier to store new knowledge in the long-term memory.

Flow: A state of mind where the student is fully engaged in the activity, which must be fun and reasonably demanding. The key is that almost any task or work can be transformed into a flow experience by creating opportunities for feedback and setting achievable goals within the task.

Game-Based Learning: Digital game-based education that uses digital games as a resource to support an educator who uses a framework of game rules for a specific learning purpose.

Gamification: A relatively new educational technique that increases students' interest through the use of game resources, game designs, game thinking, and game principles in non-game areas.

Self-Determination Theory: It is not the amount of motivation, but the particular nature of distinct motivational types that holds the most predictive and explanatory power as to how people behave.